

# Fundamental Issues for Electronic Records

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# Overview

- Policy for Electronic Records Management
- Functional Requirements for Evidence
- Reference Model for Business Acceptable Communication
- Implementation Frameworks
- Moments of Risk

# Policy Frameworks

In the late 1980's:

United Nations Administrative  
Coordinating Committee for  
Information Systems (UN-ACCIS)

Electronic Records Management Guidelines: A Manual for Policy Development and Implementation. New York, NY: United Nations. (1990). see also

[http://edit.archimuse.com/publishing/electronic\\_evidence/  
ElectronicEvidence.Ch3.pdf](http://edit.archimuse.com/publishing/electronic_evidence/ElectronicEvidence.Ch3.pdf)

# Trusted Digital Repositories

Current model:

Certification for Trusted  
Digital Repositories

see [www.oclc.org/programs/ourwork/past/  
trustedrep/repositories.pdf](http://www.oclc.org/programs/ourwork/past/trustedrep/repositories.pdf)

# Problems of Policy

- Even well-meaning individuals lack mental models and software tools to comply
- Verification requires software control
- Management requires software control, vigilance and on-going funding
- Requirements for Evidence are needed in human and machine-enforceable terms

# Characteristics of Digital Records

- not human readable
- stored randomly
- no intrinsic contextual evidence
- easily altered
- brief format and media life
- require on-going intervention to survive

# Functional Requirement for Evidence

- University of Pittsburgh Project 1993-96
- University of British Columbia & InterPares Projects 1995-2002
- Many since, cf. National Archives, UK
- <http://www.nationalarchives.gov.uk/documents/requirementsfinal.pdf>

# Functional Requirements for Evidence

## **Conscientious Organization**

Compliant (1)

## **Accountable Recordkeeping System**

### **Responsible**

Assigned (2)

Documented (3)

Implemented (4)

Consistent (5)

## **Functional Records**

Comprehensive (6)

Identifiable (7)

### **Complete**

Accurate (8)

Understandable (9)

Meaningful (10)

Authorized (11)

### **Preserved**

Inviolable (12)

Coherent (13)

Auditable (14)

Removable (15)

Exportable (16)

### **Accessible**

Available (17)

Renderable (18)

Evidential (19)

Redactable (20)

- <http://web.archive.org/web/19970707060900/www.lis.pitt.edu/~nhprc/prog1.html>

# Warrant for Functional Requirements

- In every juridical system, and in most professional contexts (accounting, law, medicine, IT) we should find the warrant for functional requirements for evidence
- University of Pittsburgh project did this for the United States. Other archivists need to do it for their country.
- David Bearman and Wendy Duff, "Grounding Archival Description in the Functional Requirements for Evidence", *Archivaria*, #41, Spring 1996, p.275-303 see <http://journals.sfu.ca/archivar/index.php/archivaria>

# FR + Warrant = Metadata Requirement for Evidence

- Digital Evidence stored as a Metadata Encapsulated Object (MEO) is a Record.
- Records must be appraised, preserved for their retention period, and made available for use as evidence within a secure legal/ social framework.

# Metadata Encapsulated Object Structure

- A Reference Model for Business Acceptable Communications (BAC) was proposed 1994
- <http://web.archive.org/web/19970707064048/http://www.lis.pitt.edu/~nhprc/prog6-5.html>
- It ensures interoperability of any Record across repositories and contains metadata provably sufficient to satisfy the Functional Requirements for Evidence.

# BAC Data Structure

## **Handle Layer**

Registration Metadata/Properties

Record Identifier

Information Discovery and Retrieval

## **Terms & Conditions Layer**

Rights Status Metadata

Access Metadata

Use Metadata

Retention Metadata

## **Structural Layer**

File Identification <Repeatable for each file>

File Encoding Metadata <Repeatable for each file>

File Rendering Metadata <Repeatable for each file>

Record Rendering Metadata <for whole record>

Content Structure Metadata

Source Metadata

## **Contextual Layer**

Transaction Context

Responsibility

Business Function

## **Content Layer**

Content-Description

## **Use History Layer <Repeatable Transaction Table>**

- BAC Records satisfy FR's for Evidence

- Metadata Specification

- Production Rules (prototype)

- <http://web.archive.org/web/19970707063459/http://www.lis.pitt.edu/~nhprc/BACartic.html>

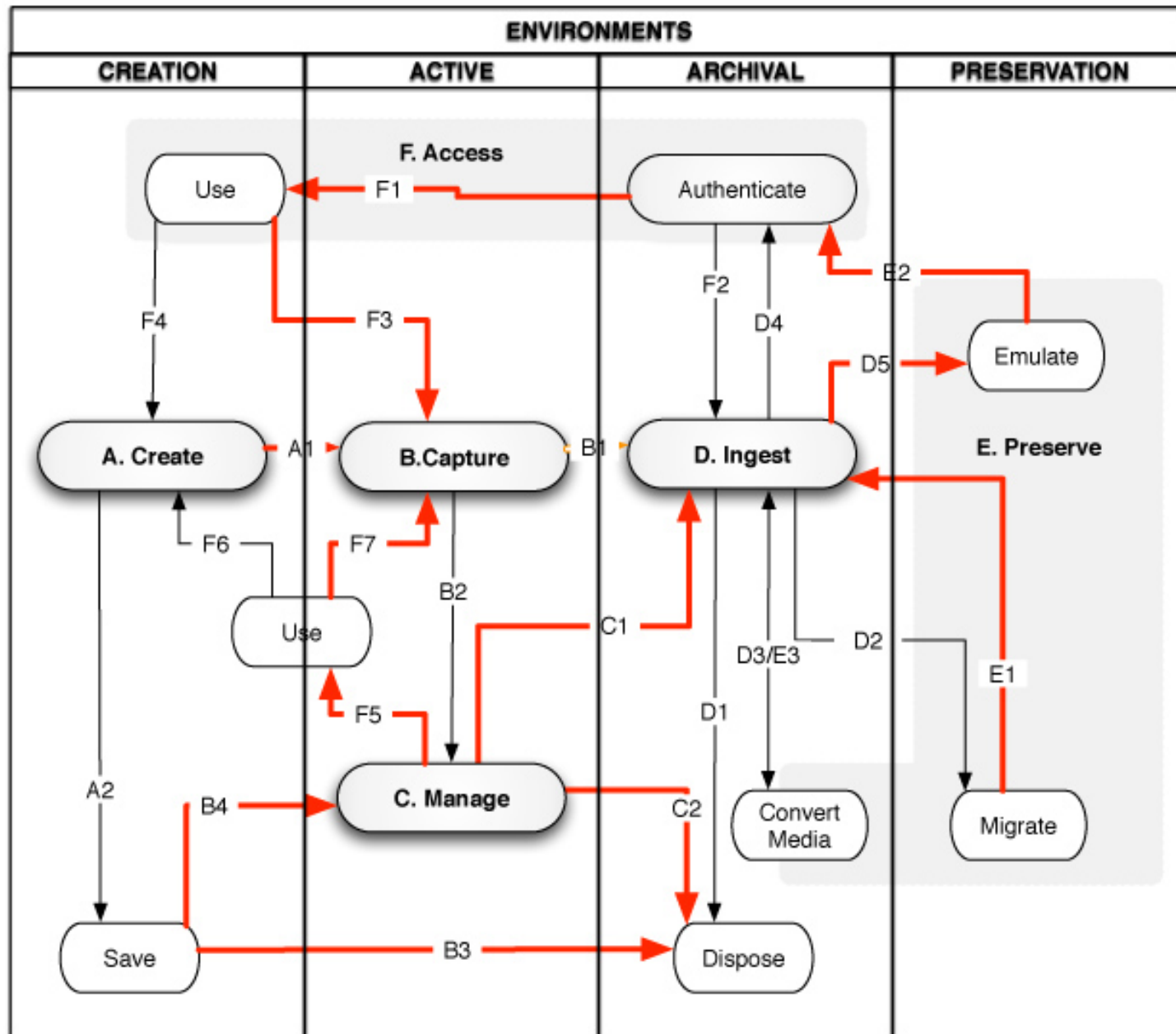
# Implementation Framework

- Trans-action = Any Communication
- All Transactions require Records
- Capture Transaction at Time of Creation
- Appraise Records using Contextual Metadata
- Records Contain Records (Big fish eat little fish)
- Structural Metadata enables Migration
- Archives Certifies Copies, retains original

# Moments of Risk

- Risk to Digital Evidence most severe when the Record is moving beyond the control of one software environment, into another
- “Moments of Risk: Identifying Threats to Electronic Records”, *Archivaria*, 62, 2006. See <http://journals.sfu.ca/archivar/index.php/archivaria>

# Moments of Risk



heavy lines signify transformations that represent substantial moments of risk

# Specifications for Recordkeeping Systems

## Framework. European Commission 2001

Model Requirements for the Management of Electronic Records: MoReq  
Specification [www.digitaleduurzaamheid.nl/bibliotheek/docs/moreq.pdf](http://www.digitaleduurzaamheid.nl/bibliotheek/docs/moreq.pdf)

## Technical Specification. UK PRO 2002

Requirements for Electronic Records Management Systems London: Public  
Records Office. 2002

Vol 1 Functional Requirements.

Vol 2 Metadata Standard

Vol 3 Reference Document

see. <http://www.nationalarchives.gov.uk/electronicrecords/reqs2002/default.htm>

# Long-term Preservation Environment

- trusted digital repositories serve as the social and economic framework
- “lots of copies keep stuff safe”
- network-wide format migration
- original formats are retained also
- only certified copies are provided for use
- copyright freedom within archiving

# Proposed Infrastructure

- Collaboration on a world-wide scale could
  - solve format migration
  - address LOCKSS requirements
  - introduce archival capture as a service within transmission infrastructure
- **David Bearman**, “Addressing Selection and Digital Preservation as Systemic Problems”, in Yola de Lusenet and Vincent Wintermans, eds. Preserving the Digital Heritage: Principles and Policies, European Commission for Preservation and Access, Den Haag, 2007 ISBN 978-90-6984-523-4, pp. 26-44 <http://www.knaw.nl/publ/pdf/ecpa/>

# Status - 2007

- no National Archive has yet implemented a fully successful system for digital evidence
- most electronic records of the past fifty years have been irretrievably lost
- your experimentation will not make matters worse and might lead to success

**Thank you.**

**feel free to write me  
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