

# Linking media servers & course management systems

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## Introduction

While VHS tapes and CDs are still an indispensable medium for many language instructors, the transition to online digital media is gaining momentum. One advantage of digital multimedia residing on a networked server over media stored on VHS, CD or DVD media is the ability for users to simultaneously control the learning material. In addition to simultaneous access, learners can also download digital media from outside of class via the Internet to a personal computer or a portable device, such as an iPod or mobile phone. By linking digital media with a course management system (CMS), multimedia activities can be tied with data from learners and courses. Digital media can be added to, for example, comprehension question activities, forums, blogs or progress reports.

## Media Servers

In essence, a media server is any type of computer that stores and serves multimedia files such as digital photos, movies or music. Within an educational environment, media servers may be used to deliver listening activities to supplement readings, video lectures, or animated grammar exercises for self-study. Typically media servers require large storage space and fast network access. The server hardware often employs RAID technology that allows access to several hard drives strung together, and has added RAM memory modules, and gigabyte speed Ethernet ports. In situations where learners are accessing a media server simultaneously, for example during class time, running the server on campus, rather than using an off site hosting service, has several advantages. Streaming of the data will typically be much quicker and data throughput is usually not regulated, although onsite maintenance of the server and security issues are often a concern. As far as software is concerned, media server applications come bundled with most operating systems, but streaming media simultaneously to multiple users requires more specialized server applications such as Flash Media Server, Helix Server, or Windows Media Services.

## Media formats

The most popular media formats used for network distribution are Windows Media format (.WM, .WMV), Apple's H.264 (.MP4) format and Flash (.SWF, .FLV) format. Windows Media (WMV) is still be the most dominant media format on the web with approximately 50% of video content on the Internet streamed in Windows Media format (Duncan, 2006). But Windows Media is quickly being outpaced by Apple's H.264 MP4 format, which is currently used to distribute movies on iTunes and to broadcast programs on BBC TV.

Flash video (.FLV) is another common media format that has become enormously popular after the launch of YouTube. News sites, such as BBC and CNN, as well as Internet television sites like joost.com, stream content in a Flash compatible format. RealMedia (.RV, .RM) and legacy QuickTime (.MOV) are other common formats for streaming media on the Internet.

### **Media server solutions**

While multimedia can be distributed over a network by simply uploading files to a web server for users to download and play, the content can be efficiently streamed to multiple users using dedicated streaming software. A popular choice for streaming media is Flash Media Server, a proprietary licensed media application developed by Adobe Systems. Flash Media Server supports h.264 streaming and with the release of Flash Media Server 3, the cost has dropped considerably. Adobe also offers a free developer's version of Flash Media Server that allows a maximum of 10 simultaneous connections. Alternative streaming Flash servers are also available; Wowza Media Server Pro, also a proprietary application, is another popular Flash streaming solution. For those interested in an open source alternative for streaming Flash content, Red5 Flash Server <[www.osflash.org/red5](http://www.osflash.org/red5)> appears to be the only option at this time.

### **Media server applications**

Delivering multimedia requires applications running on both the server and the client. Most of the media player applications on the client are embedded within the web browser. Server-end streaming applications are transparent to the user and often have the ability to serve multiple media formats. Typically client media players need to be installed by the user, although Windows Media Player is bundled the Windows OS and QuickTime is included with the Apple OS. Media players are typically restricted to proprietary formats, for instance, Windows Media Player will play .WM files, Flash Player will play .FLV files, QuickTime Player will play .MOV and .MP4 files, and RealPlayer will play .RM files. While each player advertises support for competing video formats, additional software is often needed to encode or decode the audio or video streams.

The choice of server application depends on the type of media being distributed and the number of users accessing the data. Home entertainment buffs may prefer LinuxMCE to set up a digital streaming home theater. Television or radio broadcasting stations often use a streaming media application such as Windows Media Services or RealNetworks RealServer. For educational use, Flash Media Server offers several salient advantages. The main advantage is that Flash not only features efficient video streaming, but it also can be used to construct interactive multimedia applications.

While Flash Media Server is often used to stream video or audio to a user, it is also capable of recording digital audio or video from within a web browser to be stored on the server. This is particularly useful in language learning settings where instructors may want the learner to listen or watch a media file and then elicit a response that can be captured, stored and played back. Numerous Web 2.0 applications exploit the interactivity of Flash Media Server. YackPack.com, for example, allows users to record, playback and share voice messages online. Voiceth-read.com is an interactive Flash site which allows users to upload audio and video content that other users can add to or comment on. Users can also mark up text or create a collaborative

diagram using the Flash based tools on this site. The popular video site ustream.tv uses Flash Media Server to enable users to produce live broadcasts and interact with a global audience.

## **Course Management Systems**

CMSs have become hugely popular Internet-based content distribution solutions for educators. They leverage the strength and speed of relational databases to effectively distribute content, facilitate online interaction, and document student learning outcomes. Because proprietary systems such as ANGEL, Blackboard, WebCT and Desire2Learn are closed systems, designing or adding additional modules and code is not always possible. Open source systems, such as Moodle, Sakai, ATutor and Claroline, are designed to allow a diverse user community the capacity to add, edit and improve the source code. Moodle, for example, now has over 400 user-submitted modules and plug-ins that provide added functionality to the core application.

## **Integrating media with CMS**

Video streaming and collaborative multimedia environments become much more dynamic when integrated with a CMS. The data management features of a CMS combined with the multimedia capabilities of Flash make collaborative media driven Internet applications possible. Let's say for example a student logs into the CMS to access a voice message board or forum. When the student records a voice posting, the recording is saved to the media server along with a unique ID is used to identify the user, the forum thread, the time and date, as well as other information such as the length of the recorded post. Because the media is associated with a user or course ID, it can be embedded into existing CMS applications that control how and when those data are displayed.

## **Practical applications of Flash Media Server and CMS**

The following open source projects, currently being developed at Kochi University of Technology, are based on multimedia templates that use Flash technology. The templates can be embedded into a variety of modules or activities within a CMS. The templates have been designed specifically for Moodle, but can be adopted for other CMSs as well.

The voice recording template shown in Figure 1 is a minimal Flash recorder and player that can be embedded into activities such as a blog, discussion forum, assignment upload, or glossary. Instructors and students can use the CMS tools to post text or attached images, audio or video. With the embedded Flash recorder, the user can add a text post in addition to a voice recording by clicking on a record button from within the browser and then submitting the post without having to open another application in order to record, save, and attach a file. The process of recording audio becomes much more transparent for the user when the recording application is embedded directly into the web page of the CMS.

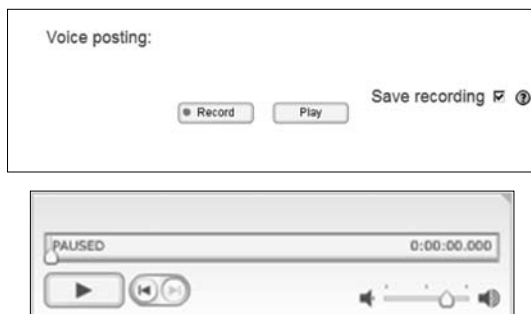


Figure 1. Embedded Flash voice recorder and player.

Another use of the embedded voice recorder is for assignment uploads. Currently the Moodle assignment module allows students to upload different types of files to a course, but with the voice recording template, users can easily record a voice response and upload it without leaving the Moodle web page. This is particularly useful when prompting learners to verbally reply to a series of listening exercises. As shown in figure 2, a user is able to click on the player on the left hand side of the window to listen to a question, and then click on the record button to the right to record a voice response, all within the a single browser window.

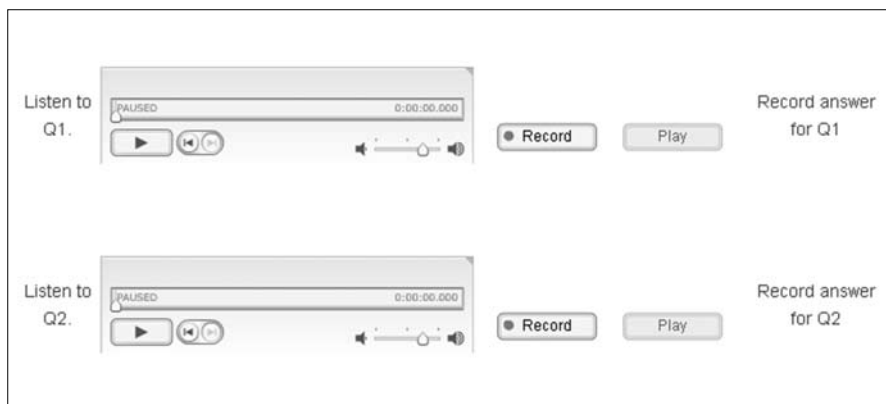


Figure 2. Listen & respond activity module with embedded Flash player and recorder.

### Slideshow application

Recently teachers are exploiting the potential of slideshows or captioned images for language learning. Instructors can use web-based slideshows to introduce language learning material. Digital storytelling can also be used to promote communication across cultures (Mazzarelli, n.d.). By employing Flash Media Server, students or instructors can create simple slideshows with images and audio captions without using an application outside of the web browser. The Flash-

based slideshow application (see Figure 3) allows users to upload images and record captions from within the browser. On the server side, the transition of the slides is determined by the length of the recorded sound file. The first image is displayed while the first audio file is being streamed. When the audio file is finished playing, the slideshow automatically advances to the second image and the second audio file begins streaming.

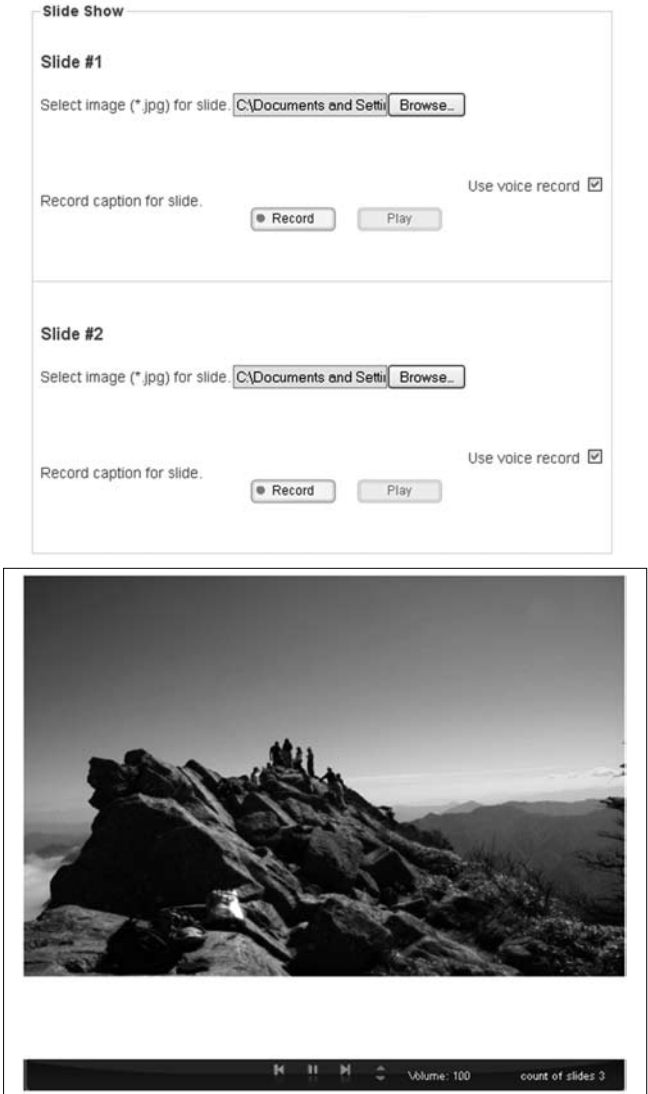


Figure 3. Slideshow editor and player that incorporate Flash Media Server and Flash Player.

## Collaborative whiteboard

Flash Media Server is not only used to record and playback audio streams, but it can also be utilized when developing interactive applications such as a shared whiteboard as shown in Figure 4. Because this collaborative whiteboard is integrated with a CMS, the data generated by the whiteboard can be coupled to a particular course, group or individual and later be retrieved for editing, viewing, or assessment.

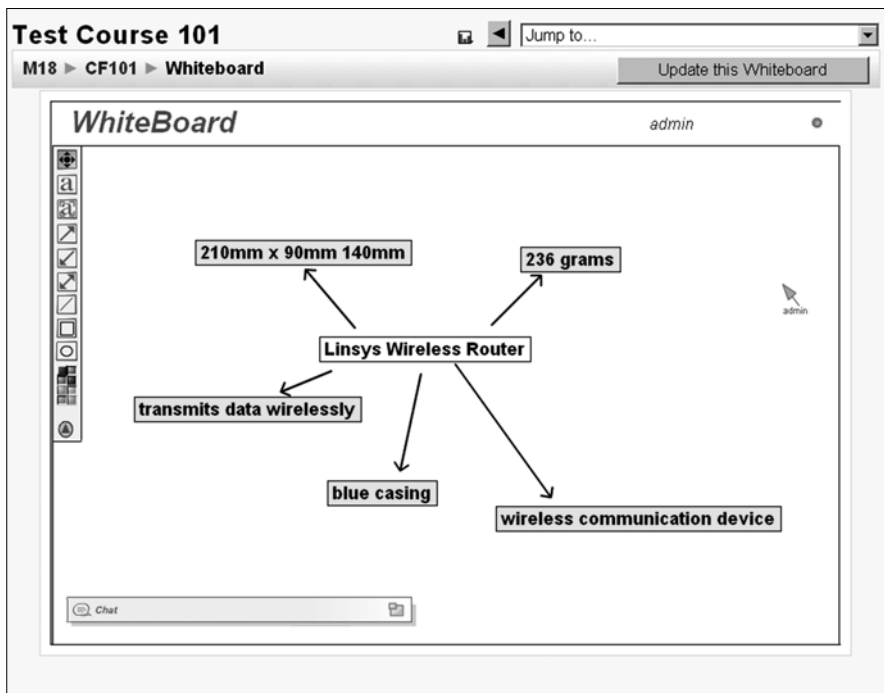


Figure 4.A collaborative whiteboard module for Moodle that employs Flash Media Server technology.

## Online services verses in-house design

There are many useful Web 2.0 sites for teachers and learners, such as Slideshare, Voicethread and Yackpack, that can be integrated into an existing CMS. Using online services, educators are able to implement classroom projects quickly and easily. It should be noted, however, that there are also potential drawbacks. The most significant concern with using third party services is content ownership. By designing and implementing learning environments that are administered within an institution, student or teacher produced content can be archived and used in ways the institution sees fit, and content is owned by the institution or learning community rather than a third party. In-house software development also ensures a uniform look and feel across applications and allows greater control over data access permissions and classroom activities. Transpar-

ency and simplicity across applications is also essential. Asking students to sign up for various online services often involves additional username and password management. Furthermore, diverse user interfaces from third party applications can lead to increased processing loads on learners. Finally, outside services may infringe on student privacy, especially if students are required to enter private email addresses or other personal information.

With mounting interest in both course management applications and in streaming multimedia, the integration of these two technologies will continue to evolve. At this time, online multimedia services, such as YouTube and Slideshare, offer improved multimedia capabilities over traditional course management applications, but by utilizing the strengths of a media server together with a CMS, educators are able to deploy much more sophisticated and effective learning environments.

## References

- Duncan, G. (2006, December 18). Windows Media Still Rules Video Streaming. Retrieved November 12, 2008 from: <http://news.digitaltrends.com/news-article/11942/windows-media-still-rules-video-streaming>
- Mazzarelli, S. (n.d.). Video slideshow exchange project. Retrieved November 20, 2008 from: <http://www.deepmoat.com/moodle/>.