

**University of Minnesota**

**Office of Classroom Management**

**Camtasia Relay Class Capture**

**Pilot Project Evaluation**

**May, 2009**

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## Introduction

This report evaluates the implementation and testing of the Camtasia Relay class capture application as part of an overall strategy to deploy a scalable solution that is suitable for use in central classrooms and elsewhere on campus. Class capture is the logical evolution of the Office of Classroom Management's (OCM) Classroom Technology Upgrade Plan: Phase III. Phase III specified a system to provide faculty with the capability of capturing classroom activity without the requirements of an additional operator, and making the class content available for asynchronous streamed recall by students. The original Phase III Pilot Program testing was conducted in Spring 2006.

The original Pilot, while successful, indicated the need for a system that is portable, produces high image and sound quality, and provides an option for downloadable content for students. The Camtasia Relay product was not available at the time of the Phase III pilot. The Phase III pilot system, while more scalable than a traditional operator and multiple camera capture system, had an associated cost that made it difficult to scale to all central classrooms and other campus locations. The primary reason for this cost was the fact that the system was based on installed hardware in the classroom. Using such a system requires faculty to be physically in the classroom to capture content. A software-based class capture system, one that can be installed and run on a laptop computer or other portable computing device, can be used anywhere the presenter wishes to capture his or her content.

The Relay product can be licensed for an entire campus and is significantly less expensive than any installed hardware-based class capture system. The OCM-OIT Camtasia Relay Pilot Plan is attached as Appendix A.

Camtasia Relay is a software solution for recording lectures and presentations and makes them available for asynchronous recall from the server. The Relay pilot will be used to record content presented on an instructor's laptop. Audio from the instructor's laptop will also be recorded. Camera or instructor video will not be recorded. Relay has both server and client components. The Relay product (Mac or PC) is meant to be used on an instructor's laptop computer and does not require installed encoding hardware in a classroom system. Relay is a product that does not require a room operator, and uses the standard technology foundation of the OCM Projection Capable Classroom.

The evaluation will report on the following aspects:

1. Quality of captured video and audio from computer-based presentations.
2. The interface and usability of the client/laptop software.
3. Scalability and cost: is this product scalable for campus-wide use?
4. Interoperability with iTunes University and other University systems.
5. Potential hardware requirements for using Relay in General Purpose classrooms.
6. Comparison to an installed hardware-based capture solution and an additional iTunes U-compatible laptop-based solution, Podcast Producer.
7. User interface and workflow.

### **Participants**

The pilot project was a joint collaboration between the Office of Classroom Management (OCM) and the Office of Information Technology (OIT).

### **Courses and Instructors**

Classical and Near Eastern Studies (CNES) 3172: Archeology of Israel. Andrea Berlin, instructor. The class was held in Folwell Hall 306, a 90-seat lecture hall. 35 undergraduate students were enrolled.

Curriculum and Instruction (CI) 5327: Designing Online Adventure Learning. Aaron Doering, instructor. The class was held in Peik Hall 335, a 30 seat tables and chairs classroom. The enrollment consisted of 23 graduate students.

## **Software, Equipment and Infrastructure**

The Relay product is based upon a server software application. Once installed on a server, the Relay software administers user accounts, processes recorded content, and distributes the client software to end-users

### **Server and Delivery Infrastructure**

The Relay software was installed on a Windows 2003 Server system. The final processing and distribution of the recordings was done by the University of Minnesota's Media Mill system. Media Mill is a central

server-based IT resource that allows users to process, distribute, and archive video. The recorded class content was distributed via a Really Simple Syndication (RSS) feed to the CNES 3172 students and to the CI 5327 students via direct download link.

The CNES recordings were encoded as iTunes/iPod formatted MPEG4 files. The CI 5327 recordings were processed in Adobe Flash format.

### **Client Hardware**

Professor Berlin used her Macintosh laptop computer with the Relay client. A connection cable allowed Professor Berlin to use the classroom's installed sound reinforcement microphone to record audio for the capture sessions.

Professor Doering used his Macintosh laptop computer with the Relay client. A USB microphone, connected to his computer, was used to capture the class' audio.

## **Partnership with OIT**

Staff members from OIT's Video Solutions group participated in the pilot. OIT staff installed and administered the Relay server component. The Relay software was initially installed on a desktop PC for testing and later moved to a development server, and then to a production 8-core server where it currently resides. The administration of the Relay server included creation, maintenance, and support of all the user accounts on the system. A profile on the Relay server was created to transfer completed recordings to the Media Mill system for final processing and distribution.

OCM staff conducted initial end-user testing on the Relay product with a variety of Windows and Macintosh laptop computers in several Projection Capable central classrooms. OCM Classroom Technical Services engineers configured a connection cable that allows the sound output from a Projection Capable Classroom to be captured by a laptop. This connection enabled instructors to use sound reinforcement microphones already in place to record voice for the class capture session. OCM staff solicited faculty to use the Relay product during the evaluation period and provided individual training and support throughout the evaluation.

## **Quality**

### **Picture Quality**

The Relay client captures the entire screen of the computer it is being used on. The clarity of the captured image was very high. The capture rate of 15 frames per second is sufficient for capturing typical presentation material. This frame rate is usable, but not ideal for capture of full-motion video content. PowerPoint slides and high quality still images were presented with little loss. The quality of the image was superior to that produced by the previous Phase III system.

### **Sound Quality**

The sound quality of the captured recordings was very dependant on the type and quality of microphone used. If the microphone was of high quality, the sound recording quality was satisfactory. Professor Berlin used a professional quality sound reinforcement microphone, worn on the lapel. With the direct connection from her classroom audio system to the laptop, the sound quality was very high. The USB microphone used by Professor Doering provided sufficient voice quality, but did not have the necessary range to pick up the entire class as was intended. A typical laptop computer does not easily accommodate extra microphones for capturing student interaction in class.

## **Software Interface and Usability**

### **Account Setup and Initial Configuration**

Once the user has an account on the Relay server, he or she is provided with a link to download the recorder software. The software is pre-configured with the network address of the Relay server. This ensures the recorder software can connect to the server without any setup requirements from the user. When the user has downloaded and installed the recorder software, they are prompted to enter their Username and Password. This matches the account information given to them when their account was created.

The installation of the software is easily accomplished by anyone with basic computer skills. The Relay client software has a simple interface with only a few options to choose from. The capture interface becomes available after the user's name and password have been entered. A Guest login is also available for one-time use without an account. The Guest mode can also be used to make a recording when no Internet access is available.

The client interface includes:

- Record Button – once clicked, Pause and Stop buttons become available. The Pause button is useful; instructors can pause and resume the capture and thereby avoid creating unintended multiple files.
- Presentation Title – allows the user to name the recording prior to uploading
- Profile – allows for selection of a profile. The only profile used for this pilot was one that routed the recordings to the Media Mill system.
- Settings – enables the use of all available audio inputs and microphones.
- Volume – an audio gain indicator provides feedback as to the level of signal strength. A level adjustment is provided here as well.

Clicking on the Record button initiates a five second countdown before the recording commences. Once the recording has begun, the interface is minimized and all screen activity plus audio is captured until the recording is paused or stopped. When the capture is stopped, the user is prompted to either upload or discard the recording. If the user clicks the Upload button, the recording is sent to the Relay server for processing. If network access is unavailable, the session will be uploaded when the computer has a connection available.

### **Recording Processing and Workflow**

Once the recording has been successfully uploaded to the Relay server, the system processes the file and routes it to the Media Mill server. The Relay server will notify the user via email when the transfer to Media Mill is complete. Media Mill makes the recording file available for processing and distribution.

The processing options include:

1. Edit Metadata: this option allows the user to include information with the recording such as a description, authors/instructors, and copyright information.
2. Access Settings: the user can select full public access, private access, or access requiring a University ID and password.
3. Video Quality and Type: many different video encoding options are available. The selection is based on the desired delivery method. This process is referred to as creating a derivative. A derivative is the processed file that will be distributed to the viewers.
4. Distribution: the user can choose how to deliver the recording. The most commonly used methods are video podcast downloads and streaming video.
5. RSS Feed Setup: the RSS feed can be created within Media Mill for use by podcast viewing software such as iTunes. Once created, the feed can be assigned to any compatible derivative.

## Usability Issues

In the early stages of the pilot, the Relay server accounts were added manually by one of the administrators after the user submitted a request form on the OIT website. The process has since been improved, but there are still a few steps to be completed for a fully automated account creation. The participants had no difficulty downloading and installing the software on their laptop computers.

The Relay server software is configured to route the incoming capture recordings to the Media Mill system for processing. This is accomplished with an account profile. After this profile was created, the Relay server informed the users via email when the recording was available on Media Mill; this process functioned reliably. The primary difficulty encountered by the instructors at this stage was with the uploading of the capture files to the Relay server. In the case of Professor Doering, his class recordings exceeded two hours in length and took longer to upload from his laptop computer. If the instructor shuts down the computer or fails to re-connect to the network with the Relay client running, the file will not complete its upload. Both instructors encountered situations where the file had not yet completed its upload and they were not aware of the reason for the delay.

Both instructors used external microphones to record their voices for the capture sessions. The instructors had to be careful that the Relay software was set to use the correct microphone for the recording. The software uses a laptop's built-in microphone as a default setting.

Once the file is available on the Media Mill system, the instructor must log in and prepare the file for encoding and distribution. An account on the Media Mill system is separate from the Relay account. After the first file is configured, the instructor can automate the encoding process so that only the metadata need be entered each time. At this time, only the iPod/iTunes-compatible processing option is configured for automation. The instructor can choose to have Media Mill send them an email when the processing is complete. The Media Mill system is a powerful tool with many options available to its users. The Media Mill interface has been designed with a moderate-to-advanced user in mind and requires some time to become familiar with all of its functions. The Relay software is simpler and has an interface that is more intuitive to beginning users.

Professor Doering chose to process his captures using the Adobe Flash codec and made the files available with a download link for his students. Professor Doering was familiar with Media Mill and video file capture and processing, but still had some difficulty with the Media Mill process.

Professor Berlin created an RSS feed so that her students could subscribe to the iPod/iTunes formatted video files within any application that supports RSS. Professor Berlin was not familiar with either podcast production or distribution via RSS feeds. Extra time was required to coach and assist Professor Berlin in setting up

her podcasts. The RSS links were distributed to students through the course page on Web Vista and via email. An instruction guide was given to students so they would be able to easily download the podcasts. After the initial files were distributed, Professor Berlin had little difficulty uploading and distributing her podcasts.

## **Costs and Scalability**

The Relay product is licensed in terms of the number of processor cores the server uses. The more cores used or licensed, the higher number of recordings that can be processed simultaneously. The University of Minnesota has purchased an eight-core license, the maximum offered by the vendor, for approximately \$10,000. The Media Mill server system, previously developed and deployed, is able to provide the needed processing back-end that allows a single Relay server to accommodate the entire Twin Cities campus user base.

The fact that this single central system is able to serve the entire campus is essential. The Relay system is fully scalable to all 300 General Purpose classrooms and can in fact be used anywhere without the need for installed infrastructure. The fact that the software is controlled entirely by the instructor eliminates any need for a room operator.

In comparison, the least expensive practical hardware-based capture solution we tested had an average cost of \$4,000 per classroom, including installation. That cost does not include any product maintenance or staff labor, which would be required to administer a hardware-based product. The installed hardware-based solution is not scalable for General Purpose Classrooms.

## **Interoperability with Current and Upcoming University Systems**

The Relay system provides a variety of output video formats that are compatible with University systems, although the Media Mill system is currently being used for this purpose. The Relay/Media Mill combination system is fully compatible with iTunes University and can provide content for many delivery formats.

An incompatibility exists between the Relay product and the University's X.500 authentication system. The vendor had promised a software update that will allow Relay to function within this system. With the release of Camtasia 1.1 and a custom hotfix, the server was successfully able to use LDAP based authentication allowing users to use their X.500 IDs and passwords with Camtasia Relay.

## **Impact on Projection-Capable Classroom System Hardware**

Camtasia Relay works independently of the standard technology of the OCM Projection Capable Classroom. The Relay product does not adversely impact the established Projection-Capable Classroom standard, as it does not require additional installed equipment. As the Relay software runs on the instructor's laptop, it is not capable of capturing other non-laptop external sources, such as the document cameras installed in some classrooms. The USB connections on the installed document cameras could be made available for direct connection to the instructor's laptop computer. This would allow images from the document camera to be captured in addition to the material being presented on the computer screen. Such a modification to existing Projection Capable Classroom systems would be of nominal expense.

The most successful use of the Relay system in a classroom was in a room that contained an installed microphone system. Expanding the number of classrooms that contain a microphone system would be beneficial to users of class capture systems but would incur some expense as the classroom audio technology would need to be updated.

## **Comparison to a Hardware-Based Capture Solution and the Podcast Producer Software Product**

Throughout the evaluation period, an installed hardware-based capture product was tested in a General Purpose Classroom. The system differed from the Relay product in the following ways:

1. It was linked to the technology system in a single classroom.
2. The system scheduled when to record the class; the instructor did not interact or control the start and stop times.
3. The hardware-based system was capable of recording all content being displayed on the projection system including the document camera and DVD/VCR.
4. The system did not require the instructor to provide a laptop computer.

The performance of the installed capture system was comparable to the Relay product in that it provided similar audio and video quality. OIT staff handled the scheduling of the recording as well as the workflow for processing the files manually. A manual start and stop control could be added to this system with additional cost.

The purchase and installation costs of the hardware-based system, while lower than that of the previous Phase III Pilot system, were high enough that such a system would not prove to be scalable to all Twin Cities campus central classrooms.

The Podcast Producer capture solution was also considered for this pilot. While the costs for Podcast Producer were minimal, it is included in Apple's OS X operating system; it had limitations, which removed it from further consideration.

1. The product had full functionality only on Mac OS systems. Windows systems are not well supported at this time
2. Podcast Producer requires an active network connection to a server. It is not capable of capturing content without a network connection.
3. The Podcast Producer server software is not currently compatible with the University's authentication servers.

## **Conclusions and Recommendations**

### **Conclusions**

The Camtasia Relay system is the practical successor to the 2006 OCM Phase III Class Capture Pilot. This product provides superior performance and capabilities that were desired but not provided by the original Phase III capture system. The Relay system is very scalable for use in General Purpose classrooms and elsewhere. The cost is very low for a system with its capabilities and has little to no ongoing costs, excepting server maintenance and software updates. The installed hardware-based solution that was evaluated, while being far more reasonably priced compared to many hardware-based systems, is still not a scalable solution that meets the needs of University of Minnesota faculty and students.

### **Performance and Features**

- The audio and video quality is acceptable for most class capture use and is of higher quality to the previous pilot system.
- The Relay product does not support or require a camera, which simplifies its use. The camera image was found to not be valuable in previous pilots for on-campus learners.
- The Relay product was purchased and is supported by OIT, a central University unit, who will provide service to all campus users. Previous class capture pilot server support was departmentally provided; the Relay product was purchased and will be supported centrally by OIT.
- Relay, along with the Media Mill system, can provide downloadable podcasts, which were widely preferred in the Phase III pilot student survey.

## Recommendations

1. *Provide comprehensive training and orientation.* The workflow process has been improved but could use further improvements. The Media Mill interface is potentially confusing to new users. If the interface is not simplified, thorough training and support will be needed for many instructors. A key comment from one of the participants: “we are not as tech-savvy as you all think we are.”
2. *Centralized user support is crucial.* OCM and OIT server staff provided support for instructors throughout the pilot. The current staff is not available to support a large base of Relay users, many of whom will require assistance and training using the Media Mill system. It is suggested that formal support for this system be added to OIT’s central technology support organization.
3. *The iTunes University and the Podcast distribution format is convenient and desired by students.* The students in the participating classes had little to no difficulty downloading the podcasts and made consistent use of the material throughout the semester. The number of downloads of the recordings were consistently high.
4. *The Projection Capable Classroom standard should include microphones to support capture activity.* It is recommended that additional microphone capability be added to Central classrooms. Microphones that are capable of capturing student interaction would be preferred.
5. *Provide microphone specifications.* A list of suggested Relay-compatible microphones for laptop computers should be investigated and provided to instructors, particularly those teaching in classrooms lacking a microphone system.
6. *Adopt a campus-wide software-based class capture solution.* A hardware-based system potentially offers additional capability over the Relay system. Such solutions may be desired in some spaces but are not scalable for wide scale use on campus.

The Camtasia Relay Pilot Project successfully tested and deployed a class capture solution that meets the criteria of the pilot. Instructors and students are increasingly embracing mobile computing devices. We believe the Relay system, with strong institutional support, is a valuable learning technology tool. The product is scalable to all campus users and a practical addition to the OCM Projection Capable Classroom standard.

## Appendix A: Relay Pilot Project Proposal

### OCM-OIT Camtasia Relay Pilot

The purpose of this pilot project is to investigate the performance of the Camtasia Relay class capture application, and evaluate its suitability for wide-scale use in Central Classrooms. Camtasia Relay, currently in a public beta, is a software solution for recording lectures and presentations. The Relay pilot will be used to record content presented on an instructor's laptop. Audio from the instructor's laptop will also be recorded. Camera or instructor video will not be recorded.

Relay has both server and client components. The Relay product is compelling due to the fact that the client is meant to be used on an instructor's laptop computer and does not require installed encoding hardware in a classroom system. Relay is a product that does not require a room operator, and uses the standard technology foundation of the OCM Projection Capable Classroom.

The pilot is a joint partnership between the Office of Classroom Management (OCM) and the Office of Information Technology (OIT).

The pilot will evaluate the following elements of the Relay product:

1. Quality of captured video and audio from computer-based presentations.
2. The interface and usability of the client/laptop software.
3. Scalability and cost: is this product scalable for campus-wide use?
4. Interoperability with iTunes University.
5. Potential hardware requirements for using Relay in General Purpose classrooms: is additional hardware required?
6. Comparison to other available iTunes U-compatible laptop-based solutions such as Podcast Producer.

The initial evaluation phase of the pilot has been successfully concluded resulting in the purchase of Camtasia Relay by OIT. OIT staff has installed the Relay server software on an OIT server as of January 2009. The pilot project has entered a beta program phase. A select group of faculty are currently using the Relay software in general purpose classrooms. Course content from this group of faculty is being recorded and being made available to students. Testing of Relay with iTunes U is continuing. Hardware issues, such as microphones, are being investigated and evaluated.

The primary contacts for this pilot project are:

OCM: John Knowles, Instructional Technology Coordinator – [knowl014@umn.edu](mailto:knowl014@umn.edu)

OIT: Lance Cunningham, Director, OIT Video Services – [lancec@umn.edu](mailto:lancec@umn.edu) and Tim Anderson (Relay server administrator), Network Media Specialist – [ande0018@umn.edu](mailto:ande0018@umn.edu).