

# A Contemporary View of Image Formats for Libraries and Archives

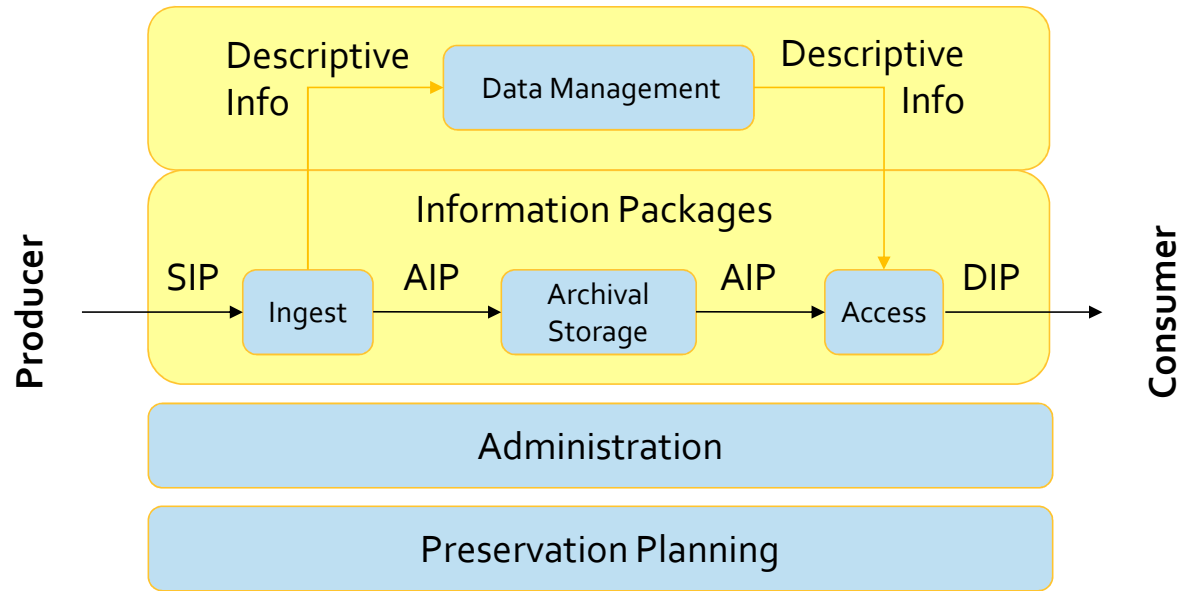
Robert Buckley

# Topics

- The Formats
- Compression
- Quality and Cost
- Future Directions

# OAIS Model

Where  
Formats Occur



# Image Formats

- TIFF
- JP2 (JPEG 2000)
- JPEG
- PNG
- PDF

FADGI  
Comparison of  
File Formats  
August 2014

- All have viable sustainability
- Cost is a differentiator
  - Low storage costs for compressed formats
  - Low implementation costs for TIFF, JPEG, PNG
- System implementation issues for JPEG 2000

# About image compression

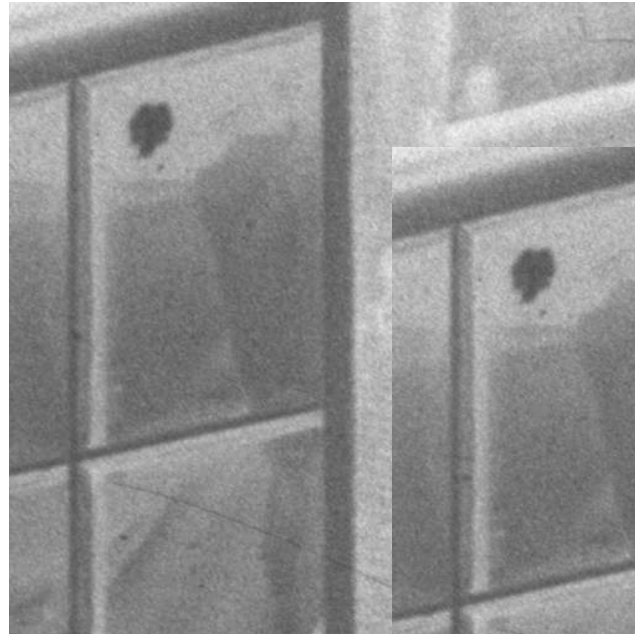
Reduced storage costs, but what about...

- Different than scanned original
- Increased vulnerability to errors
- Diminished quality

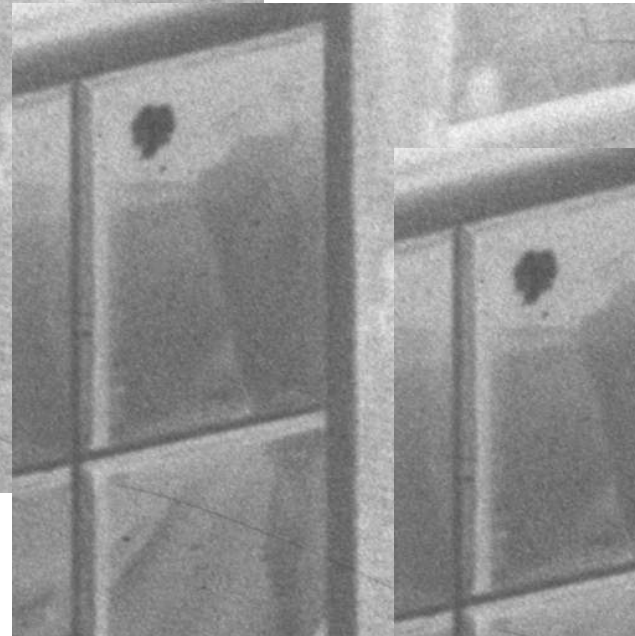
# Digitization vs. Compression



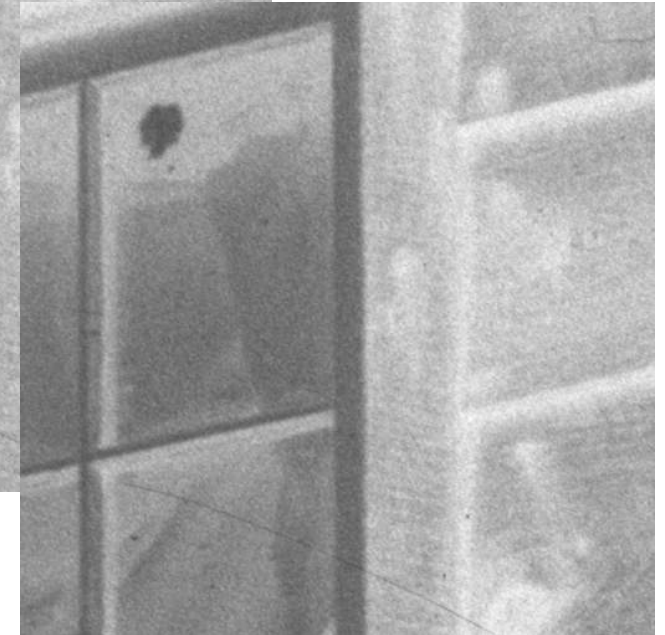
# Digitization vs. Compression



Scan 1



Scan 2



Scan 2 with CR 8:1



# Fundamentals of Electronic Imaging Systems

W.F. Schreiber

There is nothing sacred about a particular digitization of an image, and therefore there is no guarantee that a change in a digital representation must necessarily degrade an image. In many cases, changes can improve the quality.

# CIE TC8-09: Archival Color Imaging – Test Materials



X-Rite DCSG

FADGI DICE

IE-KBUTT



Print A



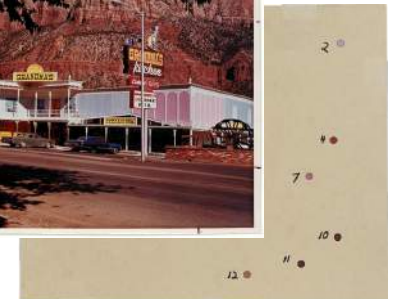
Print C



Print B



Print D



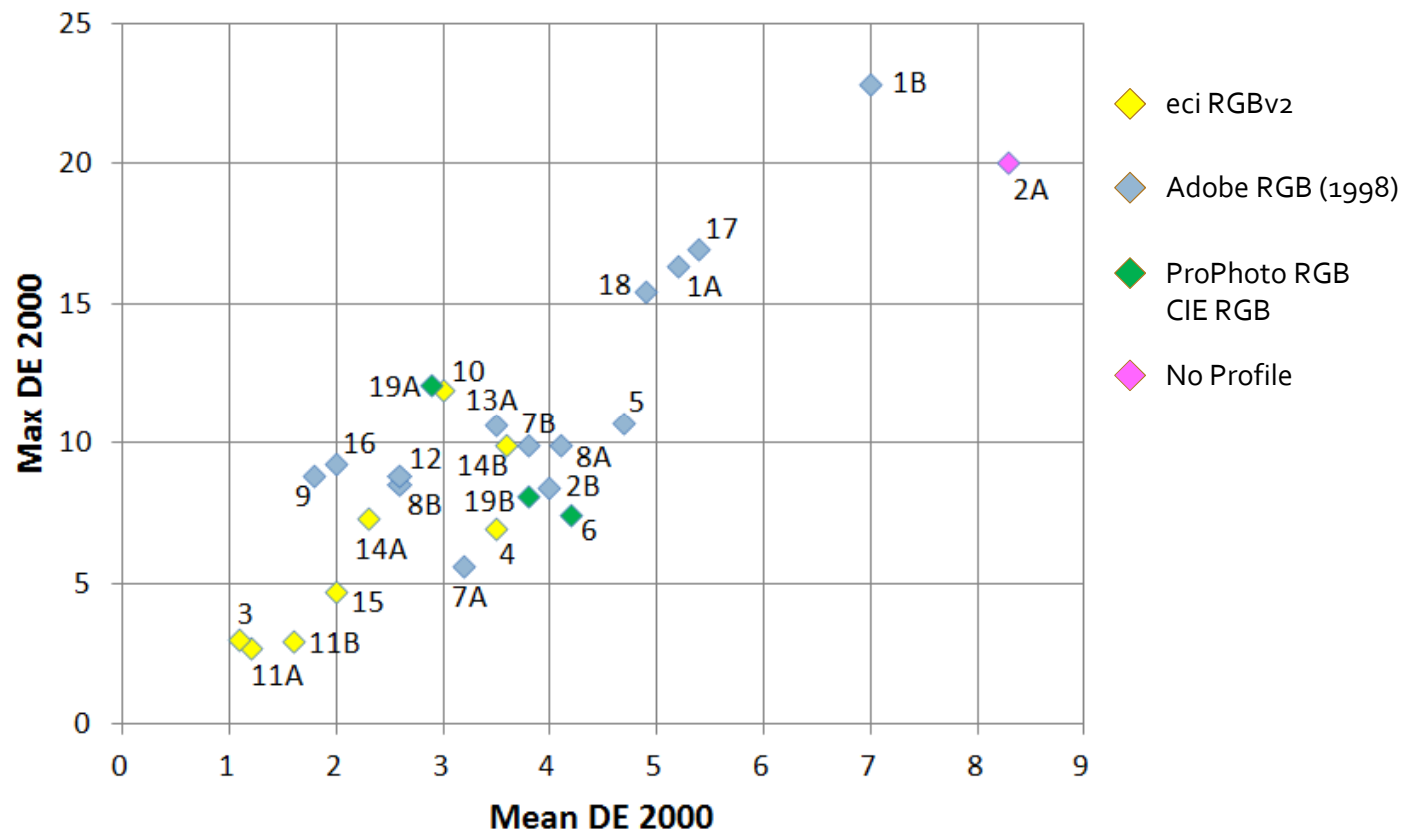
Mask

# CIE TC8-09: Archival Color Imaging – Test Partners

- Art Institute of Chicago
- Beinecke Library, Yale University
- Bobst Library, New York University
- George Eastman House International Museum of Photography and Film
- Harvard Library
- Library of Congress
- Los Angeles County Museum of Art
- Metropolitan Museum of Art
- Museum of Modern Art
- National Archives & Records Admin.
- National Gallery of Art
- National Library of the Netherlands
- Rijksmuseum
- Royal Library of Denmark
- Stanford University Libraries
- Studio Buitenhoff
- Van Gogh Museum

# CIE TC8-09: Archival Color Imaging – Test Results

## Capture Error X-Rite DCSG



# Error Vulnerability



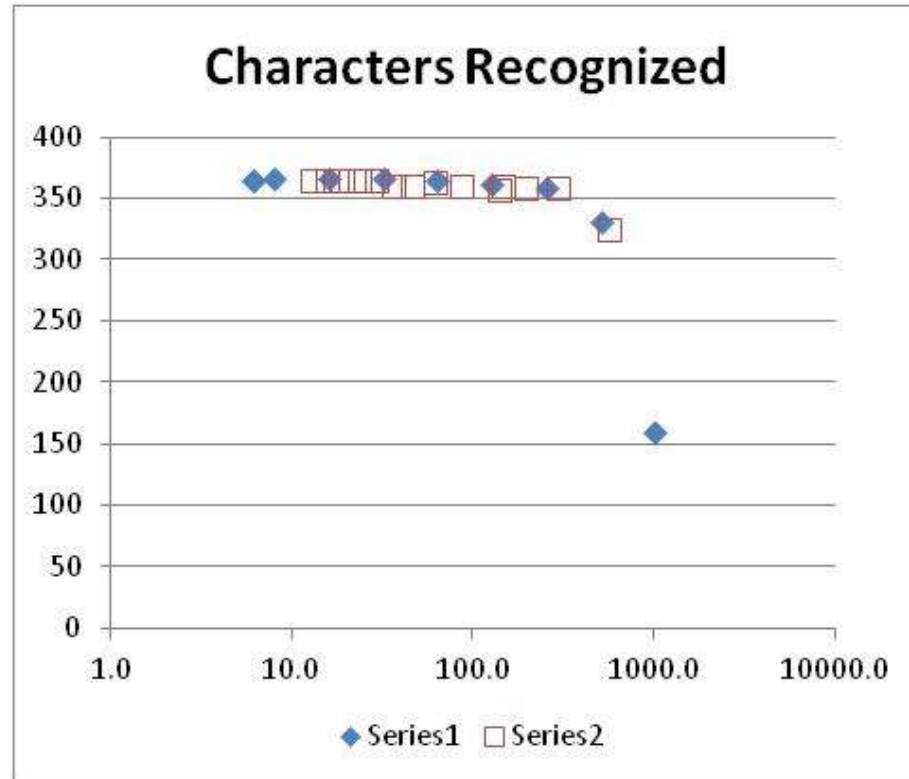
## Error Correction

Error-correcting technology is ubiquitous in modern storage systems so that the corruption of compressed image files is not a significant issue or risk in digital preservation.

## Quality and User Experience

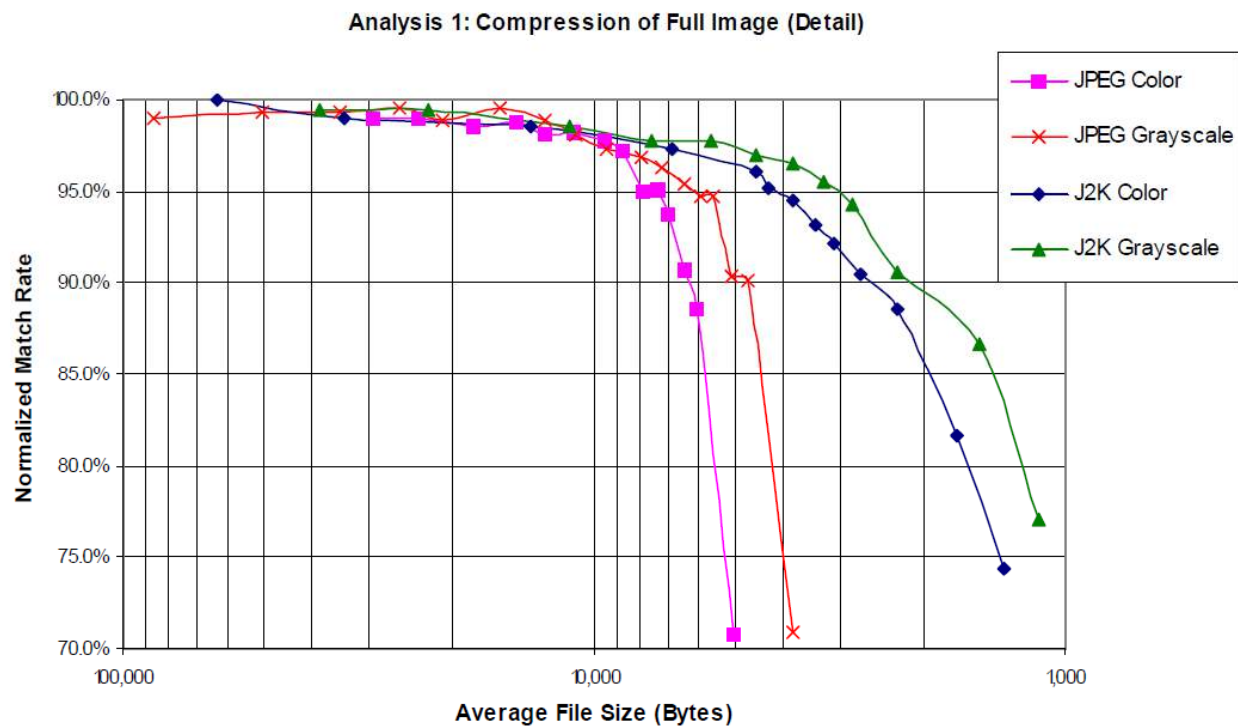
The totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs (ISO 8402-1986)

# Task: OCR

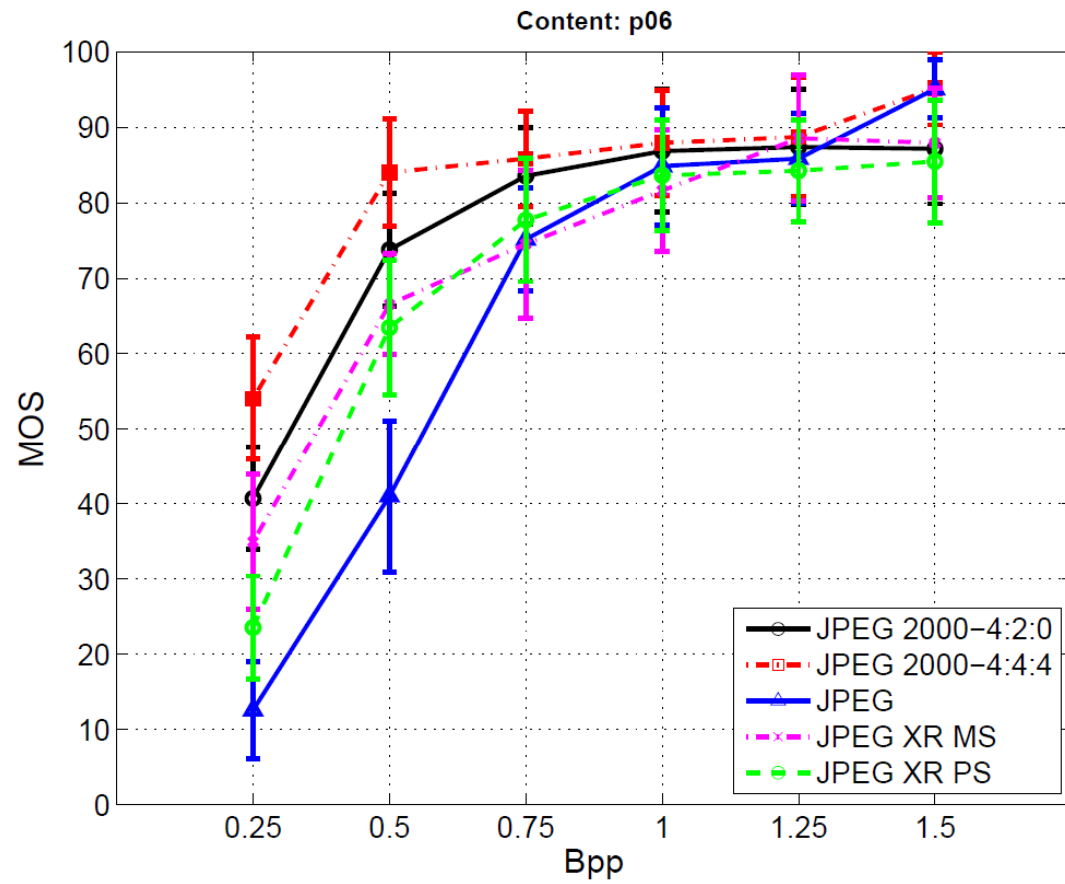




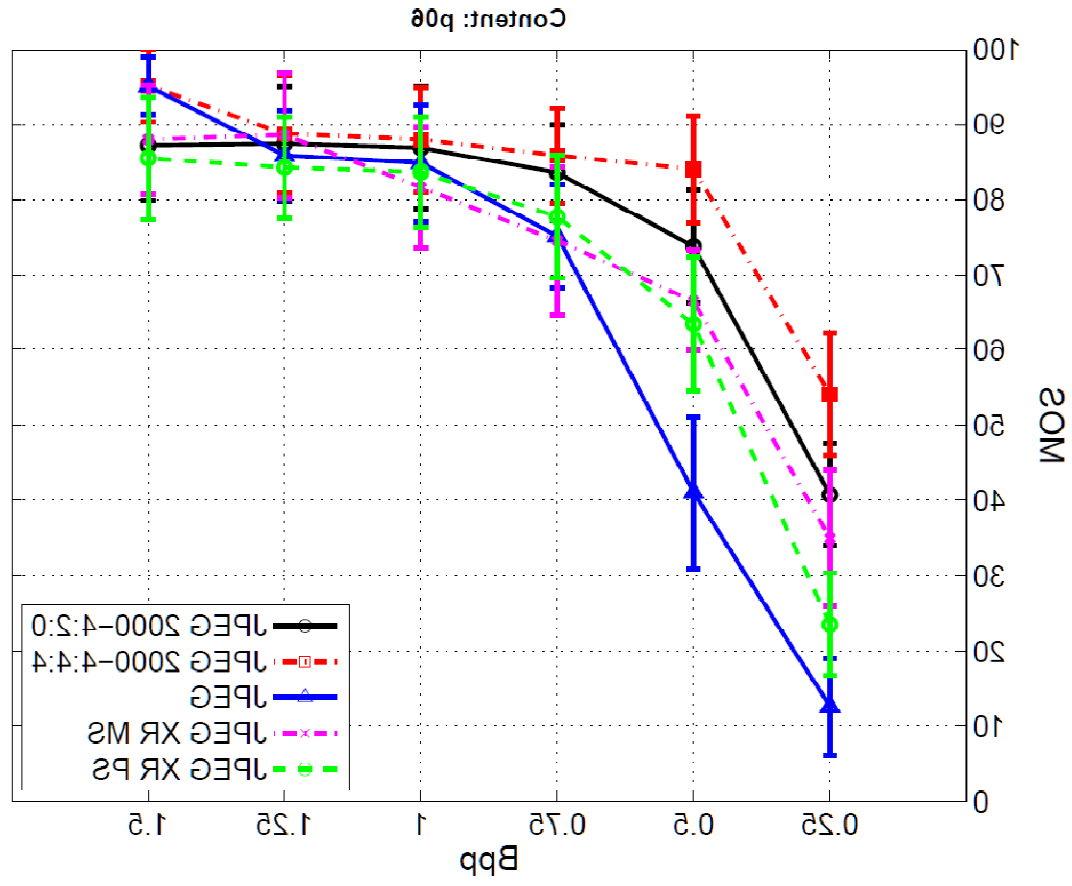
# Task: Face Recognition



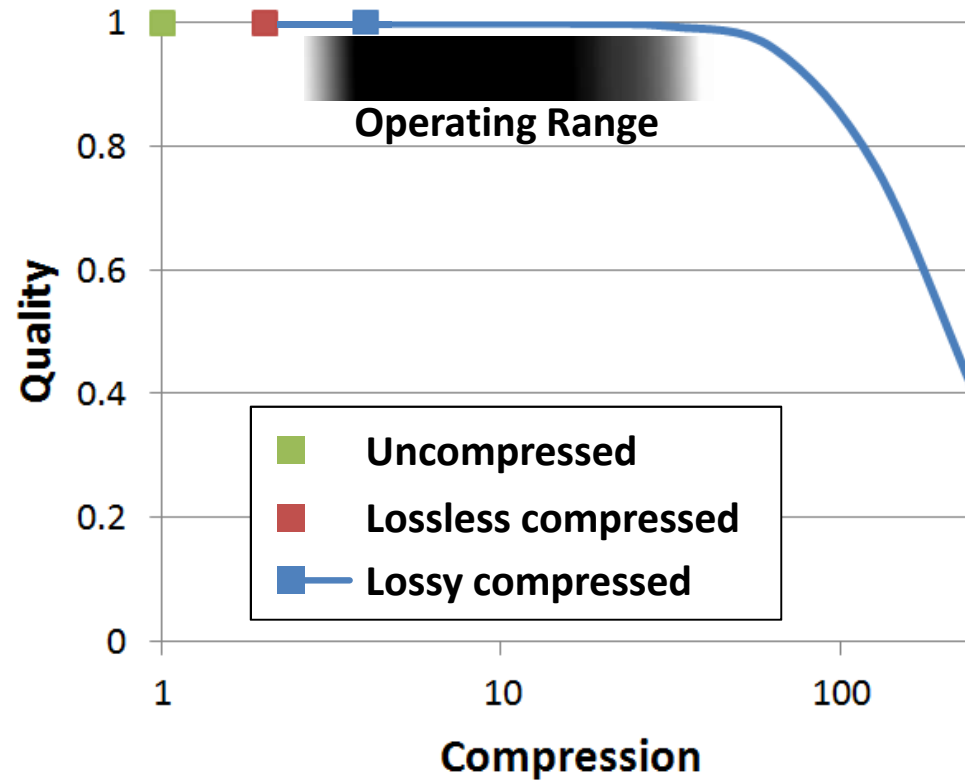
# Task: Image Comparison



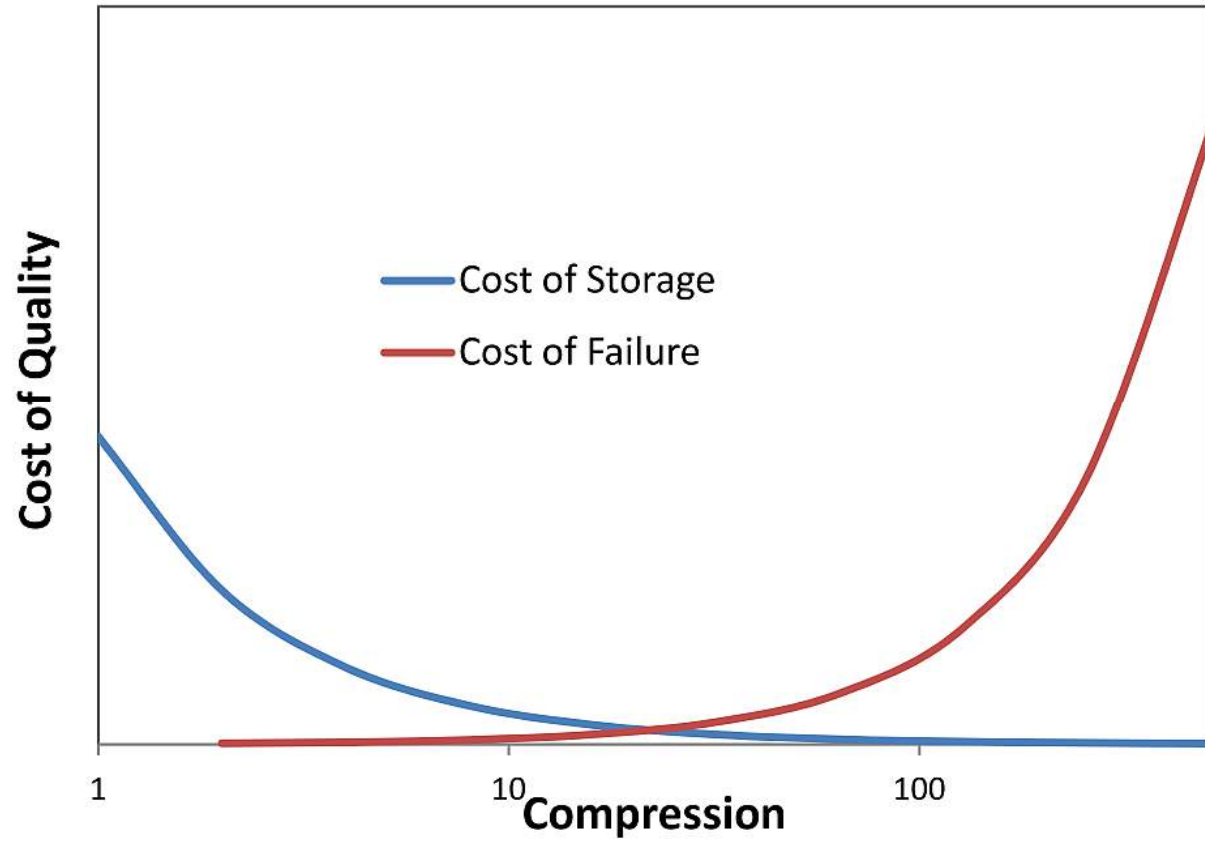
# Task: Image Comparison



# "Butterworth" Curve



# Compression and the Cost of Quality



## Formats and Compression

- Compression reduces storage costs, does not put your image data at any significant risk and need not interfere with the performance of image-based applications (functionally lossless)
- JPEG 2000 is the choice for image compression
  - Privileged for access with resolution and quality progressive modes
  - Shared by AV picture essence

## Future Directions

- Adopting image compression is the result of a cost-benefit analysis based on a particular institution's mix of skills, budget, requirements, use cases and schedule
- Explore incentives for the community and industry partners to work together to create strategies, business models and tools for digital preservation workflows...with JPEG 2000