C105: Streaming Deployment Architectures in Higher Education

Chris Knowlton, VP & Streaming Industry Evangelist - Wowza Media Systems
Jonathan Schwartz, Digital Video Manager - USC Sol Price School of Public Policy
Ernest Gillis, Learning Resource Web Manager - Berklee College of Music
Todd Stabley, Senior Media Engineer - Duke University
Siddiq Siddiqui-Ali, Analyst - UC Riverside
Usage of Video at USC

- Online Degrees
  - Managed by outside vendor

- Lecture Capture Rooms
  - MediaSite, Adobe Connect, Panopto, etc.
    - Individually operated by each school (usually IT Dept)

- YouTube / iTunes U partner
  - Marketing
  - Recruitment
  - Event Archive
  - USC specific videos (faculty, news, etc)

- Live Streaming

- Embedding of video on websites
USC Video & Streaming Strategy

Decentralized Approach

- Centralized Video Communications Director
  - Resource for departments who need advice
  - Internally produce small videos (i.e. USC News, prestigious awards, etc)
  - Coordinate outside vendors for large reach videos/high profile events
    - Fundraising Campaign
    - President’s office involvement
    - Centralized Student Recruitment
  - Streaming is outsourced completely

- Individual School Responsibility (for all events not managed by central primary)
  - Lecture Capture
  - Event Capture / Streaming / Content Creation
  - Two Models
    - Outsourced
    - Small Team of 1-3 Staff members depending on departmental commitment to video and streaming
USC Price Video Strategy

Model 1: Asynchronous

1080P JVC Cameras
QuickTime MOV file on SD Card
Sony XDCAM Codec (viewable in Mac OS X natively)
Sony Wireless Lav’s
Azden Field Mixer

AVID Workflow

AMA Workflow

Mixdown

H264 5mbps Output
Elgato turbo.264 HD Hardware accelerator or Sorensen Squeeze

YouTube

iTunes U

vimeo
USC Price Video Strategy
Model 2: Streaming - HD Mastering Capable

1st Camera
- Sony XDCAM ISO
- Record on camera

1st Camera
- Blackmagic Intensity
  - Shuttle (USB 3)
  - Extreme (Thunderbolt)

2nd + Cameras
- HDMI, SDI, or Component
- Ad-hoc Wi-Fi or Ethernet
- Teradek Cube 255

MacBook Pro
- Wirecast 5 Pro
- Blackmagic Intensity
  - Shuttle (USB 3)
  - Extreme (Thunderbolt)

720P / H264 over Ethernet
- Switched Full Res HD Master
- Blackmagic Hyperdeck Shuttle
  - ProRes 422HQ or Avid DNxHD220
  - QuickTime MOV (fast editing)

Post Event
Immediate Publish
- Ustream
- YouTube
Berklee College of Music’s
Video Needs and Use Cases

● On Demand
  o Classroom Only, Intranet Usage, Public Access

● Broadcast
  o Public Access, Intranet / Campus Only

● Client Recording & DVR
  o Student Submissions, Faculty Reviews, Broadcast Recording

● Telecommunication
  o Campus Meetings, Intercollegiate Collaborations
Berklee College of Music’s
Video Deployment Options

● On Demand
  o Wowza, Kaltura, Brightcove, YouTube

● Broadcast
  o Wowza, YouTube, Concert Window

● Client Recording & DVR
  o Wowza, Kaltura, YouTube, Concert Window

● Telecommunication
  o GoogleHangout, Skype, GoToMeeting, open source solutions
Berklee College of Music’s Video Setup - Event Capture & Broadcast

Camera Front
- XLR Pair
- SDI (to input 1)

Mixer
- SDI (out 1)
- Cat6

External Recorder

Video Switcher
- DVI
- 18 to VGA

MacMini 1 [web monitoring]
- HDMI to DVI

MacMini 2 [wirecast encoder]
- SDI (out 1)

Broadcast Server [Wowza, YouTube, Concert Window, etc]

Camera Back
- SDI (to input 2)

XLR Pair (L/R)

SDI

Video Setup
Event Capture & Broadcast
Personnel setup varies for instrumentation purposes.

Either headphones or speakers for local personnel to hear remote feed.

Internet2 Network
Remote Location has similar to exact same setup.

Berklee College of Music’s
Video Setup - Internet2 “LoLa” Event

Windows 7 Computer
- RME Audio Card
- Bitflow Frame Grabber
- LoLa Software

Cat6 Gigabit Connection

Personnel setup varies for instrumentation purposes.

Either headphones or speakers for local personnel to hear remote feed.
Streaming at Duke

- DukeCapture

- DukeStream
  - Warpwire
  - Wowza

Single Sign-On Security

- Kaltura
- YouTube
- iTunes U

Duke Digital Initiative

Office of Information Technology
Warpwire Workflow
DukeCapture Numbers
7/1/10 ~ 10/31/14

- 19 Schools/Departments
- 94 Venues
- 31,592 Recordings
- 45,255 Hours Recorded
- 198,615 Views
- 104,449 Hours Viewed
- 42.5 TB Media Generated
Strategy? What strategy?

- Academic
- Events
- Instructional
  - Lecture capture
- Public Relations
Workflow

A/V/D → Capture → Encode → LMS

Camera(s) → Switcher → Encode → CDN

Media → Rip → LMS

Digital → Process → Wowza → WWW