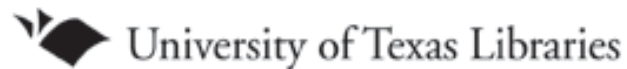


Automated Archiving of DVD Content



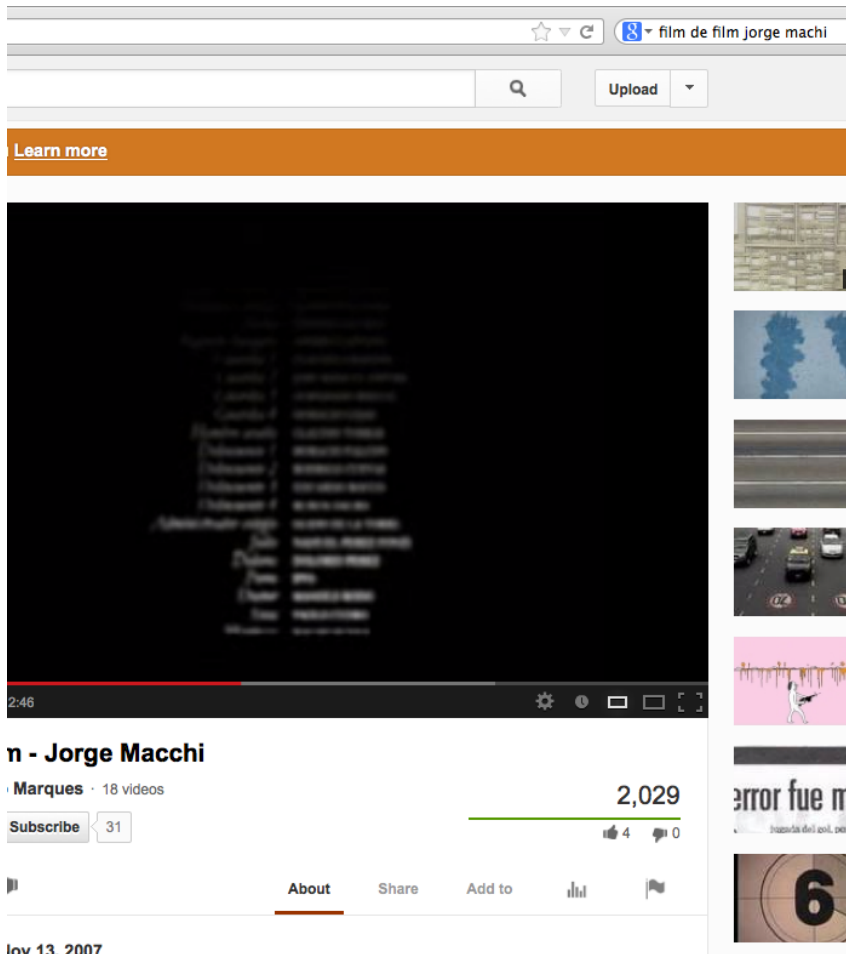
Esteva, Vega, Nieto, Scott, Gunnels, Kumar,
Lamphear, Henriksen, Lee, Martin

Motivation and perspective

- Find a file based preservation solution for video art in DVD media
- Create a SIP including files to fulfill museum functions
- Availability of high performance distributed storage
- Next generation display systems



Considerations



- Study the role of the DVD in the works technical history
- Options for conversion
- Usage of the DVD in the museum

Considerations

- UT Research Storage Infrastructure and Services
- Example of next generation display systems



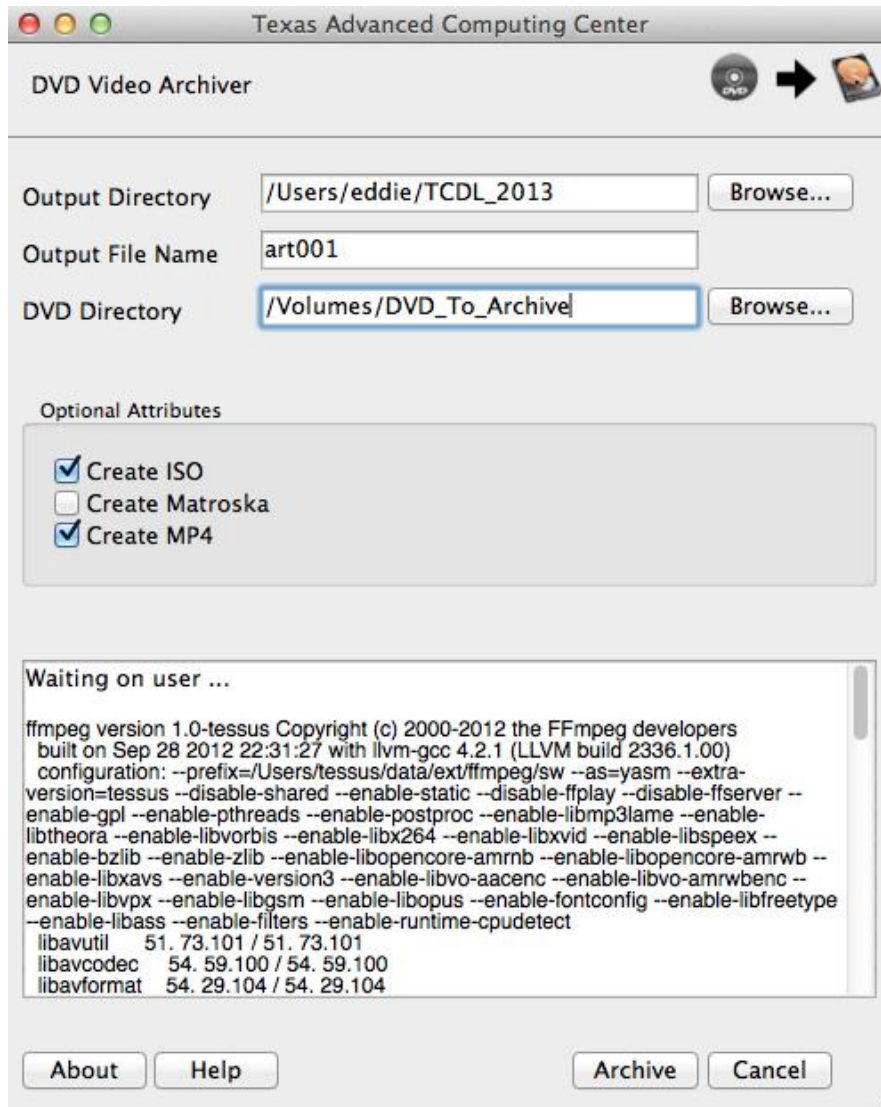
Workflow requirements

- Only for DVD-based works
- Transcoding should not involve further compression
- Fixity to establish authenticity of disk image and production quality/preservation master
- Quality metric to assess the quality of the transcoding
- Metadata and provenance documentation
- Easy to implement
- SIP contents should fulfill preservation and access functions

Preservation roadmap

- Best practices in video and digital preservation
 - Few references for DVD preservation
- ISO disk images as identical copy of the DVD
 - Preservation master
 - Base for metadata extraction and further conversions
 - Not playable
- High quality access file (also preservation file)
 - Matroska container and ffv1 codec
- Quality metric
 - Structural Similarity Index (SSIM)
- Documentation – metadata and processing provenance

Workflow step by step



- Metadata extraction
- ISO disk image
- Checksum
- Transcoding
- Checksum
- Conversion to other access files
- Quality metric
- Visual evaluation

Quality Control

- Full reference quality metric
- Structural Similarity Index
- Aim for result of 1
- Algorithm available in different programming languages
- Modeled closely to human perception
- Visual inspection of the Matroska file

DVD	100 FRAMES		500 FRAMES	
La Flecha	MKV	MP4	MKV	MP4
Average SSIM Index	1	0.974301	1	0.9681
Standard Deviation	0	0.000034	0	0.0001

DVD	100 FRAMES		500 FRAMES	
La Flecha	matroska	ISO image	matroska	ISO image
Average SSIM Index	0.974288	0.974302	0.967891	0.968107
Standard Deviation	0.000034	0.000034	0.000104	0.000104

Software choices

- Informed by testing
- Open source, command line tools
- Support technical documentation



Testing and Implementing the Automated Workflow at UT Libraries



UT Libraries and Audiovisual Digitization

- Audiovisual Digitization Unit
- DVD Archiving
 - Preservation Reformatting
 - Digital Preservation
- Example DVD archiving projects
 - Benson Latin American Collection
 - Fine Arts Library Streaming Video Project

DVD Archiving Requirements

ISO image of original

Streaming MP4

DVD access copy

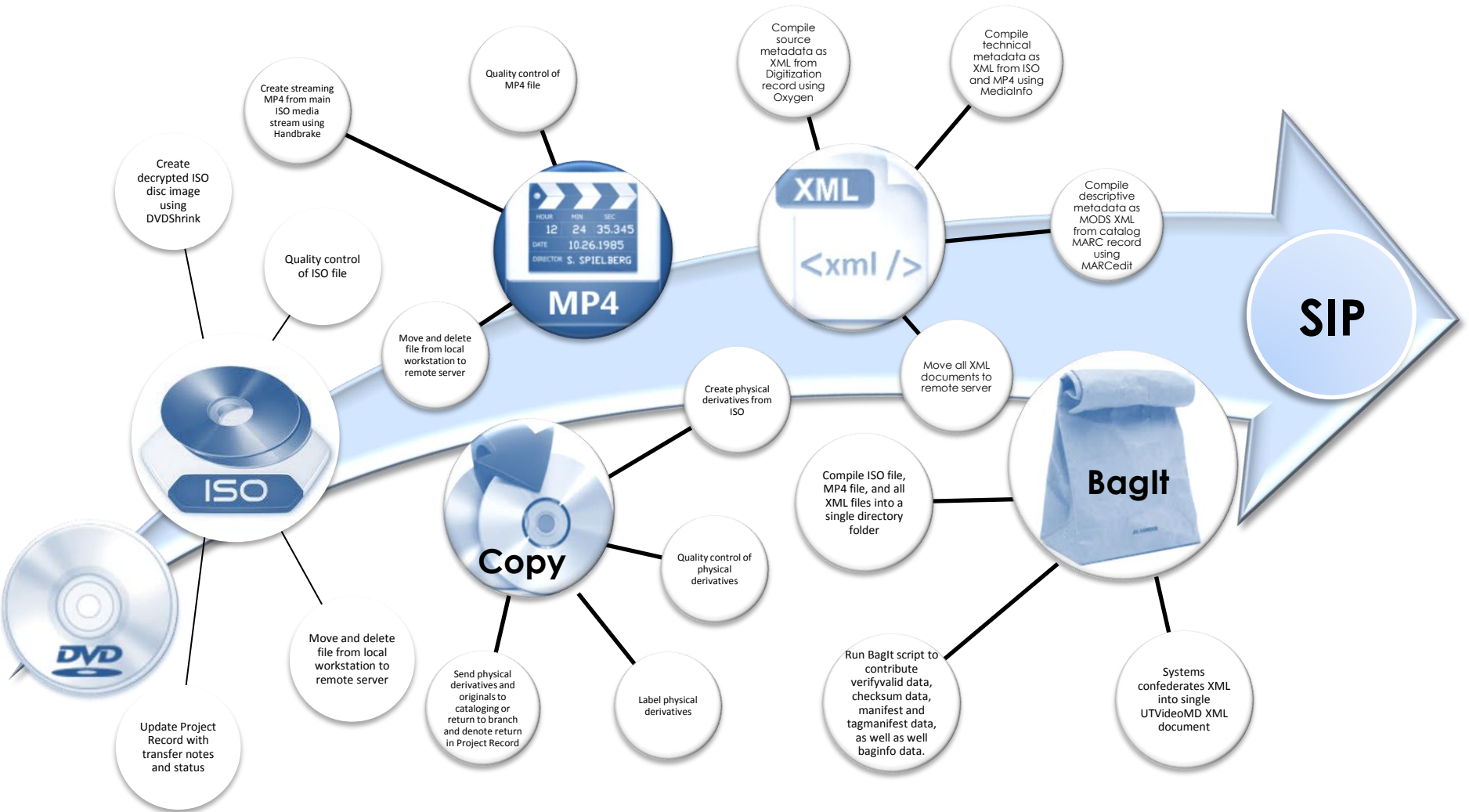
2 checksums

Descriptive metadata

Source metadata

Technical metadata

Current Workflow



Partnering with TACC

- TACC approached UT Libraries to expand testing and implementation of automated workflow
- Benefits of automation for the Libraries:
 - Streamline and unify current workflow
 - Less staff-intensive
 - Reduce opportunities for error

Testing and Results

- Test DVDs
 - 18 single-stream, unencrypted discs
 - 3 multi-stream, encrypted discs
- Workstation
 - Mac Pro running OS 10.8.3 Mountain Lion
- Results
 - Encryption errors
 - MP4 streaming compatibility
 - Saving files to host directory
 - SSIM and Python Library limitations
 - Checksums
 - Enthusiasm for the next phase!

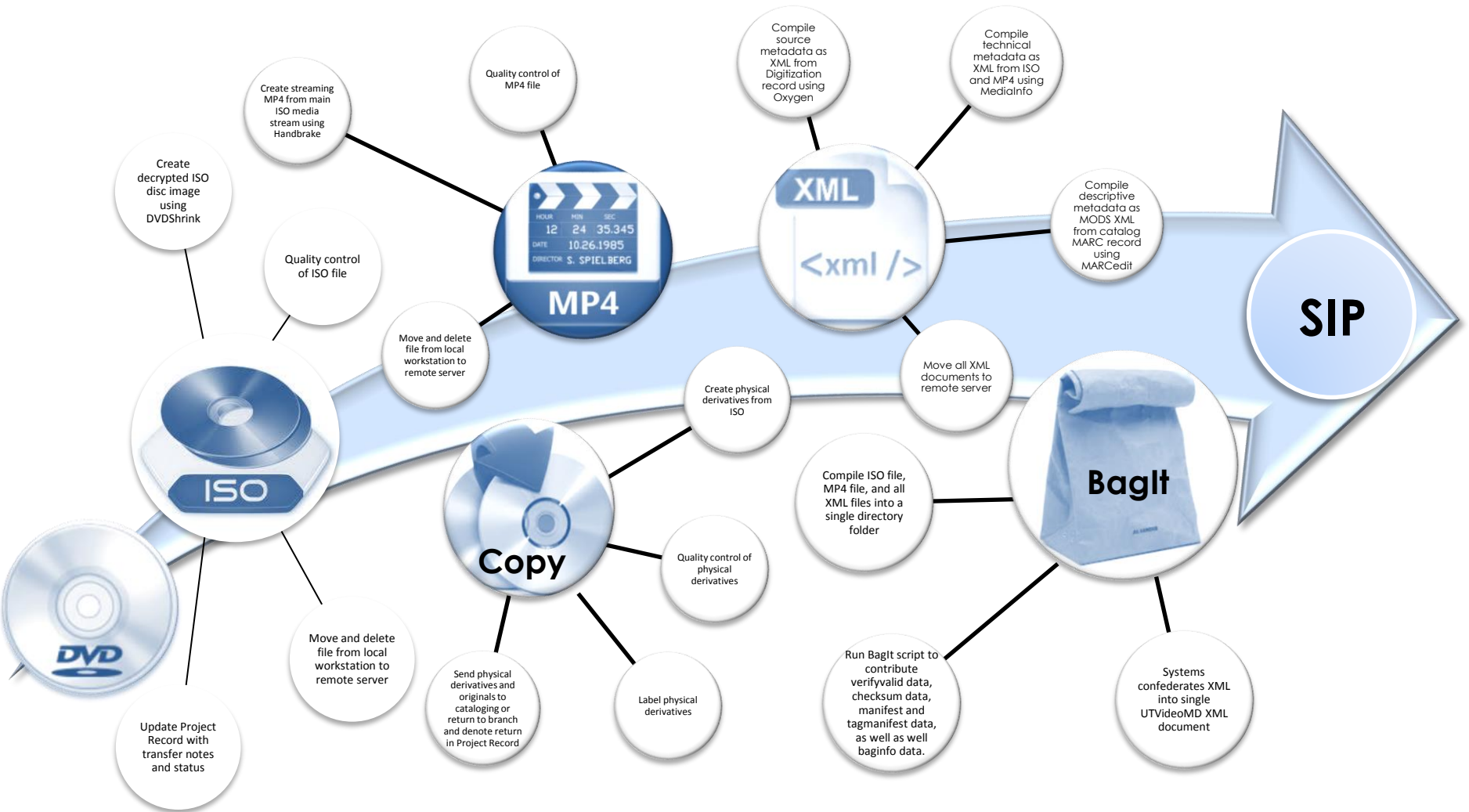
UT Libraries Modifications

- Addition of drag and drop functionality
 - DVD
 - Project Folder
- Addition of web-optimized MP4
- Elimination of Matroska file

Future Modifications

- Decryption
- 2 Checksums
- SSIM quality measure
- Expand metadata collection
- UTVideoMD
- Integrate BagIt

Manual Workflow



Automated Workflow



Thank You

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Summer Gunnels

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