Goal

The purpose of this project is to developing and/or help develop systems for the BTV program that require a custom software component.

Projects

These systems include the following:

- storage of digital video in streaming formats for use by the streaming server

- a remote-controlled webcam

- logging events like student access to BTV facilities and student attendance at BTV classes

Digital Video Storage

The BTV program is in the process of developing a system by which video content can be produced, digitized, translated to a format suitable for streaming, and deployed such that a streaming video server within the DMZ of the campus intranet can serve that video to the NVC community.

Within this system, there is a requirement for a software component that manages the conversion and/or transfer of digitized video stored on the digital video server or on discrete media to the streaming video server in a format suitable for streaming. The current thinking on the architecture of the system involves using the control server in the white room talking the Louth protocol to the video storage server to control what video file the video storage server is to transfer to the streaming video server.

This software component will be a client program running locally on the video storage server and its user interface will be console-based and not web-enabled (at least initially). The software component will have to read the RS422 port on the BlackMagic DeckLink card, parse the Louth protocol, and process any commands specified within the Louth protocol (which will at least include transferring a requested file to the streaming video server, and may include other control commands), using the DirectShow SDK supplied by BlackMagic for this card. The Louth protocol is also known as the Video Disk Control Protocol, as explained in the Wikipedia article http://en.wikipedia.org/wiki/Video_Disk_Control_Protocol .

This software program will run on a computer running Microsoft Windows XP and will be written using one of the .NET languages, either C# or Visual Basic .NET. I don't think we should attempt to use VBA within Microsoft Office programs to implement this because implementing in VBA more complex software systems like a parser does not seem as easy or robust or nearly as maintainable.

Remote-control Webcam

Members of the NVC community would like the BTV program to develop and deploy a webcam system that would show some interesting and frequently changing part of campus and would allow some observer-directed control of what gets shown by the system.

Within this system, there is a requirement for software that provides access to the webcam by observers

and administrators. This software will be accessed by users through a web browser.

Steve has a camera mount that apparently can be remotely controlled through software. However, there is no available webcam currently. As a result, this project will probably be the lowest priority of the three.

Student Activity Logging

The BTV program owns a hardware and software subsystem that consists of uniquely identified cards/fobs and a reader that can detect when one or more of these cards/fobs are close by. The components of this subsystem are made by the HID company, whose company web site is at http://www.hidcorp.com . Specifically, the card reader is the HID Serial ProxPro Reader (model number 5352A). This subsystem could be used as the basis for a system that would support the following activities for members of the BTV program:

- student access to BTV facilities, including outside doors (studio, lab, white room), field camera room, equipment room
- class attendance logging

Within this system, there is a need to transfer data generated by the HID subsystem to a log so that student access to BTV facilities and student attendance to BTV classes can be recorded. Also, this system should provide a way to view the logs in their entirety or log entries that fall within certain categories of interest. The interface to log viewing is to be determined; it could be a program that runs locally on a specific computer, or could run through a web server to provide remote access.

This project will have first or second priority. It looks like it will be much simpler than the digital video storage software, but lower in importance than the digital video storage software.

Proposed Implementation

I propose that the first stage of this project involve class attendance logging. Once we get this stage working we can apply what we learned in designing and implementing the next stage.

Since NVC apparently has a site license for Microsoft products, including operating systems and the Office productivity suite, we can use some already-licensed Microsoft products to build this system. The card reader hardware will be attached to a serial port on Steve's laptop. Steve will run Microsoft Excel to capture and review class attendance data. I'll write some custom code using Visual Basic for Applications (VBA), an application development system built-in to Microsoft Office products. The VBA program will interface to the serial port by means of direct Win32 calls, using software available at http://www.thescarms.com/VBasic/CommIO.asp . This software appears to not have any unfavorable licensing or copyright restrictions (they just want an attribution/credit for www.thescarms.com) and consists of a source code distribution. This means that BTV does not have to pay Microsoft any additional money for use of their serial port ActiveX control, and BTV has the source code to ensure that we aren't incorporating undesirable functionality (like spyware) or security vulnerabilities into our program.

The Excel spreadsheet file will reside on a shared drive on the Windows computer acting as the video storage server that feeds the streaming video server maintained by NVC IT. The permissions on this file

will permit Steve to read and write the spreadsheet file, and all other user accounts to have read-only access to the spreadsheet file.

Materials and Costs

I expect the only cost to the program will be the acquisition of a license for Microsoft Visual Studio .NET development environment (a version of Microsoft Visual Studio 2005, Standard for $55 and Pro for $110 with student discount – see http://www.foundationccc.org/Default.aspx?tabid=138). This would be used for the digital video storage software, and possibly for the webcam.

I will attempt to use either free, open-source software or software for which NVC already has a site license for all other software materials.