


# Streaming Direction Statement

	<p><b>Status of Document</b> Direction Statement is Final.</p> <p>Reviewed by: Libraries, ETS, ASSETT, ALTEC, CAETE, CIO team</p> <p>Next steps for document: Final and move to project implementation</p>
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## Direction Statement: Streaming

### Strategic Direction Statement

Revision 1.3: April 2010

Revision 2.0: May 2010

ITS will establish and support streaming media services for the campus. These services will accomplish two end goals. First is hosting and delivery of copyright sensitive materials in a fair use and protected manner (restricted access, non downloadable). Second, live streaming of classes, presentations, and other events.

### Strategic Objectives

- *Short term: Purchase an end-to-end online video streaming service from a cloud provider to support the campus's streaming needs.*
  - *Provide support via tiered model for use of the cloud based service.*
  - *Provide and support a central service for streaming classes and live events.*
  - *Provide and support streaming video from non-course based sources.*
  - *Provide and support a mechanism for delivery of copyrighted content in a fair use and protected manner.*
  - *Migrate copyrighted content from iTunesU private side to streaming service.*
- *Longer term*
  - *Provide a high quality, rich media service suite that meets all the video and audio media content and event needs for the campus, and integrates with other services where needed.*

Ultimately to support the campus mission:

This service supports section 1.2 in the 2006 IT Strategic Plan, new technologies in the support of learning, in particular:

- Become a national leader in the assessment of emerging technology's ability to shape student learning.
- Develop incentives and continue to invest in supports that enable faculty to integrate emerging technology into their teaching, research, and service endeavors.

This service supports section 1.5 in the 2006 IT Strategic Plan, Digital Asset Management Systems and Institutional Repositories, in particular:

- In addition to continuing (DAMS) and beginning (IR) current projects, the campus will develop a holistic model for implementing and integrating future digital asset and repository projects
- CU-Boulder should develop a model and process for the acquisition, storage, access, and management of digital assets, including images, audio, video, data, learning objects, and the intellectual output of the CU community; the campus should continue with its [current digital asset management systems](#) (DAMS), including the campus-wide use and support of the Luna Insight and ARTstor databases; the campus should take steps to create an institutional repository (IR) to store, manage, preserve, and provide access to the intellectual output of the CU community.
- Promote scholarly contributions to the IR; Assess the effectiveness of the IR's services, architecture, and policies, as well as its overall impact.

This project supports Flagship 2030 goals, in particular:

- [The Core Initiatives](#)
  - Investing in the Tools for Success, core initiative 6, investing in new technologies, facilities, and library collections. "Over the past 20 years, universities have seen a dramatic transformation in the use and study of new technologies, a trend we expect to accelerate during the coming decades. Already, technology has opened up new opportunities for global discourse, such as videoconferences with academic partners around the world"
  - Serving Colorado, the Community, and our Graduates, core initiative 8, by expanding outreach and opportunities for lifelong and distance learning. "We will examine the potential of real-time "virtual learning environments" and nontraditional scheduling, as well as distance-learning opportunities made possible by technological advances. With these initiatives, we will be able to offer our graduates and community members timely access to the university's vast resources---for a lifetime."

- **The Flagship Initiatives**
  - Customized Learning "In the coming years, we anticipate the academy will serve as an ongoing incubator for innovation in curriculum, teaching, use of technology, and the personalization of education for the entire student body." Classroom capture technology is an additional tool for customizing learning to the individuals learning style and needs.
  - Experiential Learning by providing avenues for portfolios of creative work
  - Colorado Research Diamond by providing participating research universities with cross collaboration abilities without extensive travel.
  - Transcending Traditional Academic Boundaries by providing diverse shared digital resources from all over campus.
  - Building Global Crossroads by supporting expansion of student and faculty exchanges around the world.
  - Year Round Learning support by adding resources for distance learning and ubiquitous access.

## Business Need or Problem

*Streaming video and audio is a way to provide media to a user on their client computer, sent in compressed format across network and displayed in a steady, continuous stream that plays instantly, and is not saved to their hard drive. Our discussion of streaming media is explicitly about technologies that do not provide downloading of the files to the client computer for local repeat viewing. Our iTunesU and YoutubeEDU deployments will meet the downloading and public content (asynchronous event) needs.*

Streaming media provides a rich media environment for users to play video or audio content, usually within a browser using a plugin or embedded player (but can also be a player application). They can control aspects of the playback for on demand media, such as pause, rewind, and in some cases mark up or bookmark sections of the video. Live streams differ in that they are distributed as a live, multicast stream - same file to multiple users which cuts down on bandwidth, and requires a timed delivery. Live streams are then often packaged as on demand downloads for repeat viewing on own time.

Campus needs to provide a centralized solution for live and on demand streaming of certain types of media. While our upcoming iTunesU solution is useful for providing audio and video for certain uses, it allows downloading of the audio and video content. This is fine for many purposes, but not all. Some commercial content such as music files are used for courses without acquiring permission from the rightsholder, based on claims of Fair Use. Allowing users to download these files tends to weigh against Fair Use.

Thus, a streaming service that does not readily allow downloading of the content is necessary to provide teaching and learning access to content for a course, including commercial and/or copyright-protected video and audio. Many cloud based vendors have negotiated contracts with content providers to solve this issue. The time required for CU to go through a legal contracting process to provide this level of service in house would exceed our proposed time to service (Fall 2010) of the short term solution. Thus we are programmatically creating a dependency on a hosted cloud solution to meet our streaming needs.

Streaming is a very fast changing technology space, with a number of experts that devote their entire business to providing the best, most efficient, most all-encompassing solutions. They rapidly provide updates to support mobile devices, desktops, tablets, in proper formats with advanced detection and proper downgrading of content for the specific user. The time to gather that level of expertise and devote resources to providing the automation and scale they offer is not something we can compete with locally. To properly support our campus needs in this streaming space, the most prudent choice is to work with a hosted cloud solution that bases their livelihood on rapid deployment of new and emerging streaming services.

Many departments have streaming needs right now, and have been reaching out to ITS and Libraries to try to meet these needs. Solutions have been provided for some aspects (audio reserves in Chinook via iTunesU private, Flash streaming server in Chinook reserves for video, Mediasite hosted for classroom capture streams, ALTEC and CAETE provide video services and have been working with Libraries to distribute some work.) as a stop gap until a central service is available. Courses in Music have legitimate needs to provide playback of music resources for their students to study. Currently they are using iTunesU private, which allows downloading of the content, some of which is copyrighted. Allowing copyrighted material to be downloaded makes it more difficult to claim Fair Use of the material. Nearly every department in A&S working with ASSETT mention using video in their classes, and some departments have large physical video libraries that they would like to convert.

- Secure, non-downloadable campus resource for streaming of audio and video is a defined need on this campus that must be addressed in a rapid manner.

*Live streaming of events and classes.* Another need is a solution to provide live streaming of classes and other events to audiences, including to overflow rooms. Some require restricted access to the live streams, and all share a common need to stream a live multicast broadcast (same media event to multiple users at the same time, while limiting bandwidth used to provide this access), which our current campus offerings do not provide. A central IT pilot of lecture capture was conducted to demonstrate the use of the technology, and assess its usefulness in supporting the campus's teaching and learning mission. The outcome was a definite need to provide this service to the campus in select locations, such as large lecture halls and other distributed locations, including departmental installations. This technology requires a live streaming service to provide live access to content. Rather than building a standalone streaming service just for this purpose, it makes sense to consolidate this need onto a centralized, enterprise class streaming service.

Departmental classroom capture users would also like to utilize the shared service to provide the multicast streams to their users in and outside the campus network. Systems biotech building on East campus is one step towards a much larger and distributed campus of the future. Students will have a need to be on main campus for classes, then in a class on East campus for the next hour, and back to main again. They will not be able to complete this challenge, so some thoughts are ways to provide classroom colocation from Main campus with classroom capture technologies - students may participate live from main campus either in a classroom or on their own laptop. Economics, Physics, and Psychology report using lecture capture technology, and are having a hard time finding a place to distribute from. ITS launched a Lecture Capture Community Collaborative in May dedicated to the technologies of lecture capture as an outcome of the Classroom Capture pilot project. Leeds is hosting the meetings and so far involvement includes CAETE, Academic Technology, ASSETT, Law, CIMB.

- Secure streaming of live events, classes for live participation or playback, and advanced colocation to support campus growth are needs

to be addresses with the streaming solution chosen.

Longer term, the short term streaming service will be re-evaluated as the landscape changes, and chosen vendors may change. For example, Apple has acquired Lala, a streaming based service. This may become a natural consolidation point of the future for the two services iTunesU and streaming.

- The procurement of streaming cloud service for today should be considered a short term and rapid effort to strengthen the case for Fair Use of video and audio streaming in an educational setting, and to provide live streaming for the fall dependency of classroom capture rollout.

Our current process for IT Strategic Planning will highlight a number of recommendations around mobile user support. It is important to remember this consideration with the new service, and procure a service that that uses standards such as HTML5, while providing support for older codecs on browsers that don't yet support an integrated h.264 codec. We need solutions that account for the current state of evolving standards around media encoding and playback.

## Specific Recommendations

- *Procure a cloud based end to end online video platform that meets the specific business requirements and standards for live multicast streams, and secure non-download streams that is source agnostic.*
- *Provide support, including distributed support to other academic IT units, in the use of these solutions.*
- *Longer term the service will be re-evaluated as the landscape changes, and chosen vendors and solutions may change.*

## Risks

- *Risk of not doing: some departments are already investing in their own point solutions.*
- *Some may not accept the choice of standards and continue to request support for their own choices.*
- *If we choose not to support this need, the campus may be more exposed on copyright issues, and has only been given approval by legal to continue offering music to music courses in a private secure version of iTunesU for a short period of time. Teaching would be impacted if the content must be removed without a solution in place.*
- *As a new set of services, we are not sure about the support resources required. We have no new funding and this may be a support intensive service.*

## Implications

- *This would give us valuable options for providing service to administrative users, conferences, individual research speakers, support staff, and others in addition to the academic uses.*
- *This will also highlight the longer term need of a coordinated, "where do we put all the stuff" integrated media storage solution engine that can act as a portal to the various campus resources for rich media.*