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Lecture archiving on a larger scale at the University of Michigan and CERN

Background…

# What is a Web Lecture?

- Low-bandwidth media-rich presentation viewable with:
    - a web browser
    - Flash or other plug-in
- Media streams:
    - lecturer's audio
    - lecturer's video
    - high-res slide images
    - high-res chalkboard image
- Features
    - slide index
    - ability to "jump around"
    - platform independence
    - low bandwidth
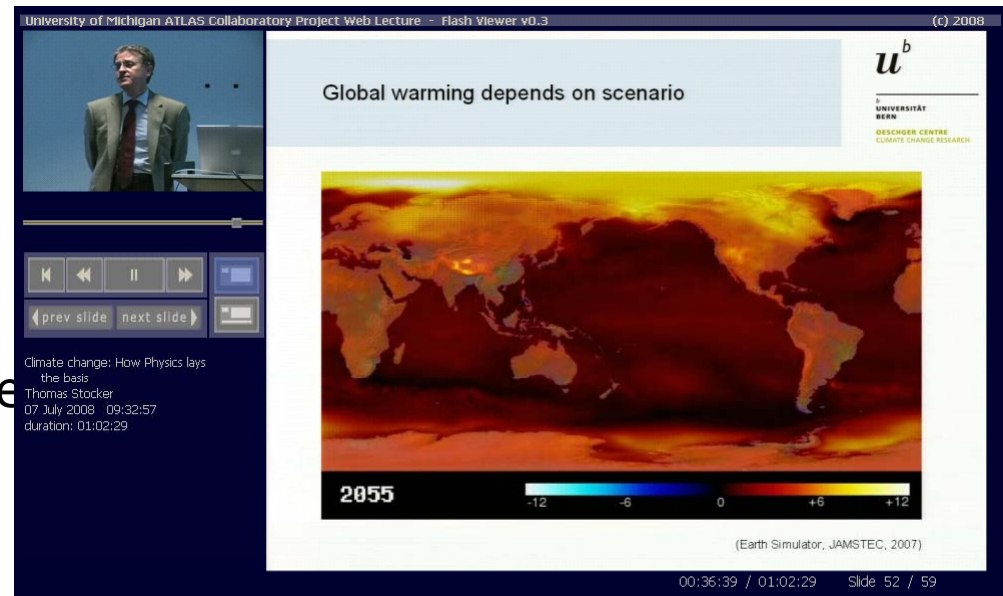
What is a Lecture Object?

- Originally proposed by our team in 2000 at in international conference
- A standardized data object containing metadata, timing, high-res media
- Designed for
  - Longevity
  - Sharing among multiple institutions
  - Flexibility in viewing formats

Thanks to Steven Goldfarb for the diagram!

Dublin Core, IEEE LOM meta data

mpeg-4

XML Description

jpeg

Lecture Object

Software
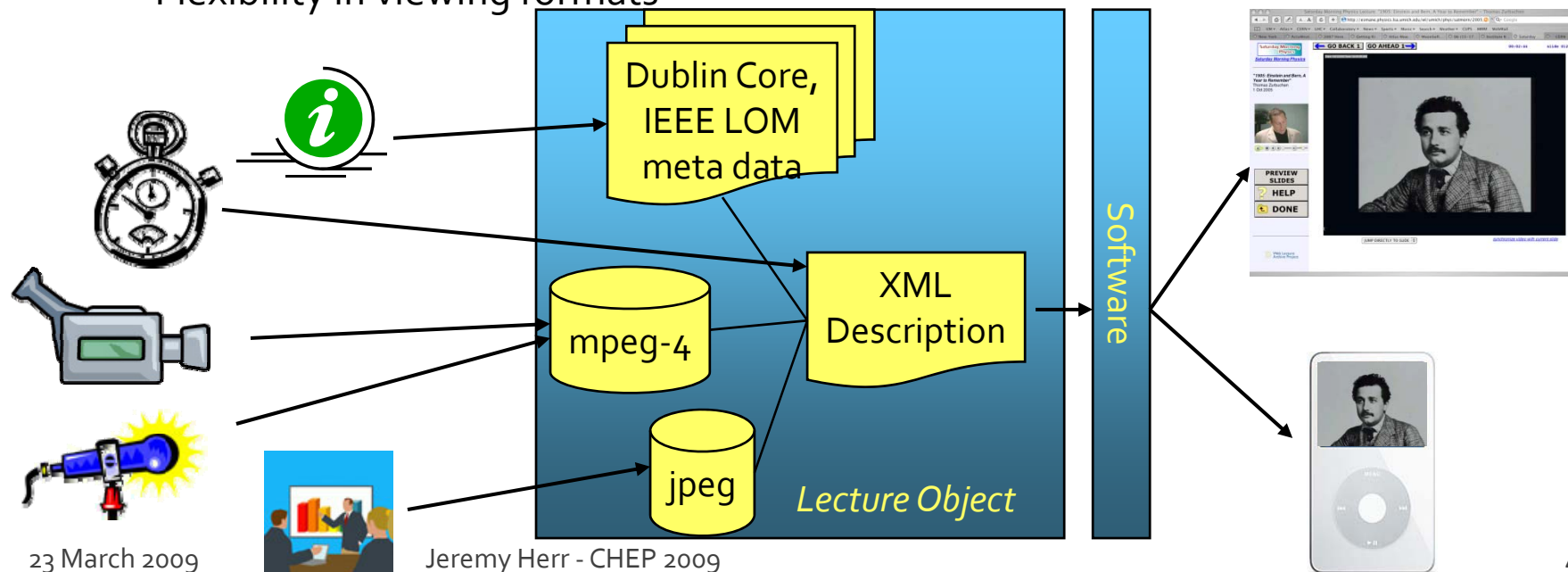
Need for web lecture archiving

- **Large scale dissemination**
  - Meetings for geographically scattered collaborations, professional organizations
  - Preservation of historical talks
  - Public outreach
- **Overcoming time/schedule constraints**
  - Enabling committees to evaluate candidates
  - Individual presentations to remote meetings
- **Study/review tool**
  - Technical training, safety courses
  - Traditional university courses

U-M ATLAS Collaboratory Project Update

Some UM ACP history

- Since 1999, the University of Michigan ATLAS Collaboratory Project (UM ACP) has been
  - recording events for ATLAS and
  - developing technology to automate recording.
- 2003-2005: NSF grant, built tracking camera
- 2006-2007: MScribe project, recorded 8 university courses
- 2008: established the CARMA service (http://carma.umich.edu), recording events for the entire University of Michigan community, on a larger scale than ever before.
- *Technology developed to help physicists turns out to be extremely useful for everyone else*

CARMA service (2008-present)

- **C**ampus **A**utomated **R**ich **M**edia **A**rchiving
- Launched: July 2008
- Availability:
  - Any school, department, unit or individual
  - Charges based on number of hours recorded
- We provide:
  - Audio/video/slides capture using portable system
  - Any campus location
  - Long-term archiving of high-quality Lecture Objects
  - Hosting/streaming of web lectures
 - *One-stop-shopping: we handle everything*

CARMA service summary through March 2009: 26 diverse customers

- **Business**:
  - Business and Finance Office
- **Engineering**:
  - Design Science
- **Health Sciences**:
  - Division of Kinesiology, General Medicine, Health Management Research Center, Medical School Dean's Office, School of Public Health
- **Humanities**:
  - African Studies Center, Center for Southeast Asian Studies, Center for Middle Eastern & N. African Studies, History of Art, Institute For the Humanities, Middle Eastern North African Studies
- **Sciences**:
  - School of Natural Resources and the Environment, Physics, Physics REU Program, School of Information
- **Social Sciences**:
  - Economics, Interuniversity Consortium for Political and Social Research, Institute for Social Research
- **Other**:
  - Clements Library, Office of Vice President of Research, OSEH, Provost Office, Council for Disability Concerns, University and Development Events Office

CARMA service summary through March 2009: length of events

- **Most events (69%) are less than 5 hours long**
- **Many events (42%) are less than 2 hours long**

Distribution of events by number of hours
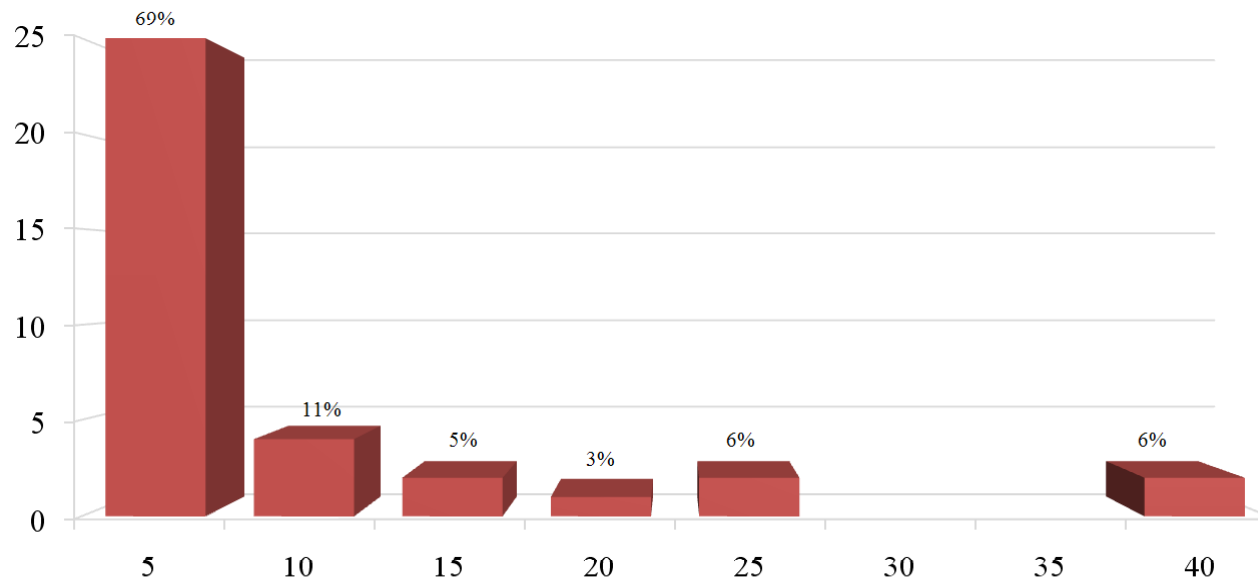
CARMA service summary through March 2009: interesting uses

- Keynote speaker was scheduled for surgery, pre-recorded her talk, played it at the conference
- Safety training courses for all U-M personnel
- Evaluation of candidates for dean position
- In one course, we enlisted students to help tag content, using twitter during class

University of Michigan lecture archive

- We now have 2 321 lectures in the archive!

Growth of UM ACP Lecture Archive 2003-2008
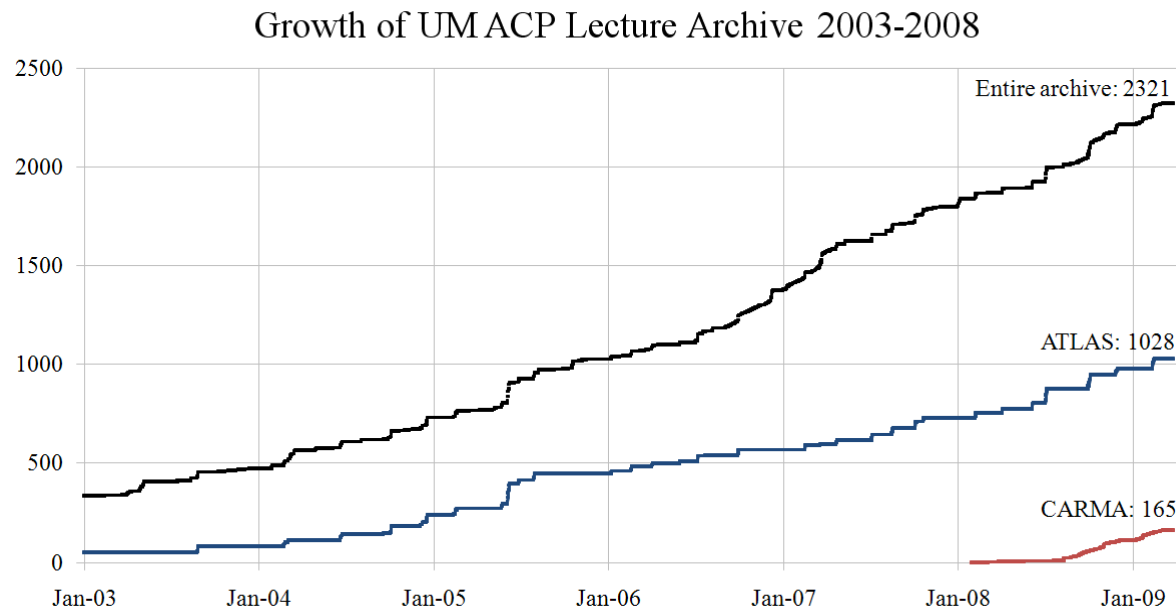
What's next?

- Development of oft-requested features:
  - Real-time streaming of events
  - DVD recordings
  - Podcasts
  - Capture of animations and video sequences in presentations
  - Transcriptons/captioning

CERN – UM partnership

CERN-UM Partnership 2008-2009

- CERN IT is committed to deploying large scale lecture archiving technology.
- UM ACP staff member is working for one year in CERN IT-UDS-AVC section. Goals are:
  - Perform a market survey of recording technologies, make recommendations
  - Implement and evaluate a recording system
  - Integrate recording system with existing hardware/software infrastructure

Lecture archiving at CERN

- Requirements include:
  - Use of the high-quality Lecture Object (LO) and Web Lecture model
  - Integration with Indico for metadata and scheduling
  - Ability to edit existing LOs
  - Ability to create LOs from existing material
  - Centralized monitoring and recording

Central recording and monitoring

- CERN has a dedicated fiberoptic network:
  - Streams audio/video between 15 rooms and Comp. Centre
  - Used for
    - webcast
    - overflow rooms
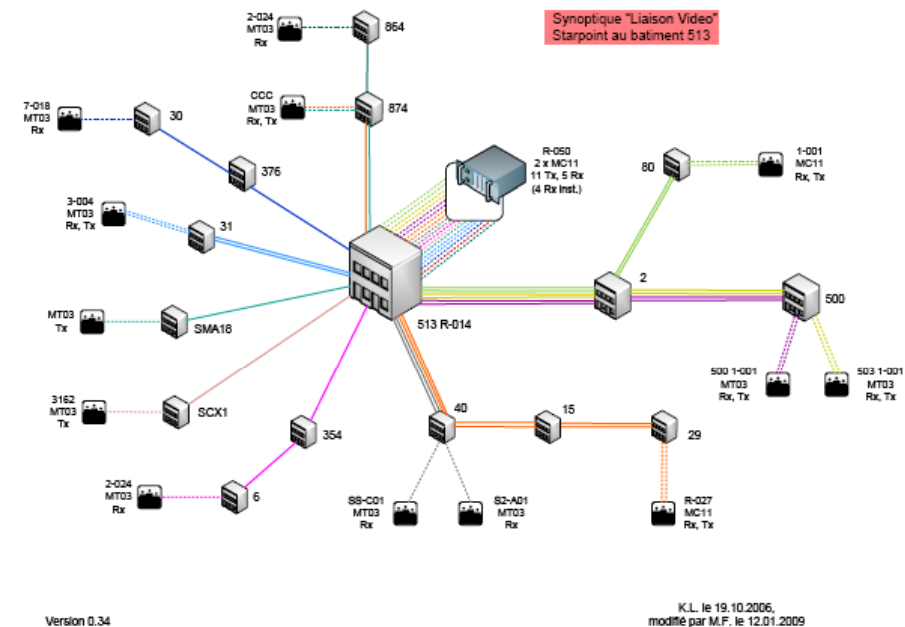
  - We plan to re-use this for recording lectures

Indico integration

- CERN users and staff already enter scheduling information and descriptive metadata into Indico
- Indico is used for booking all meetings at CERN, and also outside CERN (see talk of Jose Benito Gonzalez Lopez)
- Integrating the recording infrastructure with Indico will enable an unprecedented level of automation.

Indico integration: First step

- CERN users will be able to request that any Indico event be recorded through a standard interface.

- This feature will be available later in 2009, starting with certain rooms.
- Thanks to David Martin Clavo for implementing this

Market survey

Market survey of recording technologies

- University/open source initiatives
  - SMAC
  - UM ACP
  - REPLAY
  - OpenEyA
- Commercial products
  - MediaSite
  - Echo360
  - Ncast

Market survey: SMAC

- A comprehensive audio/video/slides capture, archiving, hosting and streaming solution
- Cooperative project between:
  - Ecole d'ingénieurs et d'architectes Fribourg, Université de Fribourg, CERN (http://smac.hefr.ch)
- Noteworthy features:
  - Utility for creation of Lecture Objects from pre-existing materials
  - Slide recognition/matching software

Market survey: SMAC

- Lecture Object creation utility, using pre-existing material
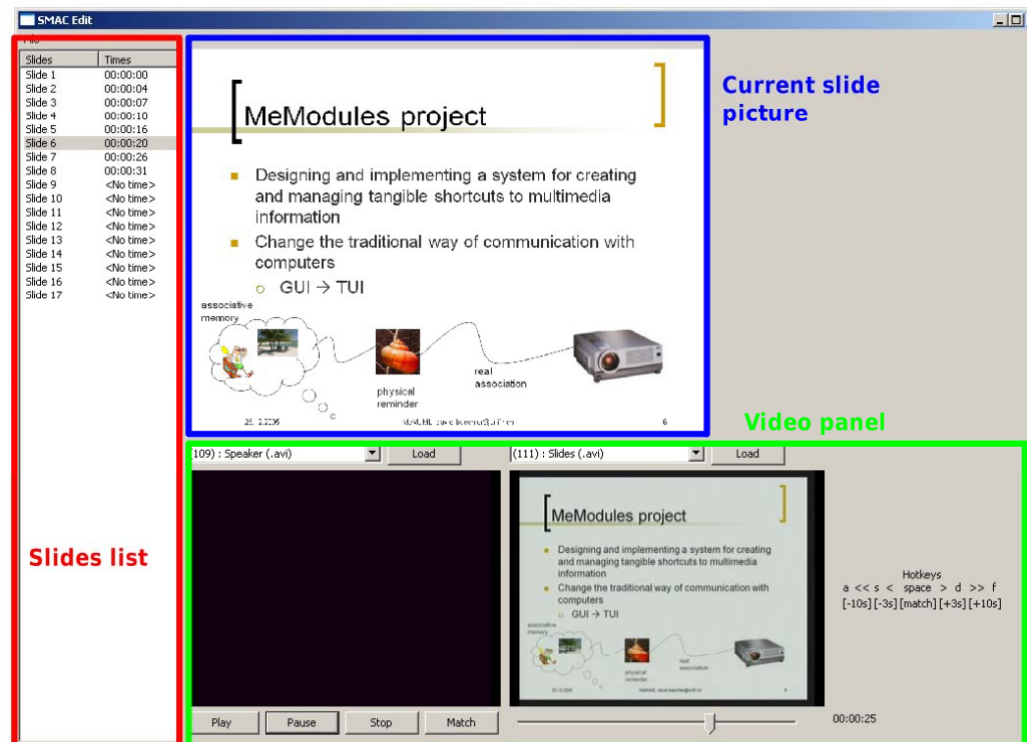
Market survey: UM ACP system

- A comprehensive audio/video/slides capture, archiving, hosting and streaming solution.
- The University of Michigan ATLAS Collaboratory Project (http://atlascollab.umich.edu)
- Noteworthy features:
  - Portability: all equipment in one box
  - Ad-hoc recording: turn on, press START

UM ACP portable recording box

Gator 4U rack bag

Shure ULXS4 wireless receiver

Shure SCM268E mic mixer

Markertek custom patch panel

home-made tray

Dell Latitude D820 laptop

Market survey: REPLAY

- A comprehensive audio/video/slides capture, archiving, hosting and streaming solution
- ETH Zurich (http://replay.ethz.ch)
- Noteworthy features:
  - Considerable planning and experience has been invested
  - Supported by OpenCast collaboration
  - Open source

Market survey: Open EyA

- Audio/video/chalkboard capture software
- ICTP, Trieste, Italy (http://www.openeya.org)
- Noteworthy features:
  - Elegant interface for viewing chalkboard
  - Open source
  - Portable: runs on a laptop

Market survey: MediaSite

- A comprehensive audio/video/slides capture, archiving, hosting and streaming solution
- Commercial product (http://www.mediasite.com)
- Noteworthy features:
  - Visual preview of audio/video/slides
  - Well established software, easy interface
  - Portable recording device
  - Many viewing formats

Market survey: Echo360

- A comprehensive audio/video/slides capture, archiving, hosting and streaming solution
- Commercial product (http://www.echo360.com)
- Noteworthy features:
  - Flash web lecture post-editor
  - Reasonably priced
  - Many viewing formats, integrates with iTunes U

Market survey: NCast Telepresenter

- Stand-alone box that captures audio/video/slides
- Commercial product (http://www.ncast.com)
- Noteworthy features:
  - only one video file to deal with
  - reasonably priced

OpenCast collaboration

- OpenCast is a growing collaboration, led by Berkeley and ETH Zurich, to develop a comprehensive open source solution for archiving lectures.
- http://www.opencastproject.org

People

- UM ATLAS Collaboratory Project
  - Homer A. Neal
  - Steven Goldfarb
  - Jeremy Herr
  - Bob Lougheed
  - Shawn McKee
- CERN IT UDS group
  - Tim Smith (UDS group leader)
  - Thomas Baron (AVC section leader)