
MetaArchive Cooperative TRAC Audit Checklist



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Executive Summary

The MetaArchive Cooperative worked with a consultant to conduct a preservation self-assessment between June and December 2009, using the *Trusted Repositories Audit & Certification: Criteria & Checklist* (TRAC).

We are pleased to report that the MetaArchive Cooperative:

- *Conforms to all 84 criteria specified by TRAC and operates according to the standards of a trustworthy digital repository across each of TRAC's three major areas of activity and concern: Organizational Infrastructure, Digital Object Management, and Technologies, Technical Infrastructure and Security, and*
- *Has undertaken 15 reviews and/or improvements to its documentation and operations as a result of its self-assessment findings (see Findings and Observations within the checklist below).*

This report contains a checklist version of these audit outcomes. The checklist is organized according to TRAC's three major areas of activity and concern. For each of TRAC's 84 criteria, this checklist provides a statement of conformance, evidence for that conformance, findings and observations of note, as well as brief descriptions of any reviews and/or improvements identified during the course of the assessment.

Methodology

Between June and December 2009, contract consultant Matt Schultz reviewed available documentation from the MetaArchive Cooperative public website and internal wikis; observed administrative activities; and performed interviews with the MetaArchive Cooperative's Program Director, Systems Administrator and Software Engineer and the LOCKSS Program's Program Director and Chief Scientist. The findings detailed in this report are a direct product of this source material and these conversations.

Audit Criteria and Checklist

TRAC is an audit tool based upon the ISO 14721:2003 Open Archival Information System: Reference Model (OAIS). It seeks evidence that a digital repository reliably preserves digital content, where "preservation" is defined in OAIS terms as storage, migration, and access. This assessment was conducted using TRAC Version 1.0, as obtained from the Center for Research Libraries on June 1, 2009: http://www.crl.edu/sites/default/files/attachments/pages/trac_0.pdf.

TRAC is currently undergoing consideration to become an ISO standard for certifying repositories, but at present there is not yet a widely recognized or trusted authority to issue formal auditor credentials or certification using TRAC on behalf of the digital preservation community.

A. Organizational Infrastructure

A1. Governance & organizational viability

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
A1.1. Repository has a mission statement that reflects a commitment to the long-term retention of, management of, and access to digital information.	<ul style="list-style-type: none">▪ MetaArchive Charter (pages 3-4)▪ Mission statement: http://www.metaarchive.org/about		Conforms
A1.2. Repository has an appropriate, formal succession plan, contingency plans, and/or escrow arrangements in place in case the repository ceases to operate or the governing or funding institution substantially changes its scope.	<ul style="list-style-type: none">▪ MetaArchive Charter (page 14)▪ Member Agreement (page 10)▪ Fourth interim report to NHPRC▪ MetaArchive/Chronopolis Documentation (forthcoming)	As of April 2010, the MetaArchive Cooperative is documenting a series of successful tests conducted in 2009 with the Chronopolis team (SDSC) using BagIt files to transfer content from MetaArchive's LOCKSS-based system into Chronopolis's Storage Resource Broker (SRB) Data Grid Management System. This work ensures that the MetaArchive Cooperative provides its content contributors with an exit strategy that uses a non-PLN-based preservation solution.	Conforms

A2. Organizational structure & staffing

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
<p>A2.1. Repository has identified and established the duties that it needs to perform and has appointed staff with adequate skills and experience to fulfill these duties.</p>	<ul style="list-style-type: none"> ▪ NDIIPP Management Plan ▪ Educopia Institute Employee Handbook ▪ Job Descriptions ▪ Core Competencies ▪ Performance Evaluations 		Conforms
<p>A2.2. Repository has the appropriate number of staff to support all functions and services.</p>	<ul style="list-style-type: none"> ▪ NDIIPP Management Plan ▪ Semi-annual Educopia Board evaluation 		Conforms
<p>A2.3. Repository has an active professional development program in place that provides staff with skills and expertise development opportunities.</p>	<ul style="list-style-type: none"> ▪ Staff Development Plans ▪ Outreach Program Implementation Plan ▪ Conference attendance and presentations ▪ Fourth interim report to NHPRC ▪ Internal training workshops 		Conforms

A3. Procedural accountability & policy framework

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
A3.1. Repository has defined its designated community(ies) and associated knowledge base(s) and has publicly accessible definitions and policies in place to dictate how its preservation service requirements will be met.	<ul style="list-style-type: none"> ▪ MetaArchive Charter ▪ Member Agreement ▪ Mission statement: http://www.metaarchive.org/about ▪ MetaWiki documentation (Members/Staff) 		Conforms
A3.2. Repository has procedures and policies in place, and mechanisms for their review, update, and development as the repository grows and as technology and community practice evolve.	<ul style="list-style-type: none"> ▪ Weekly staff and member meeting notes ▪ Bi-weekly committee meeting minutes ▪ Annual membership meeting minutes ▪ MetaWiki documentation (Members/Staff) ▪ InterWiki documentation (Staff) 		Conforms
A3.3. Repository maintains written policies that specify the nature of any legal permissions required to preserve digital content over time, and repository can demonstrate that these permissions have been acquired when needed.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 9) ▪ Member Agreement (page 9) ▪ LOCKSS manifest pages 		Conforms
A3.4. Repository is committed to formal, periodic review and assessment to ensure responsiveness to technological developments and evolving requirements.	<ul style="list-style-type: none"> ▪ Annual membership meeting minutes ▪ Contract and grant reports/documentation: http://www.metaarchive.org ▪ DRAMBORA and TRAC self-audits 2009 		Conforms

A3. Procedural accountability & policy framework (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
A3.5. Repository has policies and procedures to ensure that feedback from producers and users is sought and addressed over time.	<ul style="list-style-type: none"> ▪ Annual membership meeting minutes ▪ RT Ticketing system, administrative and technical listservs ▪ Trac bug tracking software ▪ Annual membership surveys 	As a result of this audit, MetaArchive staff members implemented new request tracker software (RT) to replace Trac in their support workflow in March 2010.	Conforms
A3.6. Repository has a documented history of the changes to its operations, procedures, software, and hardware that, where appropriate, is linked to relevant preservation strategies and describes potential effects on preserving digital content.	<ul style="list-style-type: none"> ▪ Documentation available at: http://metaarchive.org/resources ▪ MetaWiki documentation (Member/Staff) ▪ Interwiki documentation (Staff) 	MetaArchive has an extensive and well-organized series of documentation addressing this concern. Improved policies for maintaining previous versions of wiki documentation are under development by MetaArchive staff.	Conforms
A3.7. Repository commits to transparency and accountability in all actions supporting the operation and management of the repository, especially those that affect the preservation of digital content over time.	<ul style="list-style-type: none"> ▪ Operations and Management plans: http://www.metaarchive.org/resources ▪ Contract and grant reports/documentation: http://www.metaarchive.org ▪ Weekly member meeting minutes ▪ Audit tools (Cache Manager, LOCKSS UI) 	MetaArchive staff are currently enhancing their reporting strategies and policies in order to provide content contributors with regular reports that are delivered to them in addition to the current reports that are already available on demand through audit tools such as the Cache Manager and LOCKSS UI.	Conforms
A3.8 Repository commits to defining, collecting, tracking, and providing, on demand, its information integrity measurements.	<ul style="list-style-type: none"> ▪ Audit tools (Cache Manager, LOCKSS UI) ▪ MetaArchive-LOCKSS daemon status logs 	The LOCKSS user interface, daemon logs, Cache Manager and network reports communicate information integrity on demand to both staff and members.	Conforms

A3. Procedural accountability & policy framework (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
A3.9 Repository commits to a regular schedule of self-assessment and certification and, if certified, commits to notifying certifying bodies of operational changes that will change or nullify its certification status.	<ul style="list-style-type: none"> ▪ 2007 NEDCC Digital Preservation Readiness Assessment ▪ 2009 DRAMBORA Risk Assessment ▪ 2009 TRAC Self Audit 		Conforms

A4. Financial sustainability

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
A4.1. Repository has short- and long-term business planning processes in place to sustain the repository over time.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 12) ▪ Operations, Management, Financial plans, Annual membership meeting minutes ▪ Semi-Annual Educopia Board meeting minutes 	The MetaArchive Cooperative is currently working on a Preservation Business Model that will include additional documentation on the revenue streams and anticipated areas of growth for the organization and its host, the Educopia Institute (forthcoming, May 2010).	Conforms
A4.2. Repository has in place processes to review and adjust business plans at least annually.	<ul style="list-style-type: none"> ▪ Annual membership meeting minutes ▪ Semi-annual Educopia Board meeting minutes 		Conforms
A4.3. Repository's financial practices and procedures are transparent, compliant with relevant accounting standards and practices, and audited by third parties in accordance with territorial legal requirements.	<ul style="list-style-type: none"> ▪ Management Plan ▪ Financial Plan ▪ Monthly and quarterly federal financial reports to the Library of Congress 	The MetaArchive Cooperative's financial management is handled by the Educopia Institute, and is subject to accounting standards as they apply to a 501c3 non-profit organization operating in the state of Georgia. MetaArchive has consulted with an accounting firm since 2006 to ensure proper accounting procedures. The Cooperative will undergo its first external accounting audit in 2011.	Conforms
A4.4. Repository has ongoing commitment to analyze and report on risk, benefit, investment, and expenditure (including assets, licenses, and liabilities).	<ul style="list-style-type: none"> ▪ Market Analysis ▪ Financial Plan ▪ Preservation Business Model (in draft form) 		Conforms

A4. Financial sustainability (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
A4.5. Repository commits to monitoring for and bridging gaps in funding.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 12) ▪ Operations, Management, Financial Plans ▪ Annual membership meeting minutes ▪ Semi-Annual Educopia Board meeting minutes 	The auditor observed that the Program Director, in coordination with the Educopia Institute Board of Directors, regularly evaluates the program’s funding and keeps financial projections as part of the overall accounting for the Cooperative’s activities.	Conforms

A5. Contracts, licenses, & liabilities

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
A5.1 If repository manages, preserves, and/or provides access to digital materials on behalf of another organization, it has and maintains appropriate contracts or deposit agreements.	<ul style="list-style-type: none"> ▪ Member Agreement ▪ Manifest pages 	Redundant copies of Member Agreements are filed systematically at the offices of the Program Director and the President. The Program Director plans to begin preserving these Member Agreements within the MetaArchive network in 2010.	Conforms
A5.2 Repository contracts or deposit agreements must specify and transfer all necessary preservation rights, and those rights transferred must be documented.	<ul style="list-style-type: none"> ▪ Member Agreement ▪ Manifest pages 		Conforms
A5.3 Repository has specified all appropriate aspects of acquisition, maintenance, access, and withdrawal in written agreements with depositors and other relevant parties.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 8) ▪ Member Agreement (pages 5-10) ▪ Manifest pages 		Conforms
A5.4 Repository tracks and manages intellectual property rights and restrictions on use of repository content as required by deposit agreement, contract, or license.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 8) ▪ Member Agreement (pages 5-10) ▪ Manifest pages 		Conforms
A5.5 If repository ingests digital content with unclear ownership/rights, policies are in place to address liability and challenges to those rights.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 14) ▪ Member Agreement (page 7) 		Conforms

B. Digital Object Maintenance

B1. Ingest: Acquisition of Content

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B1.1. Repository identifies properties it will preserve for digital objects.	<ul style="list-style-type: none"> ▪ NDIIPP MetaArchive Scope Document ▪ LOCKSS Overview: http://www.lockss.org/lockss/How_It_Works ▪ LOCKSS Publications: http://www.lockss.org/lockss/Publications ▪ MetaWiki documentation (Member/Staff) 	MetaArchive is in the process of developing a formal Collection Policy as an outgrowth of its existing Scope Document and MetaWiki documentation.	Conforms
B1.2. Repository clearly specifies the information that needs to be associated with digital material at the time of its deposit (i.e., SIP).	<ul style="list-style-type: none"> ▪ Manifest pages ▪ Plugin definitions ▪ Conspectus Schema ▪ MetaWiki documentation (Member/Staff) 	Helpful instructions for preparing digital material for ingest are currently available in the MetaWiki. MetaArchive is in the process of developing a more formal technical procedures manual for ingest activities that will be made available on the MetaWiki.	Conforms
B1.3. Repository has mechanisms to authenticate the source of all materials.	<ul style="list-style-type: none"> ▪ Manifest page ▪ Plugin definitions ▪ Secure Sockets Layer ▪ LOCKSS network/polling operations 		Conforms
B1.4. Repository's ingest process verifies each submitted object (i.e., SIP) for completeness and correctness as specified in B1.2.	<ul style="list-style-type: none"> ▪ LOCKSS network/polling operations ▪ Audit tools (Cache Manager, LOCKSS UI) 		Conforms

B1. Ingest: Acquisition of Content (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B1.5. Repository obtains sufficient physical control over the digital objects to preserve them (Ingest: content acquisition).	<ul style="list-style-type: none"> ▪ LOCKSS network/polling operations ▪ Secure Socket Layers 		Conforms
B1.6. Repository provides producer/depositor with appropriate responses at predefined points during the ingest processes.	<ul style="list-style-type: none"> ▪ Audit tools (Cache Manager, LOCKSS UI) 		Conforms
B1.7. Repository can demonstrate when preservation responsibility is formally accepted for the contents of the submitted data objects (i.e., SIPs).	<ul style="list-style-type: none"> ▪ Conspectus database ▪ Audit tools (Cache Manager, LOCKSS UI) 		Conforms
B1.8. Repository has contemporaneous records of actions and administration processes that are relevant to preservation.	<ul style="list-style-type: none"> ▪ MetaWiki documentation (Member/Staff) ▪ MetaArchive-LOCKSS daemon status log ▪ Audit tools (Cache Manager, LOCKSS UI) 		Conforms

B2. Ingest: Creation of the Archival Package

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B2.1. Repository has an identifiable, written definition for each AIP or class of information preserved by the repository.	<ul style="list-style-type: none"> ▪ Manifest page ▪ Plugin definitions ▪ (POSIX) file system specification ▪ WARC file format specification ▪ MetaWiki documentation (Member/Staff) 		Conforms
B2.2. Repository has a definition of each AIP (or class) that is adequate to fit long- term preservation needs.	<ul style="list-style-type: none"> ▪ MetaWiki documentation (Member/Staff) 		Conforms
B2.3. Repository has a description of how AIPs are constructed from SIPs	<ul style="list-style-type: none"> ▪ MetaWiki documentation (Member/Staff) 		Conforms
B2.4. Repository can demonstrate that all submitted objects (i.e., SIPs) are either accepted as whole or part of an eventual archival object (i.e., AIP), or otherwise disposed of in a recorded fashion.	<ul style="list-style-type: none"> ▪ MetaArchive test network protocols ▪ Audit tools (Cache Manager, LOCKSS UI) ▪ Audit proxy feature 		Conforms
B2.5. Repository has and uses a naming convention that generates visible, persistent, unique identifiers for all archived objects (i.e., AIPs).	<ul style="list-style-type: none"> ▪ Plugin definitions ▪ Base_URL for collections ▪ MetaArchive Collection Identifier (Conspectus database) 		Conforms

B2. Ingest: Creation of the Archival Package (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B2.6. If unique identifiers are associated with SIPs before ingest, the repository preserves the identifiers in a way that maintains a persistent association with the resultant archived object (e.g., AIP).	<ul style="list-style-type: none"> Institution Collection Identifier (Conspectus database) 	Unique identifiers that are used by members for their internal repository purposes, can be recorded in the Conspectus database, and can be used in conjunction with the MetaArchive Collection Identifier for validation.	Conforms
B2.7. Repository demonstrates that it has access to necessary tools and resources to establish authoritative semantic or technical context of the digital objects it contains (i.e., access to appropriate international Representation Information and format registries).	<ul style="list-style-type: none"> HTTP protocols (enables browser retrieval/rendering) MIME Type protocols (enables browser retrieval/rendering) LOCKSS network/polling operations (handles fixity) LOCKSS format migration solution: http://www.dlib.org/dlib/january05/rosenthal/01rosenthal.html (plugins supporting migration on access) 	MetaArchive currently relies upon LOCKSS format agnostic preservation operations and the success of format migrations conducted by the LOCKSS team. MetaArchive is discussing the future benefit of relying upon Unified Digital Formats Registry (UDFR) resources, and similar such tools and services for validation purposes.	Conforms
B2.8 Repository records/registers Representation Information (including formats) ingested.	<ul style="list-style-type: none"> LOCKSS format migration: http://www.dlib.org/dlib/january05/rosenthal/01rosenthal.html 	LOCKSS performs bit-level preservation for web-enabled formats that are widely supported by web browser technologies.	Conforms
B2.9 Repository acquires preservation metadata (i.e., PDI) for its associated Content Information.	<ul style="list-style-type: none"> Plugin definitions (defines and enforces context) HTTP Headers (assists with provenance, reference) Conspectus database (reference, provenance, access rights) LOCKSS network/polling operations (ensures fixity) 		Conforms

B2. Ingest: Creation of the Archival Package (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B2.10 Repository has a documented process for testing understandability of the information content and bringing the information content up to the agreed level of understandability.	<ul style="list-style-type: none"> ▪ MetaWiki documentation (Member/Staff) 		Conforms
B2.11 Repository verifies each AIP for completeness and correctness at the point it is generated.	<ul style="list-style-type: none"> ▪ MetaArchive test network protocols ▪ Audit tools (Cache Manager, LOCKSS UI) ▪ Audit proxy feature 		Conforms
B2.12 Repository provides an independent mechanism for audit of the integrity of the repository collection/content.	<ul style="list-style-type: none"> ▪ LOCKSS network/storage operations ▪ Audit tools (Cache Manager, LOCKSS UI) ▪ Audit proxy feature 		Conforms
B2.13 Repository has contemporaneous records of actions and administration processes that are relevant to preservation (AIP creation).	<ul style="list-style-type: none"> ▪ MetaWiki documentation (Member/Staff) ▪ Listservs ▪ MetaArchive-LOCKSS daemon status log ▪ Audit tools (Cache Manager, LOCKSS UI) 		Conforms

B3. Preservation Planning

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B3.1. Repository has documented preservation strategies.	<ul style="list-style-type: none"> ▪ MetaArchive Project Documentation http://www.metaarchive.org/projects ▪ MetaArchive Publications http://www.metaarchive.org/publications ▪ LOCKSS Overview http://www.lockss.org/lockss/How_It_Works ▪ LOCKSS Publications http://www.lockss.org/lockss/Publications ▪ MetaWiki documentation (Member/Staff) ▪ InterWiki documentation (Staff) 	The MetaArchive Cooperative is discussing the incorporation of formal Preservation Plans and Review Policies in conjunction with their Preservation Business Model.	Conforms
B3.2. Repository has mechanisms in place for monitoring and notification when Representation Information (including formats) approaches obsolescence or is no longer viable.	<ul style="list-style-type: none"> ▪ HTTP protocols (enables browser retrieval/rendering) ▪ MIME Type protocols (enables browser retrieval/rendering) ▪ LOCKSS network/polling operations (handles fixity) ▪ LOCKSS format migration solution: http://www.dlib.org/dlib/january05/rosenthal/01rosenthal.html (plugins supporting migration on access) 	MetaArchive is discussing the future benefit of relying upon Unified Digital Formats Registry (UDFR) resources, and similar such tools and services for validation purposes. No formats currently preserved in the MetaArchive network are in danger of going obsolete.	Conforms
B3.3 Repository has mechanisms to change its preservation plans as a result of its monitoring activities.	<ul style="list-style-type: none"> ▪ Weekly staff and member meetings ▪ Bi-weekly committee meetings ▪ Annual member meetings 		Conforms
B3.4. Repository can provide evidence of the effectiveness of its preservation planning.	<ul style="list-style-type: none"> ▪ MetaArchive Project Documentation http://www.metaarchive.org/projects ▪ MetaArchive Publications http://www.metaarchive.org/publications ▪ MetaWiki Documentation (Members/Staff) 		Conforms

B4. Archival Storage & Preservation/Maintenance of AIPs

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B4.1. Repository employs documented preservation strategies.	<ul style="list-style-type: none"> ▪ MetaWiki documentation (Member/Staff) ▪ MetaArchive Publications 		Conforms
B4.2. Repository implements/responds to strategies for archival object (i.e., AIP) storage and migration.	<ul style="list-style-type: none"> ▪ RT Ticketing system, administrative and technical listservs ▪ Trac bug tracking software ▪ MetaArchive-LOCKSS storage/network operations 	MetaArchive is also developing a more formal technical procedures manual for content access and recovery activities that will be available through the MetaWiki in 2010.	Conforms
B4.3 Repository preserves the Content Information of archival objects (i.e., AIPs).	<ul style="list-style-type: none"> ▪ LOCKSS network/polling operations ▪ Audit tools (Cache Manager, LOCKSS UI) ▪ Audit proxy feature 		Conforms
B4.4 Repository actively monitors integrity of archival objects (i.e., AIPs).	<ul style="list-style-type: none"> ▪ LOCKSS network/polling operations ▪ Audit tools (Cache Manager, LOCKSS UI) ▪ Audit proxy feature ▪ Cache/network polling reports ▪ Weekly staff and member meetings 	Helpful instructions for auditing content in its preserved state are available on the MetaWiki. MetaArchive is in the process of developing a more formal technical procedures manual for content monitoring activities that will be available through the MetaWiki in 2010.	Conforms
B4.5 Repository has contemporaneous records of actions and administration processes that are relevant to preservation (Archival Storage).	<ul style="list-style-type: none"> ▪ Audit tools (Cache Manager, LOCKSS UI) ▪ Audit proxy feature ▪ Weekly staff and member meetings ▪ Bi-weekly committee meetings ▪ MetaWiki documentation (Members/Staff) ▪ InterWiki documentation (Staff) 		Conforms

B5. Information Management

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B5.1 Repository articulates minimum metadata requirements to enable the designated community to discover and identify material of interest.	<ul style="list-style-type: none"> ▪ Conspectus Schema 		Conforms
B5.2 Repository captures or creates minimum descriptive metadata and ensures that it is associated with the archived object (i.e., AIP).	<ul style="list-style-type: none"> ▪ HTTP Headers (http://www.lockss.org/lockss/Daemon_Release_Notes - see LOCKSS daemon release 1.38.4) ▪ Conspectus database 	MetaArchive staff members are currently researching further strategies for ensuring that stored metadata is secured more fully and better integrated with content in the face of loss or corruption.	Conforms
B5.3 Repository can demonstrate that referential integrity is created between all archived objects (i.e., AIPs) and associated descriptive information.	<ul style="list-style-type: none"> ▪ Title Database ▪ Conspectus database 	A Conspectus database entry must be created for a collection before caches ingest it into the MetaArchive preservation network.	Conforms
B5.4 Repository can demonstrate that referential integrity is maintained between all archived objects (i.e., AIPs) and associated descriptive information.	<ul style="list-style-type: none"> ▪ Title Database ▪ Conspectus database 		Conforms

B6. Access Management

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B6.1 Repository documents and communicates to its designated community what access and delivery options are available.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 14) ▪ Member Agreement (page 9) 	MetaArchive is also currently developing a more formal set of Access & Use Policies for members and staff that will be issued in 2010.	Conforms
B6.2 Repository has implemented a policy for recording all access actions (includes requests, orders etc.) that meet the requirements of the repository and information producers/depositors.	<ul style="list-style-type: none"> ▪ MetaArchive-LOCKSS daemon status logs ▪ Secure Sockets Layer 		Conforms
B6.3 Repository ensures that agreements applicable to access conditions are adhered to.	<ul style="list-style-type: none"> ▪ MetaArchive Charter (page 14) ▪ Member Agreement (page 9) 		Conforms
B6.4 Repository has documented and implemented access policies (authorization rules, authentication requirements) consistent with deposit agreements for stored objects.	<ul style="list-style-type: none"> ▪ See Section B6.1 		Conforms
B6.5 Repository access management system fully implements access policy.	<ul style="list-style-type: none"> ▪ MetaArchive-LOCKSS daemon status logs ▪ Secure Sockets Layer ▪ Audit proxy feature 		Conforms
B6.6 Repository logs all access management failures, and staff review inappropriate “access denial” incidents.	<ul style="list-style-type: none"> ▪ MetaArchive-LOCKSS daemon status logs 		Conforms

B6. Access Management (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
B6.7 Repository can demonstrate that the process that generates the requested digital object(s) (i.e., DIP) is completed in relation to the request.	<ul style="list-style-type: none"> ▪ LOCKSS UI ▪ Audit proxy feature ▪ Plugin repository ▪ Conspectus metadata 		Conforms
B6.8 Repository can demonstrate that the process that generates the requested digital object(s) (i.e., DIP) is correct in relation to the request.	<ul style="list-style-type: none"> ▪ Audit proxy feature 		Conforms
B6.9 Repository demonstrates that all access requests result in a response of acceptance or rejection.	<ul style="list-style-type: none"> ▪ Audit proxy feature ▪ MetaArchive-LOCKSS daemon status log 		Conforms
B6.10 Repository enables the dissemination of authentic copies of the original or objects traceable to originals.	<ul style="list-style-type: none"> ▪ LOCKSS network/polling operations ▪ LOCKSS UI ▪ Audit proxy feature 		Conforms

C. Technologies, Technical Infrastructure, & Security

C1. System Infrastructure

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
C1.1 Repository functions on well-supported operating systems and other core infrastructural software.	<ul style="list-style-type: none"> RedHat Linux CentOS 		Conforms
C1.2 Repository ensures that it has adequate hardware and software support for backup functionality sufficient for the repository's services and for the data held, e.g., metadata associated with access controls, repository main content.	<ul style="list-style-type: none"> LOCKSS network/polling operations MetaArchive-LOCKSS storage/network operations MetaArchive EC2 Cloud Backup Strategies: (public web server, administrative server) 		Conforms
C1.3 Repository manages the number and location of copies of all digital objects.	<ul style="list-style-type: none"> Audit tools (Cache Manager, LOCKSS UI) Listservs & Weekly meetings: (cache replication assignments) Conspectus Database 		Conforms
C1.4 Repository has mechanisms in place to ensure any/multiple copies of digital objects are synchronized.	<ul style="list-style-type: none"> LOCKSS network/storage operations Audit tools (Cache Manager, LOCKSS UI) 		Conforms
C1.5 Repository has effective mechanisms to detect bit corruption or loss.	<ul style="list-style-type: none"> LOCKSS network/polling operations 		Conforms
C1.6 Repository reports to its administration all incidents of data corruption or loss, and steps taken to repair/replace corrupt or lost data.	<ul style="list-style-type: none"> LOCKSS network/polling operations MetaArchive-LOCKSS daemon status log Cache/network polling reports 		Conforms

C1. System Infrastructure (cont.)

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
C1.7 Repository has defined processes for storage media and/or hardware change (e.g., refreshing, migration).	<ul style="list-style-type: none"> ▪ Technical Specifications (page 2) 		Conforms
C1.8 Repository has a documented change management process that identifies changes to critical processes that potentially affect the repository's ability to comply with its mandatory responsibilities.	<ul style="list-style-type: none"> ▪ LOCKSS software development cycle ▪ MetaArchive test network protocols ▪ Weekly staff and member meetings ▪ Bi-weekly committee meetings ▪ Annual member meetings ▪ Listservs 		Conforms
C1.9 Repository has a process for testing the effect of critical changes to the system.	<ul style="list-style-type: none"> ▪ LOCKSS software development cycle ▪ MetaArchive test network protocols 		Conforms
C1.10 Repository has a process to react to the availability of new software security updates based on a risk-benefit assessment.	<ul style="list-style-type: none"> ▪ MetaArchive test network protocols ▪ CentOS auto-security updates 		Conforms

C2. Appropriate Technologies

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
<p>C2.1 Repository has hardware technologies appropriate to the services it provides to its designated communities and has procedures in place to receive and monitor notifications, and evaluate when hardware technology changes are needed.</p>	<ul style="list-style-type: none"> ▪ Weekly staff and member meetings ▪ Bi-weekly committee meetings ▪ Annual meetings ▪ Conference attendance ▪ Relationships with other digital preservation groups (NDIIPP, DCC, Chronopolis, etc) 		Conforms
<p>C2.2 Repository has software technologies appropriate to the services it provides to its designated community(ies) and has procedures in place to receive and monitor notifications, and evaluate when software technology changes are needed.</p>	<ul style="list-style-type: none"> ▪ LOCKSS software development cycle ▪ MetaArchive test network protocols ▪ Weekly staff and member meetings ▪ Bi-weekly committee meetings ▪ Annual member meetings ▪ Listservs 		Conforms

C3. Security

Criterion	Evidence (Documents) Examined	Findings and Observations	Results
C3.1 Repository maintains a systematic analysis of such factors as data, systems, personnel, physical plant, and security needs.	<ul style="list-style-type: none"> ▪ Weekly staff and member meetings ▪ Cache/network polling reports ▪ MetaArchive-LOCKSS daemon status logs 		Conforms
C3.2 Repository has implemented controls to adequately address each of the defined security needs.	<ul style="list-style-type: none"> ▪ LOCKSS network/storage operations 		Conforms
C3.3 Repository staff have delineated roles, responsibilities, and authorizations related to implementing changes within the system.	<ul style="list-style-type: none"> ▪ Documentation forthcoming 	The auditor observed that MetaArchive staff and members currently observe best practices for authorizations, but a well-documented set of policies and procedures is also under development in conjunction with more formal Access & Use Policies for members and staff.	Conforms
C3.4 Repository has suitable written disaster preparedness and recovery plan(s), including at least one off-site backup of all preserved information together with an off-site copy of the recovery plan(s).	<ul style="list-style-type: none"> ▪ See Section A1.2 ▪ LOCKSS network/storage operations ▪ Sourceforge Software Repository ▪ Stanford's Backup and Recovery Service BaRS ▪ MetaArchive EC2 Cloud Backup Strategies: (public web server, administrative server) 		Conforms