Understanding Multimedia File Size in Blackboard

In our team's blog, we've written before about the importance of NOT directly uploading audio and/or video files directly into a Blackboard course, whether by the instructor or by students. As previously mentioned, there are known performance issues when an instance of Blackboard Learn becomes bloated with a significant number of large multimedia files. For those of you who may be wondering about the "whys" and "wherefores" of this matter, we have prepared this document.

Blackboard – System Basics

The image below, from Blackboard's support site, shows the architecture or configuration of a self-hosted Blackboard installation, such as we use at UHCL. As you can see, the full system is more than simply an application (e.g., Word, Excel). It consists of multiple elements, working together and carefully maintained for optimum performance.
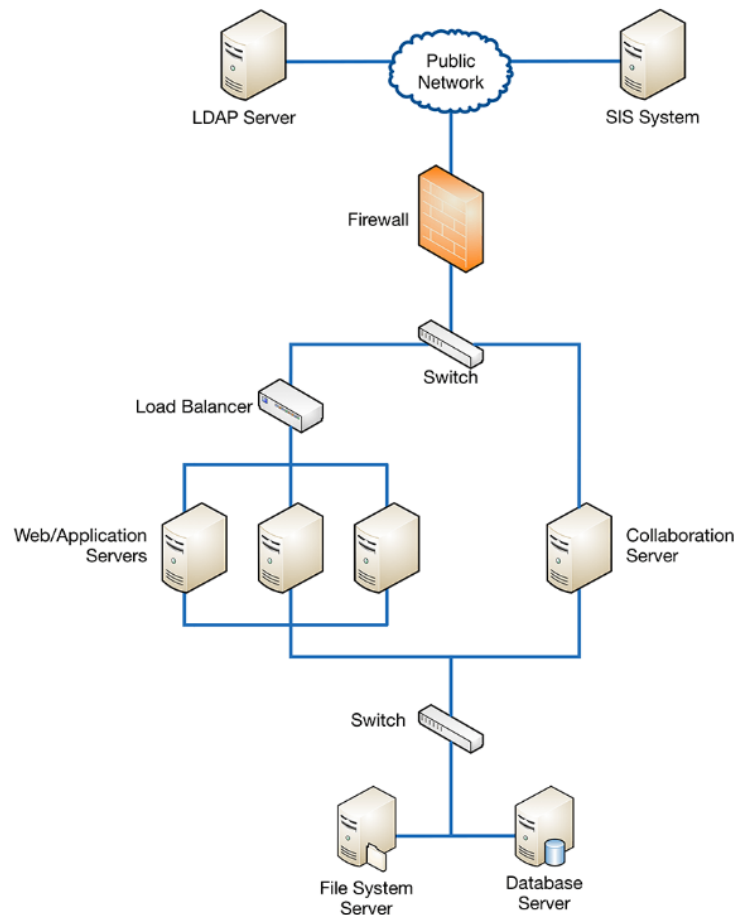

Figure 1. Self-Hosted Blackboard System Configuration

Database Server

When addressing the issue of file size and system performance, we are primarily concerned with the **database server**, shown in the bottom right of the image. The database server is where everything that goes into Blackboard courses are stored. When you upload your syllabus into a Blackboard shell, that

document doesn't actually "live" in the Blackboard Learn application. It lives in the database server. When you or your students enter the course, Blackboard Learn shows you a link or image that is connected to the uploaded file that lives in the database. The same process applies when students submit assignments with attachments or when they add attachments to discussions, journals, wikis, etc. in your Blackboard course.

The database server for our current Blackboard production environment typically contains between two and two and a half terabytes (TB) of data and the system performs fairly well with that amount of information to handle. Although we can increase the amount of data storage (in 1TB increments), there are disadvantages to doing so:

- More data items typically increases the number of transactions, or communication jobs that must take place between Blackboard courses and the database server, which can significantly slow down the overall performance of the entire system;
- The larger the database, the more resources are needed by UCT to manage the nightly backup of the entire Blackboard system; and
- The larger the database, the more time UCT needs to perform periodic and unscheduled maintenance tasks, such as the weekly Sunday morning maintenance period. Right now, we can complete system maintenance within the existing two-hour window. However, if we need to add additional terabytes of storage and data, would we also need to increase the maintenance window.

Data Basics – Keeping Things Lean
UCT staff already take steps to keep the Blackboard system as lean as possible. These include the following:

- **Annual purging of Blackboard semester offerings (shells) that are older than three years**. Faculty have the option of archiving their old courses before we remove them and saving those on a personal storage device, such as an external drive or flash drive, for long-term storage. Several reminders are emailed between January and June of each year, advising faculty to review their Blackboard inventory and archive courses that are scheduled for deletion in the summer.
- **Weekly maintenance period**. The System Announcement area of the Blackboard login page contains a static message about weekly system maintenance every Sunday, from 7AM-9AM. During that window, UCT's database administrators performing a variety of tasks to ensure that the database runs as efficiently as possible.

Even with these steps, UHCL's Blackboard system does occasionally become overwhelmed and we see that in the system becoming slow to respond to user commands and an increase in the number error messages seen by users. In many cases, these performance issues can be minimized if we can all be better custodians of file space, especially when it comes to the following types of files:

- PowerPoint (.ppt/.pptx) presentations that include audio and/or video elements within them
- Audio recordings (.mp3, .wav, .wma)
- Video recordings (.mp4, .mov, .wmv, .flv, .avi)
- High-definition Images (.jpeg, .png, .gif, .tiff)

- Other documents in which audio and/or video elements are embedded (.pdf, .doc, .docx)

Handling Multimedia Files for Blackboard

UCT's team of instructional designers is available to answer your questions about and assist you with using multimedia effectively and deploying it in your course(s) without negatively affecting the Blackboard system. Some of the strategies that we use and on which we provide training and support include the following:

- Creating Videos (MP4s) from Narrated/Annotated PowerPoint Files
- Using Collaborate to Record a Video Lecture/Presentation
- Storing and Deploying Audio/Video (A/V) Files from UHCL's Streaming Media Server or from YouTube
- Compressing Images/Pictures
- Effective Instructional Use of A/V Files in Blackboard
- Using Student-Created A/V Files for Assessment in Blackboard

For assistance with your multimedia files in Blackboard, please contact the Support Center or your designated instructional designer directly. You can contact the Support Center by telephone (281.283.2828) or by email (supportcenter@uhcl.edu).