My presentation demonstrated two ways in which we have used Kaltura, an open-source middleware, first to streamline e-reserves within our course management system and second, to create a course website with integrated multimedia content.

Kaltura is a tool that manages the delivery of multimedia objects to end users, that is, instructors and students in their classes. It is designed to work with a number of Adobe Flash delivery tools. U.Va.’s Learning Management System (LMS) is Sakai-based, and our users know it as UVaCollab. (Kaltura also has a plugin for the common LMS platform Blackboard.) I first showed what Kaltura looks like in the context of our LMS, then later I demonstrated a Wordpress instance which we used to design a more fully integrated course website.

The work of testing and evaluating Kaltura was done not by the Music Library but by colleagues both inside and outside the University Library system, who helped make the decision to adopt this tool.

(1) The Digital Media Lab, a close collaborator of ours within the Arts & Media Services arm of the University Library. Although we are in different buildings, we coordinate closely to make sure we have the same hardware and software so that our students can work on their projects in all our labs. The DML is also the primary locus of staff support for digital work with multimedia.

(2) The programmers and developers behind UVaCollab, who tweaked the Sakai plugin and made it friendly for non-programmers to use.

(3) The broad-based digital initiative SHANTI, the latest in a growing line of centers, labs, and initiatives to support digital scholarship, driven by innovative faculty and staff from across the University. One of SHANTI’s core missions, according to Associate Director Rafael Alvarado, is “to make the digital liberal arts mainstream through the promotion and support
of powerful and easy-to-use media and content tools.” In the 2+ years since their inception, they have assembled an “ecology of resources” as well as a constantly growing, user-supported Knowledge Base on how all these tools work. http://shanti.virginia.edu

Kaltura was ultimately selected for purchase based on its ability to manage and deliver media in support of teaching, learning and research in ways that allow full consideration of privacy, copyright, and licensing. Over the course of many meetings with members of all these groups and with other interested faculty and support staff, I learned enough about Kaltura to adopt it for the Music Library’s delivery of e-reserves.

The Old Way: “The Old Way” was a laborious, homegrown method of forcing CD tracks to behave more or less the same way as journal articles, book chapters, and other class assignments. At the urging of our in-house lawyer, we added three more steps to ensure that Library-owned and copyright-protected content could not be directly downloaded by students. And no matter the platform, one of the unavoidable steps is adding meaningful metadata to these CD tracks.

With the Kaltura plugin, the process is shortened considerably. Content can come from a mix of various sources, both audio and video; lossless data formats are preserved, doing away with compression; direct upload from a hard drive or built-in camera is possible.

And from the Library’s perspective, the best news of all is that Kaltura is streaming by default.

Files are uploaded via a Flash popup and placed in the Site Library. Content can be reused for multiple sites managed by the same user.
Kaltura plugin for Sakai (LMS)

The video or audio player displays inline. Content is not sortable, so it is important to tag items as they are added so that they can be easily found by searching.

Unfortunately, each file must be made “public” so that students can see it, and there is no batch process for this step. So I wait to enter metadata (including tags) until I have brought up this screen to make the file public. But since each field is a text field rather than a filename, Kaltura allows more flexibility in creating useful metadata for students and instructors.

Final display places Media Collections (“folders”) in proximity to other “Resources” (required readings, web links, etc.) in the LMS.

Despite some shortcomings, the Kaltura/Sakai plugin is simple enough that some faculty have been bypassing Library assistance completely and building media collections themselves!
In the summer of 2010, Professor Joel Rubin contacted me with the perfect nightmare of a course proposal: an upper-level undergrad seminar with nearly 300 audio tracks and video clips of required listening, drawn from a variety of sources (internet, personal collection, Library resources). We decided to see if Kaltura was equal to the challenge of building an integrated multimedia course website that would still respect copyright, licensing, and privacy. It took a great deal of work, but the results were impressive. We built the site using Wordpress, traditionally a blog-building tool, but one with a plugin to embed Kaltura A/V content.

Each listening example features a clear and useful title, an embedded player, and item-specific guides to listening. (When this course was previously taught, students had to negotiate a 40-page PDF document containing all the listening notes for the whole semester!)

Content-based tags helped generate a site-wide tag cloud, and best of all, students were able (and actually required) to write reactions to what they were listening to – and even respond to each other’s comments.

The site also featured helpful illustrations, video clips, and links to both required reading and online biographies of featured bands and musicians.
It was, however, a lot of work.

Wordpress allows for much more control of content and display but requires a lot more hands-on tinkering. The division of labor went something like this: as reserves manager, I agreed to manage the audiovisual content and get it ready to link to the Wordpress site (more about this process under Kaltura Management Console below). The professor decided how he wanted the content organized, and he dropped in most of the listening notes from the 40-page PDF mentioned above as well as images and links to external content. For the nuts & bolts of crafting the Wordpress site, we received help from SHANTI by signing up for a “Semester of Support,” defined by SHANTI as “one-time infusions of support and training to empower individuals to integrate the best available technologies at the University into their teaching, research, and engagement.” [http://shanti.virginia.edu/wordpress/?page_id=2917](http://shanti.virginia.edu/wordpress/?page_id=2917)

Our SHANTI consultant created and organized the nearly 300 posts, helped us learn how the various plugins worked, and did a great deal of troubleshooting both before and during the semester. We certainly could not have accomplished the site without him!
Kaltura Management Console

The method of upload into the stand-alone Kaltura account is similar to the plugin I showed in the LMS instance; however, the KMC account allows a user (instructor, library, etc.) to manage content independent of classroom or semester – indeed, some of our faculty have adopted it as the repository for their field tapes and in-class audiovisual materials as well.

Metadata entry can be batch-processed (very inefficient, but workable). Tags help with organization and retrieval, and categories allow for batch creation of posts in Wordpres.
One of the attractive features of Kaltura is its sensitivity to the user’s bandwidth and connection strength while streaming a file, thus avoiding the annoyance of stopping to buffer. This is accomplished by making several copies (“flavors”) of each file according to our preferences. If Kaltura recognizes a drop in signal strength, it will switch to a lower-quality “flavor” while continuing to stream the content.

<table>
<thead>
<tr>
<th>ID</th>
<th>Conversion Flavor</th>
<th>Description</th>
<th>Format</th>
<th>Codec</th>
<th>Bitrate(kbps)</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Source</td>
<td>Maintains the original format and settings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>HD</td>
<td>High Definition</td>
<td>flu</td>
<td>vp8</td>
<td>4192</td>
<td>[w640 x h480]</td>
</tr>
<tr>
<td>2</td>
<td>High – Large</td>
<td>High web quality, large frame</td>
<td>flu</td>
<td>vp9</td>
<td>28225</td>
<td>[w800 x h600]</td>
</tr>
<tr>
<td>3</td>
<td>Standard – Large</td>
<td>Standard web quality, large frame</td>
<td>flu</td>
<td>vp9</td>
<td>1645</td>
<td>[w800 x h600]</td>
</tr>
<tr>
<td>4</td>
<td>Standard – Small</td>
<td>Standard web quality, small frame</td>
<td>flu</td>
<td>vp9</td>
<td>846</td>
<td>[w480 x h360]</td>
</tr>
<tr>
<td>5</td>
<td>Basic – Small</td>
<td>Basic web quality, small frame</td>
<td>flu</td>
<td>vp9</td>
<td>408</td>
<td>[w240 x h180]</td>
</tr>
<tr>
<td>6</td>
<td>H264 for Expert</td>
<td>High web quality in H264 format, to be used for editing</td>
<td>mp4</td>
<td>h264</td>
<td>2048</td>
<td>[w800 x h600]</td>
</tr>
<tr>
<td>7</td>
<td>Embedable</td>
<td>Good web quality, to be embedded in HTML</td>
<td>flu</td>
<td>vp9</td>
<td>764</td>
<td>[w480 x h360]</td>
</tr>
<tr>
<td>3516</td>
<td>Web (H264) – Basic</td>
<td>iPhone, Android</td>
<td>mp4</td>
<td>h264</td>
<td>404</td>
<td>[w480 x h360]</td>
</tr>
<tr>
<td>3519</td>
<td>Web (H264) – Standard</td>
<td>iMobile (H264) – Standard</td>
<td>mp4</td>
<td>h264</td>
<td>854</td>
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<td>iPad</td>
<td>iPad</td>
<td>mp4</td>
<td>h264</td>
<td>1680</td>
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<td>Nokia/Symbian</td>
<td>3gp</td>
<td>64</td>
<td>804</td>
<td>[w480 x h360]</td>
</tr>
</tbody>
</table>

Depending on one’s storage space allotment, the original source file may be stored as well. Since Kaltura is built for video, we at the Music Library don’t really have to worry about running out of storage space or bandwidth. We did find that a mid-semester upgrade caused temporary anxiety – that is, the entire KMC looked different – but functionality wasn’t really hurt.

In summary, we at U.Va. have been pleased with the ways in which Kaltura has simplified media management in the context of classroom support. It solves many of the problems of online delivery of protected audiovisual content. It’s flexible, easy enough to use and doesn’t require specialist intervention. Overall it has removed some of the barriers our users and support staff have encountered in trying to integrate multimedia into courses. Kaltura is available in two ways: a commercial software-as-service (kaltura.com) as well as a free open-source tool (kaltura.org). Packages are available for both on-site and remote hosting of content.

One of the questions posed after my presentation was how the inline Kaltura player, since Kaltura is a Flash-based product, behaves (or misbehaves) on Apple computers. Jama Coartney from the DML responds: “Apple’s decision to not support Adobe Flash impacts media streaming technologies across all industries. While the Adobe Flash Media Server is still a core component of our media delivery, the latest release of Kaltura’s software has built-in functionality to incorporate HTML5 standards such as webM, a ‘free and open video format designed to provide
royalty-free high-quality video.’ http://www.webmproject.org/ While we’ve done proof of concept testing (it works), we haven’t incorporated this capability into any of our workflows.”

I was also asked for more detail about how I uploaded content into course sites in the LMS: did I deliver it to the professor’s drop box, or what?

I applied for and received a generic user account for the Music Library (we already had one for general e-mails, but it wasn’t compliant with our LDAP). This allowed me to authenticate as “mus-lib” and ask the professors to add me as a teaching assistant or alternate instructor. That way, I can upload the content independent of any personal account information, and I can retain access to Library content even after the semester is over. In addition, I can add my personal account as a “student” so I can verify that the student display is correct.