Trust, Audit and Certification

Compliance

- Trustworthy repositories
- Compliance to best practices, standards
- 4 core initiatives, of which 2 prescriptive
  - RLG- National Archives and Records Administration Digital Repository Certification Task Force:
    Trustworthy Repositories Audit & Certification: Criteria and Checklist (TRAC)
  - NESTOR:
    Catalogue of Criteria of Trusted Digital Repositories
  - Data Seal of Approval
    http://www.datasealofapproval.org
  - DCC/DPE:
    DRAMBORA: Digital Repository Audit Method Based on Risk Assessment
- Partially aligned with OAIS model

Trustworthy Repositories Audit & Certification: Criteria and Checklist

Contents:

Introduction
Establishing Audit and Certification Criteria
Towards an International Audit & Certification Process
Using this Checklist for Audit & Certification
Applicability of Criteria
Relevant Standards, Best Practices & Controls
Terminology
Audit and Certification Criteria
Organizational Infrastructure
Digital Object Management
Technologies, Technical Infrastructure & Security
Audit Checklist
Glossary
Appendices

Version 1.0
February 2007

Catalogue of Criteria for Trusted Digital Repositories

Version 1
(draft for public comment)

Published by
Nestor working group –Trusted repositories – Certification

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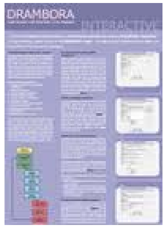
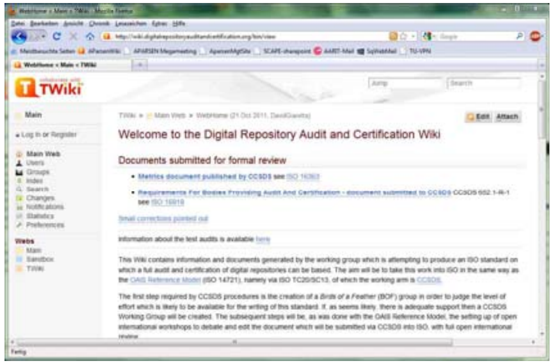


Trust in a Repository

- How is trust established, maintained, and secured?
- How to verify trust?
- Audit and Certification



TWiki » Main Web » WebHome (21 Oct 2011, DavidGiaretta)

Welcome to the Digital Repository Audit and Certification Wiki

Documents submitted for formal review

- Metrics document published by CCSDS see ISO 16363
- Requirements For Bodies Providing Audit And Certification - document submitted to CCSDS CCSDS 652.1-R-1 see ISO 16919

Small corrections pointed out

Information about the test audits is available here

This Wiki contains information and documents generated by the working group which is attempting to produce an ISO standard on which a full audit and certification of digital repositories can be based. The aim will be to take this work into ISO in the same way as the OAIS Reference Model (ISO 14721), namely via ISO TC20/SC13, of which the working arm is CCSDS.

The first step required by CCSDS procedures is the creation of a *Birds of a Feather* (BOF) group in order to judge the level of effort which is likely to be available for the writing of this standard. If, as seems likely, there is adequate support then a CCSDS Working Group will be created. The subsequent steps will be, as was done with the OAIS Reference Model, the setting up of open international workshops to debate and edit the document which will be submitted via CCSDS into ISO, with full open international review.

- Digital Repository
  Audit and Certification Wiki
  - http://wiki.digitalrepositoryauditandcertification.org/bin/view
  - ISO/DIS 16363 - Audit and certification of trustworthy digital repositories
  - ISO/DIS 16919 - Requirements for bodies providing audit and certification of candidate trustworthy digital repositories
- TRAC, 3 Sections
  - Organizational Infrastructure
  - Digital Object Management
  - Technologies, Technical Infrastructure & Security

TRAC and Preservation Planning 1:

- **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
  - Watch Services, triggers
  - Verification against changes in the environment
  - Update of preservation plans
- **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
  - History of preservation plans (created, reviewed and updated)
  - Plato: Automated documentation of planning activities

Compliance

TRAC and Preservation Planning 2:

- **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
  - Solid workflow in consist manner enables informed and well-documented decisions
  - Explicit definition of objectives and measurement units
- **B1.1** Repository identifies properties it will preserve for digital objects
  - Objective Tree

Compliance

TRAC and Preservation Planning 3:

- **B3.1** Repository has documented preservation strategies
  - Preservation Plan
- **B3.3** Repository has mechanisms to change its preservation plans as a result of its monitoring activities.
  - Watch Services, triggers
  - Verification against changes in the environment
  - Update of preservation plans

Trust in a Repository

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- How to verify trust?

- Audit and Certification

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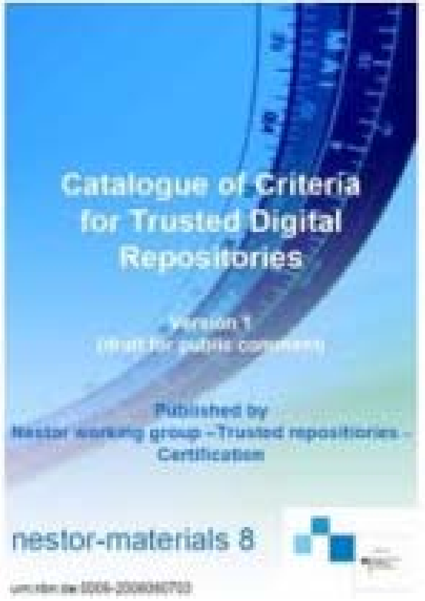
Nestor

- Kompetenznetzwerk Langzeitarchivierung
- Kriterienkatalog vertrauenswürdige digitale Langzeitarchive, 2006
- Kriterien für die Bereiche
  - Organisatorischer Rahmen
  - Umgang mit Objekten
  - Infrastruktur und Sicherheit



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urn:nbn:de:0008-2006060703

Nestor Kriterien

- Organisatorischer Rahmen
  - A2.2 Das digitale Langzeitarchiv stellt die Interpretierbarkeit der digitalen Objekte durch seine Zielgruppe sicher.
  - A4.5 Die Fortführung der festgelegten Aufgaben ist auch über das Bestehen des Archivs hinaus sichergestellt.

- Umgang mit Objekten
  - B9.2 Das Archiv definiert, welche Eigenschaften der digitalen Objekte für den Erhalt von Information signifikant sind.
  - B12.1 Das Archiv identifiziert seine Objekte und deren Beziehungen eindeutig und dauerhaft.

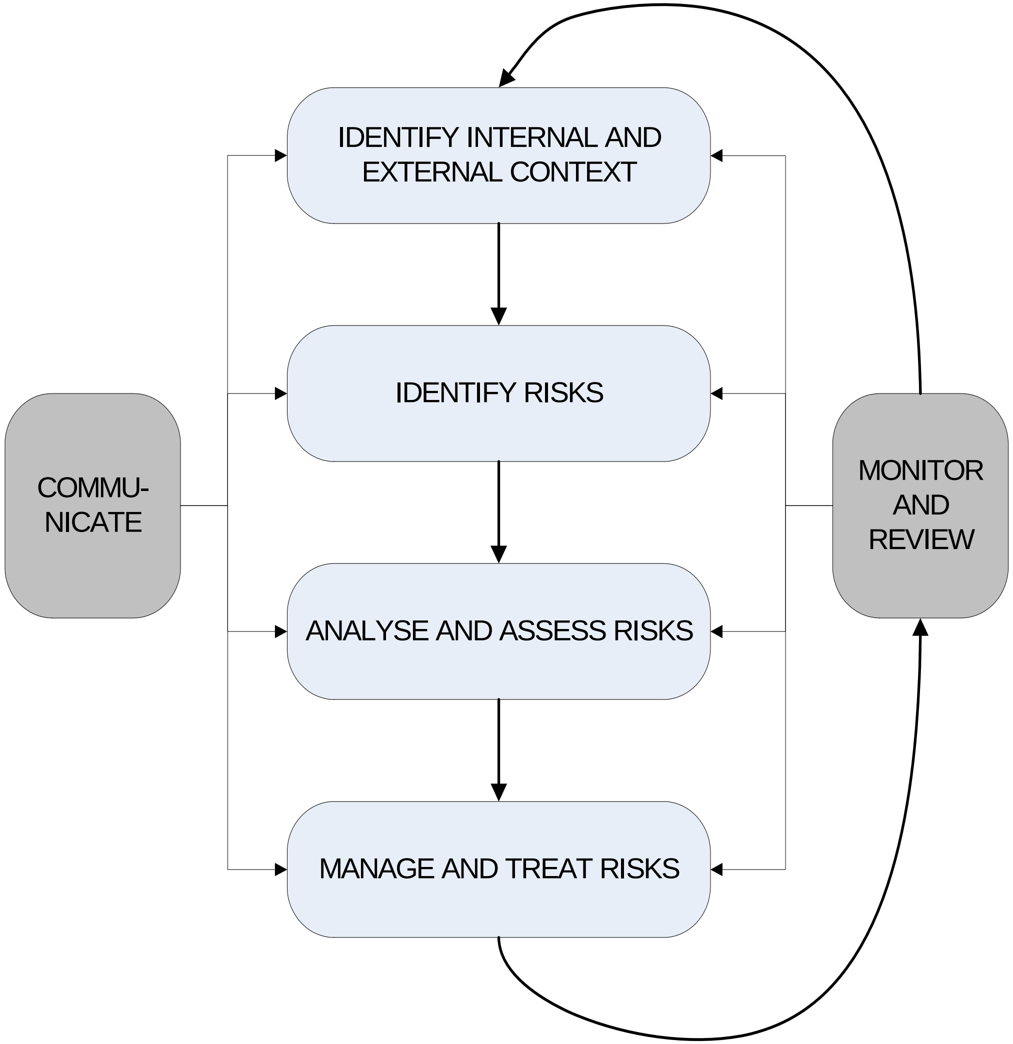
…and in practice?

- Criteria catalogues not always helpful
  - How to measure fulfilment
  - How to prove trust
  - How to improve

- Audit and Certification as ultimate goal
- Self-audit as important step
- Risk assessment

Risk and Digital Preservation

- Digital Preservation ***is*** Risk Management
- Transform uncertainties into manageable risks
- Standard risk management models in many disciplines



DRAMBORA

- Digital Repository Audit Method Based on Risk Assessment
  - Risk assessment workflow
  - Risk catalogue

- Facilitate internal self-assessment & reporting
- Validate appropriateness of repository's efforts
- Generate appropriate documentation

Goals and Outcomes

- Documented organisational self-awareness
- Catalogued risks
  - Composite risk score for each of eight functional classes
  - Comparison of risk scores
  - Identification of most vulnerable areas of repository

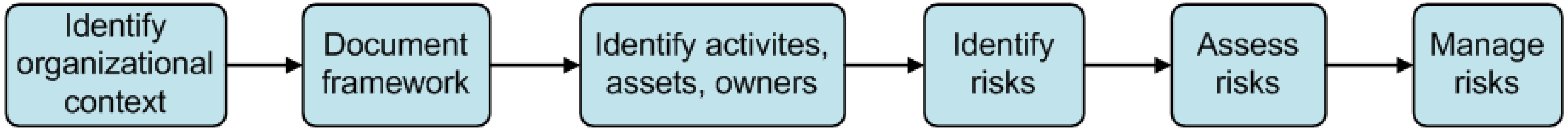
- Understanding of infrastructural successes and shortcomings

- Preparation for a full scale external audit

Process overview

- Establish organisational profile
- Develop contextual understanding
- Identify and classify repository activities and assets
- Derive risk register
- Assess risks
- Commit to management strategies

- Guided process with tool support


Identify organizational context
Document framework
Identify activites, assets, owners
Identify risks
Assess risks
Manage risks

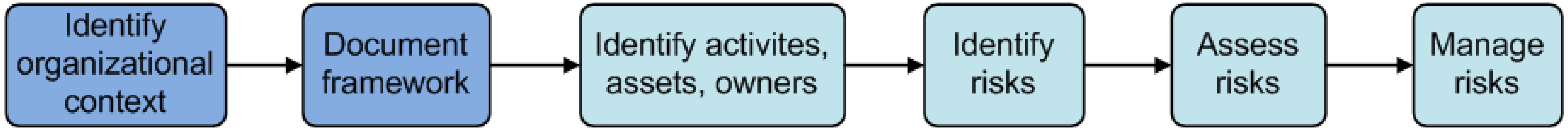
Evidence

- Documentary
  - Mission statement
  - Business plan, financial reports
  - Job descriptions
  - Technical documents,…
- Testimonial evidence
  - Find omissions in documentation
  - Validate documentation vs. Reality
- Observation of practice
  - Less objective, but important

Stage 1+2: Defining the Context

- Mandate of the repository
- Goals and objectives
- Policies the repository has in place
- Legal and contractual requirements
- Standards
- any other influences

➢ Basis for risk definition and assessment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Organisational Goals

- Associated with one of 8 functional classes
  - Acquisition & Ingest
  - Preservation & Storage
  - Metadata Management
  - Access & Dissemination

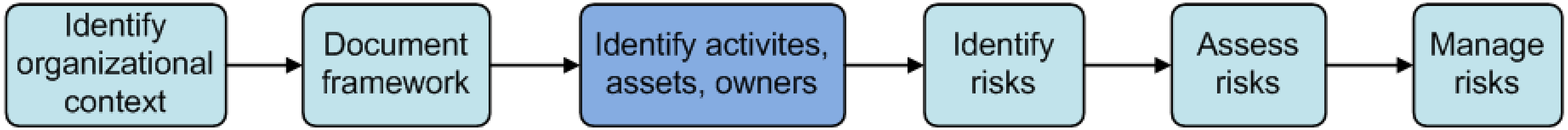
operational classes

  - Organisation & Management
  - Staffing
  - Financial Management
  - Technical Infrastructure & Security

supporting classes

3: Identify Activities, Assets and Owners

- Conceptual model of what the repository does
- Split mission and goals into specific activities
- Assign to responsible actors
- Link to key assets
  - information
  - Software and physical assets
  - services and utilities
  - Processes and people
  - Intangibles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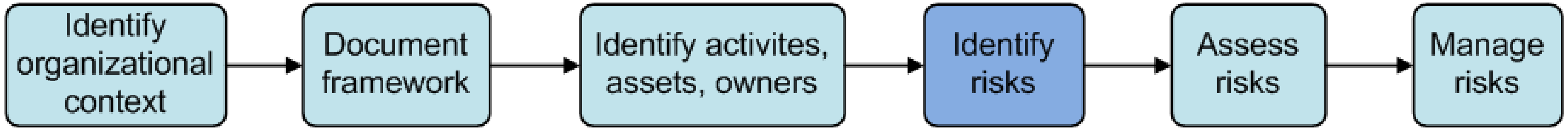
Stage 4: Identify Risks

- Assets & Activities associated with vulnerabilities
- List of risks for associated activities and assets
- Iterative brainstorming process

- Kinds of risks
  - Activities or assets fail to achieve goals
  - Internal threats
  - External threats
  - Threats to assets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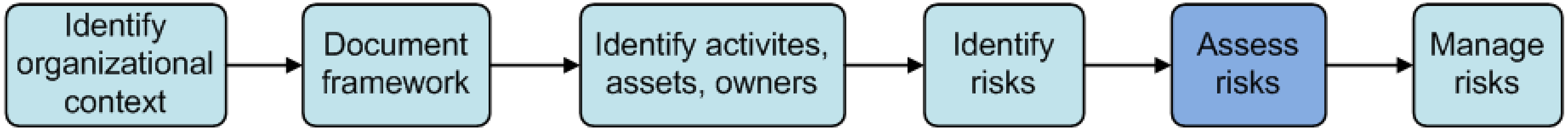
Examples

- R32: Hardware or software incapable of supporting emerging repository aims
  - Insufficiently scalable
  - Incompatible with emerging systems
- R66: Preservation strategies result in information loss
  - Migration might lose ‘look and feel’ of documents
  - Acceptable loss?
- R30: Hardware failure
- R21: Loss of key member of staff

Stage 5: Assess Risks

- Probability
- Impact
- Relationships

- Plus
  - Manifestations
  - Risk escalation owner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Risk Impact

- In terms of:
  - impact on repository staff or public well-being
  - impact of damage to or loss of assets
  - damage to reputation
  - damage to financial viability
  - deterioration of product or service quality

  - *loss of digital object authenticity and understandability*

- Scale 0-6
  - *Recoverable, 0-3: Zero, negligible, superficial, medium*
  - *Unrecoverable, 4-6: High, considerable, cataclysmic*

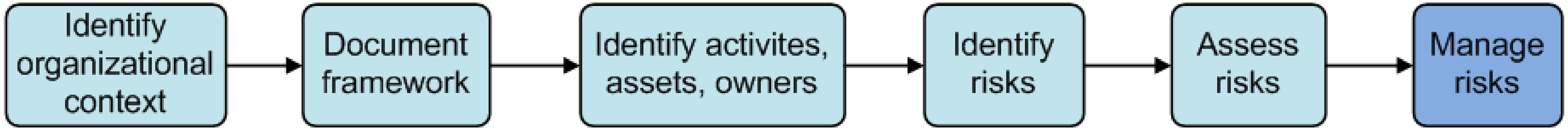
Risk Likelihood and relationships

- Likelihood: Scale 1-6
  - 1: minimal probability, every 100 years
  - 6: very high probability, more than once a month

- Relationships
  - Atomic
  - Domino
  - Complementary
  - Contagious
  - Explosive

Stage 6: Manage Risks

- Combination of avoidance, tolerance and transfer
  - avoid circumstances in which risk arises
  - limit likelihood of risk
  - reduce potential impact of risk
  - share the risk
  - Transfer to others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Examples

- R32: Hardware or software incapable of supporting emerging repository aims
  - Allocate time to monitor scalability and compatibility of technologies

- R66: Preservation strategies result in information loss
  - Evaluate strategies in controlled environment before execution
  - Ensure procedures are reversible

Example risk

- R31: Software failure or incompatibility
- System software is rendered incapable of facilitating current business objectives
- Example: Software update breaks dependencies of other core software services
- Avoidance:
  - Monitor ongoing suitability of software and assess value of emerging technologies
  - Evaluate effects of system changes prior to implementation
  - Anticipatory investment in software
- Transfer:
  - Seek formal assurance or SLAs from software suppliers

The Audit Result

- Risk score for each risk quantifies risks' severity
- Composite risk score for each category
- Illustrates vulnerabilities
- Facilitates resource investment

DRAMBORA: A Summary

- Risk-based self assessment
- Evidence is essential

- Documented self-awareness
- Risk register as basis for ongoing management
- Preparation for external audit

- Building of Trust

Summary

- Trust in Digital Repositories
- Criteria catalogues
  - Trustworthy Repositories Audit and Certification (TRAC)
  - Nestor: Kriterien für digitale Archive
- Risk and Digital Preservation
- Principles of DRAMBORA
  - Overview
  - Workflow
  - Results
  - Benefits