The Sticky Wicket Paradigm
Preserving Digital Humanities for the Foreseeable Future
Five Facets

- Content, Context and Authenticity in Digital Humanities Works and Collections
- Life Cycles, Definitions, and Decisions of Digital Humanities Preservation
- Strategies, Tools, and Resources to Explore
- Embracing Risk, Redundancy and Community
- First Steps to Take...
Three Unofficial Themes

- Cricket
- Robert Frost
- Sheldon Cooper
Cricket is a bat-and-ball game played between two teams of 11 players on a field, at the centre of which is a rectangular 22-yard long pitch. One team bats, trying to score as many runs as possible while the other team bowls and fields, trying to dismiss the batsmen and thus limit the runs scored by the batting team. A run is scored by the striking batsman hitting the ball with his bat, running to the opposite end of the pitch and touching the crease there without being dismissed. The teams switch between batting and fielding at the end of an innings.

In professional cricket the length of a game ranges from 20 overs of six bowling deliveries per side to Test cricket played over five days. The Laws of Cricket are maintained by the International Cricket Council (ICC) and the Marylebone Cricket Club (MCC) with additional Standard Playing Conditions for Test matches and One Day Internationals.[1]

Cricket was first played in southern England in the 16th century. By the end of the 18th century, it had developed into the national sport of England. The expansion of the British Empire led to cricket being played overseas and by the mid-19th century the first international matches were being held. The ICC,
Content, Context and Authenticity in Digital Humanities Works and Collections
Preservation-wise, how do we approach...
- Digital Texts?
- Digital Artwork and Time-based Media?

“Two roads diverged in a yellow wood...”
Robert Frost
Introduction

Samuel Sullivan Cox (1824–1889) served as a Democratic congressman in the United States House of Representatives from 1856 until his death, save for a few short interruptions, first representing his native Ohio (he was born in Zanesville) and then, from 1868 onward, his adopted state of New York. As a public servant, he is most remembered, even revered, for strengthening the Life-Saving Service (a precursor to the Coast Guard) and improving the working conditions of mail carriers. As a Democratic politician, his legacy is marred by his oft-assumed role as spokesperson for his party's resistance to abolition and emancipation during the years leading up to the Civil War. As an author, Cox published articles and books throughout his life on political and popular subjects, including six travel books. But in May 1851, Cox was a twenty-six-year-old Brown University graduate who had moved back to Ohio to practice law and had recently married (Peskin). On May 7, he and his wife Julia (née S. S. Cox (Cox and N. Buckingham, whom he married in October 1849), along with her brother Phil Buckingham and a cousin, Lucy Sturges, set sail on a long-delayed honeymoon of Europe and the Orient (Linsey 204–205).

The manuscript journal presented in this edition records Cox's experiences and reflections on the trip, but it also serves as a sketch pad for an expanded account of the voyage that Cox published the following year, A Buckeye abroad; or, Wanderings in Europe and in the Orient (1852). Appearing seventeen years before Mark Twain's more famous debut as a travel writer, The Innocents Abroad; or, The New Pilgrims Progress (1869), A Buckeye Abroad is still far from the first account in English of a "grand tour" of Europe. Both Twain and Cox offer similar appeals for publishing yet another account of a grand tour. Twain presents himself as everyman, rather than guide or critic:

Yet notwithstanding it is only a record of a picnic, it has a purpose, which is to suggest to the reader how he would be likely to see Europe and the East if he looked at them with his eyes instead of the eyes of those who traveled in those countries before him. (xvii)
stopped at our Bankers:  
ate fruit too plentifully —  
came home to dine & write  
to Col. M. — Leave here Mon- 
day for Malta, & then for  
Jerusalem! [embellishment]  

Sunday June 22 / 51.  
Spent Sunday morn, in looking at  
the bay & writing. Afternoon after  
dinner, saw the great procession  
of Saint Louis, extending for miles  
with music, cannon & the Elevation  

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Founded in 1999, the Rhizome ArtBase is an online archive of new media art containing some 2153 art works, and growing. The ArtBase encompasses a vast range of projects by artists all over the world that employ materials such as software, code, websites, moving images, games and browsers to aesthetics and critical ends. We welcome submissions to the ArtBase; they are reviewed by our curatorial staff on a monthly basis. Read More »

**.Collections**

**Formalism & Glitch**
These works highlight practices that embrace the aesthetics and formal qualities inherent in the web, operating systems, software errors, and glitches.

**Code**
These works embody three of the oldest creative practices existing as the intersection of art & computation: Data Visualization, and Generative, and parametric art.

**Digital Archivalism**
Artistic practices have long involved modes of collecting and archiving. This collection seeks to highlight these strategies in dialog with internet based practices.

**Tactical Media**

**Net.art and Hypertext**

**Rendered Reality**
The Deleted City is a digital archaeology of the world wide web as it exploded into the 21st century. At that time the web was often described as an enormous digital library that you could visit or contribute to by building a home-page. The early citizens of the net (or netizens) took their netizenship seriously, and built home-pages about themselves and subjects they were experts in. These pioneers found their brave new world at Geocities, a free web-hosting provider that was modelled after a city and where you could get a free "plot of land" to build your digital home in a certain neighbourhood based on the subject of your homepage. Heartend was — as a neighbourhood for all things rural — by far the largest, but there were neighbourhoods for fashion, arts and other related topics to name just a few.

Around the turn of the century, Geocities had tens of millions of "homesteaders" as the digital tenants were called and was bought by Yahoo! for three and a half billion dollars. Ten years later in 2009, as other metaphors of the internet (such as the social network) had taken over, and the homesteaders had left their properties vacant after migrating to Facebook, Geocities was shut down and deleted. In an heroic effort to preserve 10 years of collaborative work by 35 million people, the Archive Team made a backup of the site just before it shut down. The resulting 850 Gigabyte bit-torrent file is the digital Pompeii that is the subject of an interactive excavation that allows you to wander through an episode of recent online history.

The installation is an interactive visualisation of the 650 gigabyte Geocities backup made by the Archive Team on October 27, 2009. It depicts the file system as a city map, spatially arranging the different neighbourhoods and individual lots based on the number of files they contain.

In full view, the map is a data-visualisation showing the relative sizes of the different neighbourhoods. While zooming in, more and more detail becomes visible, eventually showing individual HTML pages and the images they contain. While browsing, nearby MIDI files are played.

The video above shows version 2.0 of the Deleted City installation. Go back to version 1.0.
Life Cycles, Definitions, and Decisions of Digital Humanities Preservation
Preservation is the creation of digital products worth maintaining over time.

Paul Conway
The DOCAM Research Alliance

For more than 50 years, the use and integration of technology in art practices has greatly changed the cultural landscape and has prompted us to review and adapt our conservation and documentation methods. The work and results of DOCAM demonstrate that the preservation of media art requires that its particular characteristics be taken into account. The mission of the DOCAM Research Alliance has been to identify and implement five research axes and propose tools, guides and methods that contribute to the preservation of the media arts heritage. The axes are conservation, documentation, cataloging, history of technologies and terminology.

DOCAM was entrusted with a mandate to examine the factors that threaten the technological arts heritage and to put forward solutions and tools to allow artists, collaborators, museum professionals and collectors to better document and preserve this heritage. The causes of this fragility are many and varied. Most notable among them is the increasingly rapid obsolescence of the technologies used in these artworks. It is this obsolescence that is driving us to re-examine the factors that define the authenticity and integrity of new media works and recognize that they are based on variable media. It therefore becomes clear that the essence of a new media work is found more in its behaviour and the effects it generates than in the materiality of its components.

These works also often include transient features that leave them unstable and in a state of constant transformation. These features lead us to view the works as having a variable nature, in that they are subject to diverse changes, transformations or mutations through the course of their lifespan.

Within this context, DOCAM conducted a number of case studies on works that feature technological components and that belong to the collections of museums associated with the Alliance, such as the National Gallery of Canada, Musée d’art contemporain de Montréal, Montreal Museum of Fine Arts, and Canadian Centre for Architecture. These works were created by artists that include Janet Cardiff, Stan Douglas, Gary Hill, Nam June Paik, David Rocheby, Greg Lynn and Bill Viola.

The practical work carried out as part of the case studies produced five tools and guides that are now accessible to all on the DOCAM Web site:

- A Preservation Guide for Technology-Based Artworks
- A Cataloguing Guide for New Media Collections
- A Documentary Model adapted to media arts
- The DOCAM Glossaurus, a bilingual terminological tool
- A Technological Timeline, which includes both media artworks and technological components.

In addition, a number of educational activities such as the DOCAM seminars and international summits were undertaken and generated many audiovisual documents, which are also available on the DOCAM Web site.
Figure 1 - Lifecycle events of a work as per the DOCAM Documentation Model
Taking on a “Digital Mortgage?”

“Each organization must budget to transfer old files to new formats as software and hardware change and electronic media reach the end of their relatively short life expectancies...also a digital infrastructure including staff, contracts, equipment, and software”

- What will you keep?
- Why is it valuable to you?
- How can you “keep” it?

5 Organizational Stages of Digital Preservation

1. **Acknowledge**: understanding that digital preservation is a local concern

2. **Act**: initiating digital preservation projects

3. **Consolidate**: segueing from projects to programs

4. **Institutionalize**: incorporating the larger environment and rationalizing programs

5. **Externalize**: embracing inter-institutional collaboration and dependency

Anne Kenney—*Cornell Study on Institutional Readiness, 2003-2005*
Strategies, Tools, and Resources to Explore
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Figure 1 - Lifecycle events of a work as per the DOCAM Documentation Model
Content Manifest for Samuel Sullivan Cox's "Journal of a Tour to Europe" (1851) as of Oct. 22, 2008

Cox Journal E-text Edition

- consists of
  - TEI-encoded Transcript
  - XSL Style Sheets
  - Dynamic HTML Pages
  - End User Comments
  - Static JPEG Files
  - Static HTML Files
  - Audio Files
  - Video Files
  - Archival TIFF Images
  - Production JPEG Files
  - Derivative Image Files

- generates views from
- generates
- generates
- generates
- generates clips from

- COH Cocoon Server
  - manages
  - COH IT SysAdmin

- COH Cold Fusion and SQL Servers
  - manages
  - COH IT SysAdmin

- COH Web Server
  - manages
  - COH IT SysAdmin

- COH Streaming Media Server
  - manages
  - COH IT SysAdmin

- CD-ROM, Local HDs
  - manages
  - Individuals

- ASC Media Manager Image Server
  - manages
  - ASC IT System Admin

- Service Level Agreements for Production & Preservation

- role or relationship not yet implemented
- delivers to client or browser for processing
- processes on back end before delivering to client or browser for further processing
Five “-ities” of Permanent Digital Objects

- **Sustainability**
  - The digital object can be maintained and accessed over time

- **Authenticity**
  - Digital object is reliably true to the original

- **Scalability**
  - Processes and procedures used to capture and manage the digital objects are applicable no matter what the size of the project

- **Interoperability**
  - The ability of one standards-based object to be used in any other standards-based system

- **Reusability**
  - Objects can be used in ways not related to original purpose
Main Page

From Archivematica

What is Archivematica?

Archivematica is a comprehensive digital preservation system. Archivematica uses a micro-services design pattern to provide an integrated suite of free and open-source tools that allows users to process digital objects from ingest to access in compliance with the ISO-0AIS functional model.

Users monitor and control the micro-services via a web-based dashboard. Archivematica uses METS, PREMIS, Dublin Core and other best practice metadata standards. Archivematica implements media-type preservation plans based on an analysis of the significant characteristics of file formats.

The overview section provides a detailed description of Archivematica's functionality and technical architecture. This screencast gives a demo of the Archivematica 0.7.1-alpha release.

**Archivematica 0.7.1-alpha Dashboard**
<table>
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<th>Media type</th>
<th>File formats</th>
<th>Preservation format(s)</th>
<th>Access format(s)</th>
<th>Normalization tool</th>
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<td>WAVE (LPCM)</td>
<td>MP3</td>
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<td>PST</td>
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<td>DOCX, PPTX, XLSX</td>
<td>Original format</td>
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<td>TXT</td>
<td>Original format</td>
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<td>PDF/A</td>
<td>Original format</td>
<td>Ghostscript</td>
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<td>ODF (WPD and RTF)</td>
<td>PDF</td>
<td>OpenOffice</td>
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</table>

(*) PNG and JPEG2000 are not normalized to a preservation format
(**) in development
iRODS User Group Meeting 2013
(click here)

Policy-based Data Management for managing community driven collection life cycles

The fifth annual User Group meeting for iRODS, the integrated Rule-Oriented Data System, will be held at Max Planck Institute for Plasma Physics (IPP) in Garching, Germany on February 28 - March 1. This will be a joint meeting with the E-iRODS consortium (http://e-irods.org) for learning about current applications of iRODS and for planning future development activities.

The iRODS User Group Meeting provides an opportunity for the growing iRODS community to participate in sessions on applications of iRODS, technology development planning, and sustainability. Sessions at the meeting will be focused on helping users implement and extend the new paradigm of sustainable policy-based management, sharing, and preservation of today’s diverse and rapidly growing digital data collections.

Papers are solicited on topics including: implementation of data management applications using iRODS - Development of new features for improving data management capabilities - Site reports from existing iRODS users, including descriptions of the types of collections that are managed - Policy sets for managing, administering, or verifying collection properties.

Sessions will be held on: Planned feature development in iRODS - New iDrop-web interface - Status of the E-iRODS consortium - Migration of features from the academic version of iRODS to the E-iRODS system - Tutorial on installation of iRODS.

The iRODS User Group Meetings are a good source of information and use cases on iRODS, see iRODS User Group Meetings for information from past meetings.

iRODS, the Integrated Rule-Oriented Data System, is a data grid software system developed by the Data Intensive Cyber Environments research group (developers of the SRB, the Storage Resource Broker), and collaborators. The iRODS system is based on expertise gained through a decade of applying the SRB technology in support of Data Grids, Digital Libraries, Persistent Archives, and Real-time Data Systems. iRODS management policies (sets of assertions these communities make about their digital collections) are characterized in iRODS’s Rule and State information. At the iRODS core, a Rule Engine interprets the Rules to decide how the system is to respond to various requests and conditions. iRODS is open source under a BSD license.

We are continuing to support the SRB, and will do so for quite some time to come. Tools to migrate from SRB to iRODS are being developed.

About DICE: The Data Intensive Cyber Environments (DICE) research group leads core development of the open-source iRODS Integrated Rule-Oriented Data System. With more than a decade of award-winning research in advanced technologies for managing, sharing, publishing, and preserving digital data, the group is based at the DICE Center at the University of North Carolina at Chapel Hill, and the Institute for Neural Computation at the University of California, San Diego. The nonprofit Data Intensive CyberInfrastructure Foundation (DIF) is the home of the growing iRODS open source community, contributing to development worldwide. Development of the core iRODS data grid system is funded by the National Science Foundation and the National Archives and Records Administration.
Database Object (DBO) and DB Resource (DBR) Microservices

Can be called by client through irule.

- **msiDboExec** – Execute a database object on a DBR
- **msiDbrCommit** – Executes a commit on a DBR
- **msiDbrRollback** – Executes a rollback on a DBR

Data Object Low-level Microservices

Can be called by client through irule.

- **msiDataObjCreate** – Create a data object
- **msiDataObjOpen** – Open a data object
- **msiDataObjClose** – Close an opened data object
- **msiDataObjLseek** – Repositions the read/write offset of an open data object
- **msiDataObjRead** – Read an opened data object
- **msiDataObjWrite** – Write to an opened data object

Data Object Microservices

Can be called by client through irule.

- **msiDataObjUnlink** – Delete a data object
- **msiDataObjRepl** – Replicate a data object
- **msiDataObjCopy** – Copy a data object
- **msiDataObjGet** – Get a data object
- **msiDataObjPut** – Put a data object
- **msiDataObjChksum** – Checksum a data object
- **msiDataObjPhymv** – Move a data object from one resource to another
- **msiDataObjRename** – Rename a data object
- **msiDataObjTrim** – Trim the replicas of a data object
- **msiPhyPathReg** – Register a physical file into iRODS
- **msiObjStat** – Stat an iRODS object
- **msiDataObjRsync** – Syncs a data object from a source to a destination
- **msiCollRsync** – Recursively syncs a source collection to a target collection
- **msiGetObjType** – Finds if a given value is a data, coll, resc, ...
- **msiCheckPermission** – Check if a data object permission is the same as the one given
- **msiCheckOwner** – Check if the user is the owner of the data object
- **msiSetReplComment** – Sets the data_comments attribute of a data object

Collection Microservices

- **msiCollCreate** – Create a collection
- **msiCollRepl** – Replicate all files in a collection
- **msiRmColl** – Delete a collection
- **msiAutoReplicateService** – Checks and repairs up to n replicas
- **msiDataObjAutoMove** – Used to automatically move the newly created file into a destination collection
- **msiTarFileExtract** – Extracts a tar object file into a target collection
- **msiTarFileCreate** – Creates a tar object file from a target collection
DH Content Brings Its Own Metadata Needs

Metadata is often specific to a community, a content type, a format, or an audience.

Seeing Standards: A Visualization of the Metadata Universe, Jenn Riley.
Principles of **GOOD** Digital Initiatives

A good digital initiative (a.k.a. project, program)...

- has a substantial design and planning component.
- has an appropriate level of staffing with necessary expertise to achieve its objectives.
- follows best practices for project management.
- has an evaluation component.
- markets itself and broadly disseminates information about the initiative's process and outcomes.
- considers the entire lifecycle of the digital collection and associated services.

A Framework of Guidance for Building Good Digital Collections, NISO.
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A Framework of Guidance for Building Good Digital Collections, NISO.
The Moment of Truth, Daniel Dion (with the collaboration of Su Schnee)

The Moment of Truth (1991) was acquired by the MMFA in 1999 and consists of a 100-second videotape shown on a portable video player affixed to a wall. In the work, a sentence is repeated over and over, somewhat like a mantra, and is accompanied by a series of images that begin with nature and conclude with the fate of humanity.

The current presentation of the work differs notably from the way it was first presented. Originally, the 8 mm videotape was displayed directly on a Sony EV-300 player mounted on the wall and powered with rechargeable batteries. Following its acquisition, the tape was played by a concealed external device, which was powered by a regular electrical outlet. A few years later, the screen on the original player broke down. Because it was no longer possible to obtain the Sony device on the market, it was replaced by a model recommended by the artist, a Casio EV-870.

First problem: preservation of the viewing device

To successfully lead the conservation efforts for a work, the restorer must understand the conceptual, historical, aesthetic and operational importance of the devices that comprise it. To help identify these aspects, a discussion with the artist may be advisable. During a videotaped
xml translation of dan graham's "schema" (2004)

by matt butler

In 1966 conceptual artist Dan Graham composed a language-based work entitled Schema. The artwork consisted of a formal procedure for how to describe a document, or a "set of pages," with no real reference to the content of that document. This schema, as he called it, shares a remarkable similarity with XML, invented over 30 years later. This work is an XML implementation of Graham's Schema.
Preservation

In the four decades since video emerged as an artist's tool, an explosion of media formats has served as the catalyst for a broad array of independent media and art. With each new artistic or technical development comes a preservation challenge. Videotape decays. Playback machines break down. Computer disks become corrupted. As the worlds of art and media change, the preservation and conservation worlds change with them. Independent Media Arts Preservation (IMAP) [www.imapreserve.org] has created the Preservation sections of this website, in cooperation with EAI, as a way of bringing together the latest developments in the field of media preservation.

Whether you are a creator of media art, a caretaker, or a conservator, this site will help you better understand the problems that arise in preserving these works...and the solutions that can keep them alive for years to come.

© 2006-2009 | Independent Media Arts Preservation, Inc.
Embracing Risk, Redundancy and Community
Insuring Digital Collections

- Three possible strategies
  - Actual value
  - Replacement value
  - Self-Insure

- Start by identifying risks
  - Organizational Risks
  - Content Risks
  - Infrastructure Risks
Preservation Storage ca.1997
Local hardware and portable media
Preservation Storage ca. 2005
Networked systems and servers
Preservation Storage ca. 2013
Cloud storage providers and consortiums
Bit-level, Content, and Format Preservation

- Store
  - Fixity checks
- Refresh
- Migrate
  - LC’s Sustainability Formats
- Emulate
  - mimeTypes
  - DROID, Pronom, Global Digital Format Registry
- Encapsulation
- Preserve the Technology
- Digital Forensics
- “3-3-3” Strategy
Back-up ≠ Preservation

- Back-up ≠ Preservation
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- Back-up ≠ Preservation
- Back-up ≠ Preservation
Sustainability

“Ensuring that valuable digital assets will be available for future use is not simply a matter of finding sufficient funds.

It is about mobilizing resources—human, technical, and financial—across a spectrum of stakeholders diffuse over both space and time...”

Trustworthy Repositories Audit & Certification: Criteria and Checklist

- Builds on Open Archival Information System (OAIS) reference model

ISO/DIS 16363

- Formalizes TRAC into a Standard

Trustworthy Digital Repositories Audit & Certification (TRAC), CRL.
Preservation Infrastructure Strategies

- Redundancy within systems
- Mirrored sites
- Disaster recovery planning
- Back-up strategies
- Diversify funding sources
- Document activities
- Maintain and grow skill sets and knowledge bases
- Policies, Policies, Policies
- Planning, Planning, Planning...
- Saving for a “Rainy Day”
“But we won’t complain. You ought to have seen how it looked in the rain...” Robert Frost
First Steps to Take...
“Sheldon-ize”

- Adopt the 3-3-3 Rule
  - 3 copies on 3 media types in 3 different locations
- Ensure quality and authenticity
- Document the Work and YOUR Actions
- Anticipate future uses
- Manage rights
Thank you!

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Digital Initiatives Librarian
Worcester Polytechnic Institute