

# SERVIR West Africa Training Program on Data Stewardship and the CoreTrustSeal Requirements: Session 1, Motivation and R0 Requirement

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Coordinated by AFRIGIST

April 17, 2024, 13:00 – 14:30 WAT (8:00 - 10:30 a.m. EDT)



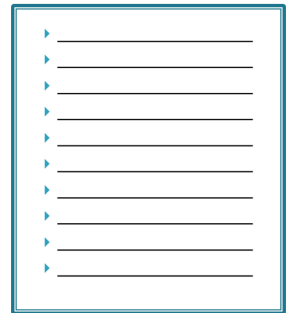
## Brief Review of Previous Webinars

- Data Stewardship Concepts, Principles, and Certification Instruments
  - CoreTrustSeal, ISO 16363, Nestor DIN 31644
- Preservation, Designated Community, Sustainability
- CoreTrustSeal Certification requirements
- Organizational aspects of Data Stewardship
- CoreTrustSeal Requirements 2020-2022: R01-R16
- Setting the stage for Planning to Meet the CoreTrustSeal Requirements



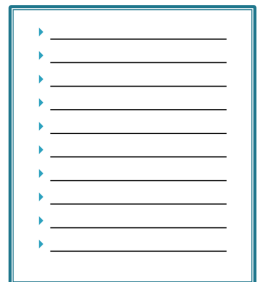
# **SERVIR West Africa Training Program on Data Stewardship and CoreTrustSeal Requirements**

- Key topics:
  - Motivation to meet the CoreTrustSeal requirements
  - R0 Requirement
- Instructional format
  - Lecture, questions, and discussion
- Session will be recorded
  - Recording will be posted on the SERVIR West Africa website



## Outline for Current Session

- Progress Planning and Participant Introductions (10 minutes)
- Scheduling Training Sessions and CoreTrustSeal Application Preparation (10 minutes)
- Relevant principles and why repositories pursue certification (10 minutes)
- Benefits of CoreTrustSeal Certification (10 minutes)
- Overview of CoreTrustSeal Certification and Processes (10 minutes)
- Overview of CoreTrustSeal Requirements 2023-2025 (10 minutes)
- CoreTrustSeal Requirement 0 (20 minutes)
- Preparing for Next Session (10)



## Progress Planning and Introductions

- CoreTrustSeal application template will be created for each repository
- Each repository uses template to progressively revise their self-assessment
- Each participant: please put repository name and your email address in Zoom chat
- Brief introductions follow the order of names posted in Zoom chat

## Scheduling Training Sessions and CoreTrustSeal Application Preparation

- Is the current weekday and time of day available to most participants?
  - Alternative is to stagger weekdays and times of day
- Plan to schedule sessions twice monthly enabling time for progress
  - Repositories complete template sections between sessions
  - Each session includes review and introduction to subsequent section

Relevant principles and why repositories pursue certification

# Data Stewardship Concepts, Principles, and Certification Instruments: Open Archival Information System (OAIS) Functional Requirements

- **Negotiates for and Accepts Information**

- Negotiate for and accept appropriate information from information Producers.

- **Obtains Sufficient Control**

- Obtain sufficient control of the information provided to the level needed to ensure Long Term Preservation.

- **Determines Designated Community**

- Determine, either by itself or in conjunction with other parties, which communities should become the Designated Community and, therefore, should be able to understand the information provided, thereby defining its Knowledge Base.

- **Ensures Information is Independently Understandable**

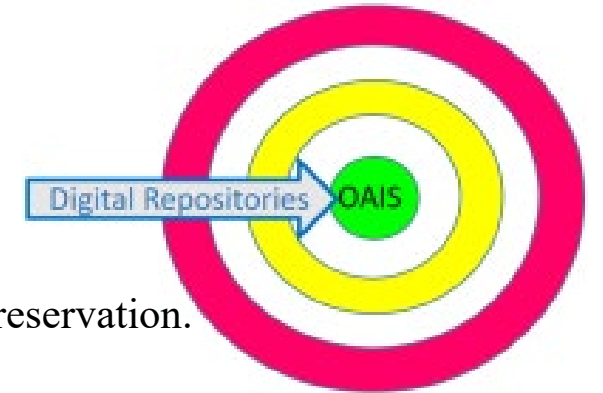
- Ensure that the information to be preserved is Independently Understandable to the Designated Community. ... Designated Community should be able to understand the information without needing special resources ... .

- **Follows Established Preservation Policies and Procedures**

- Follow documented policies and procedures which ensure that the information is preserved against all reasonable contingencies, including the demise of the Archive, ensuring that it is never deleted unless allowed ...

- **Makes the Information Available**

- Make the preserved information available to the Designated Community and enable the information to be disseminated as copies of, or as traceable to, the original submitted Data Objects with evidence supporting its Authenticity.





# F<sub>indable</sub> A<sub>ccessible</sub> I<sub>nteroperable</sub> R<sub>eusable</sub>

## Findable

- F1. (Meta)data are assigned a globally unique and persistent identifier
- F2. Data are described with rich metadata (defined by R1 below)
- F3. Metadata clearly and explicitly include the identifier of the data they describe
- F4. (Meta)data are registered or indexed in a searchable resource

## Accessible

- A1. (Meta)data are retrievable by their identifier using a standardised communications protocol
  - A1.1 The protocol is open, free, and universally implementable
  - A1.2 The protocol allows for an authentication and authorisation procedure, where necessary
- A2. Metadata are accessible, even when the data are no longer available

## Interoperable

- I1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (Meta)data use vocabularies that follow FAIR principles
- I3. (Meta)data include qualified references to other (meta)data

## Reusable

- R1. (Meta)data are richly described with a plurality of accurate and relevant attributes
  - R1.1. (Meta)data are released with a clear and accessible data usage license
  - R1.2. (Meta)data are associated with detailed provenance
  - R1.3. (Meta)data meet domain-relevant community standards

# TRUST Principles for Digital Repositories

- **Transparency**

- To be transparent about specific repository services and data holdings that are verifiable by publicly accessible evidence.

- **Responsibility**

- To be responsible for ensuring the authenticity and integrity of data holdings and for the reliability and persistence of its service.

- **User Focus**

- To ensure that the data management norms and expectations of target user communities are met.

- **Sustainability**

- To sustain services and preserve data holdings for the long-term.

- **Technology**

- To provide infrastructure and capabilities to support secure, persistent, and reliable services.



# C<sub>ollective Benefit</sub> A<sub>uthority to Control</sub> R<sub>esponsibility</sub> E<sub>thics</sub>

- **Collective Benefit**

- For inclusive development and innovation
- For improved governance and citizen engagement
- For equitable outcomes

- **Authority to Control**

- Recognizing rights and interests
- Data for Governance
- Governance of data

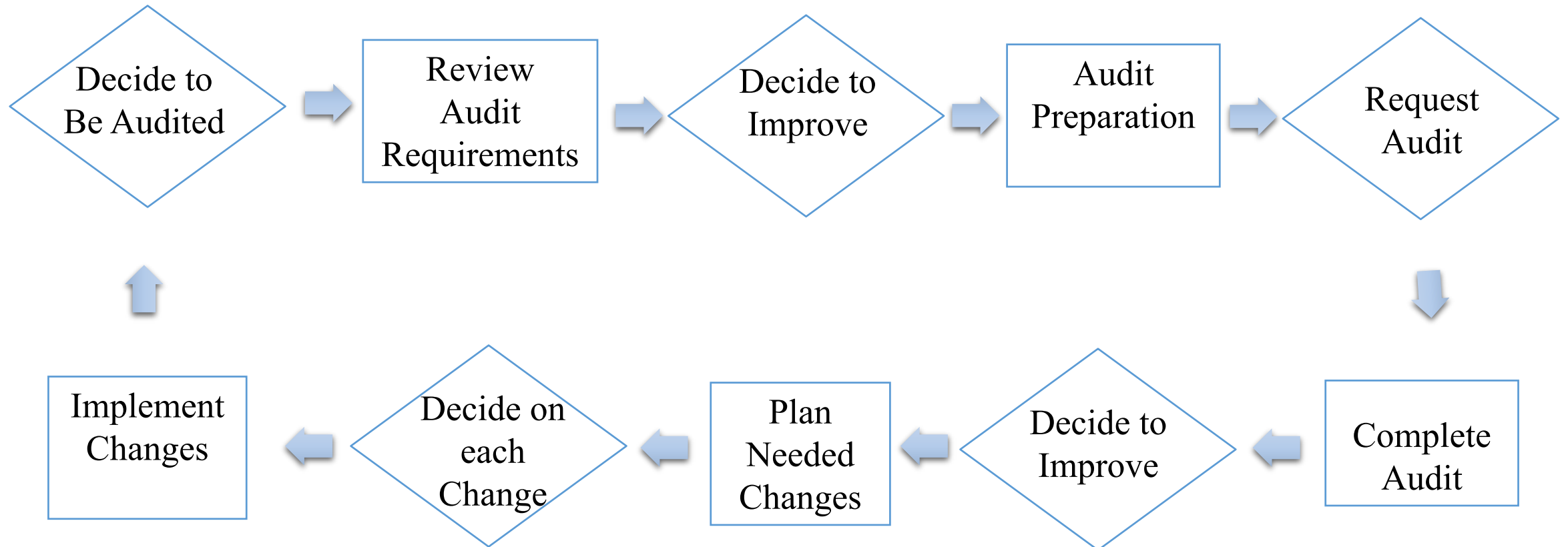
- **Responsibility**

- For positive relationships
- For expanding capability and capacity
- For indigenous languages and worldviews

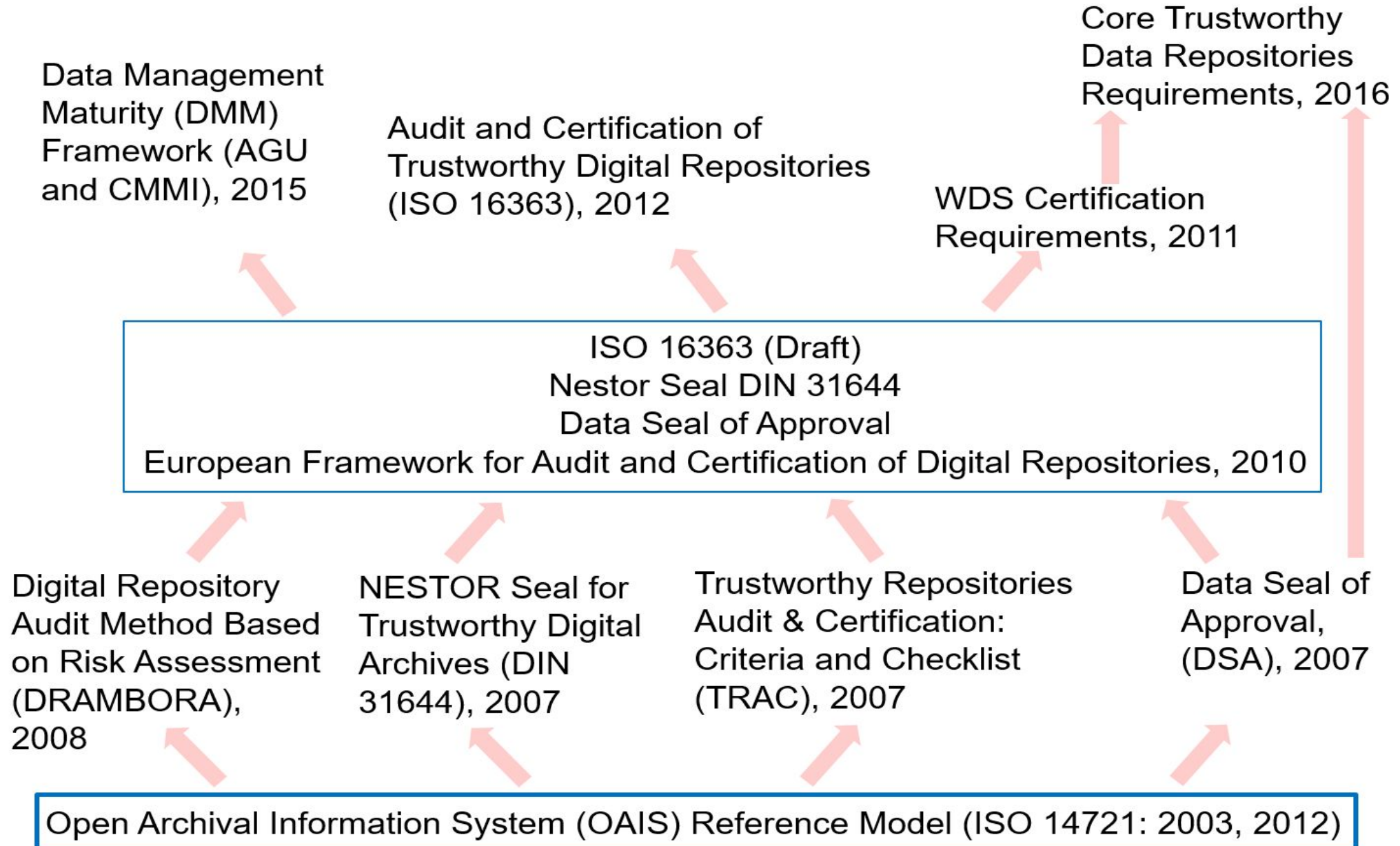
- **Ethics**

- For minimizing harm and maximizing benefits
- For justice
- For future use

# Continuously Improving the Scientific Data Archive



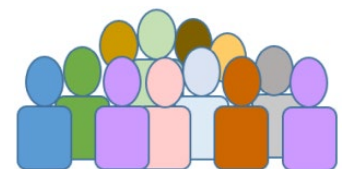
# Evolution of Instruments for Assessing Trustworthy Data Repositories



# Overview of CoreTrustSeal Certification



- Meeting community-developed requirements for trustworthy data repositories
  - Repository community strives to serve as trustworthy data stewards
- Process for cooperative self-improvement of data repositories
  - Opportunity for repositories to improve performance through internal and external assessments
- Peer-reviewed assessments of evidence from data repositories' self-assessments
  - Applications reviewed by representatives of CTS certified repositories and CTS Board
- CoreTrustSeal requirements evolve with community expectations and practices
  - CTS requirements are revised every 3 years based on community recommendations



# Questions for Consideration

## Data Repository Certification – Why Do Repositories Pursue it?

Digital data repositories are relatively new with development occurring globally

- Why should the data repository work in isolation without the benefit of others' experience?
- Will the effort of applying for certification enable a repository to learn about new resources?
- Will advice from external reviewers contribute to the capabilities of the repository and its staff?

Improving the data repository is laudable and contributes to the services offered

- Will pursuing certification enable the repository to identify ways of improvement?
- Will better service to users result in higher user satisfaction?
- Is identifying and implementing measures to improve efficiency and effectiveness worth pursuing

## Benefits of CoreTrustSeal Certification



## Benefits of CoreTrustSeal Certification: Overview

- What it means to be a trustworthy digital repository
  - Preserving digital objects to offer long-term access for the designated community
- Certification process improves repository capabilities
  - Peer reviewers describe needed improvements, repository corrects deficiencies
- Recognition as trustworthy by repository stakeholders
  - Host institution, funders, data producers & users, potential & current staff members
- Branding as a trustworthy digital repository offers new opportunities
  - Collaborations, support, partnerships for trusted repository and data
- Certified as having attained the repository community standard
  - Continuously improving digital repository capabilities

# Additional Reasons for Attaining CoreTrustSeal Certification



- Serves as a stepping stone to World Data System membership
  - 133 World Data System Members as of March 2024
- Developing archiving capabilities to avoid expatriation of data

## THE CONVERSATION

Academic rigor, journalistic flair

Arts + Culture Economy Education Environment + Energy Ethics + Religion Health Politics + Society Science + Tech Podcasts

### Africa must keep its rich, valuable data safe from exploitation

Published: November 21, 2017 9:30am EST

- Serve as exemplars for data repositories in Africa

WDS membership March 2024



Source: <https://worlddatasystem.org/members/members-map/>

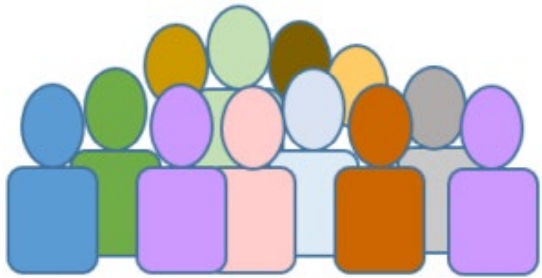
# Intrinsic Benefits of CoreTrustSeal Certification



- Validation as a trustworthy digital repository
- Improving repository capabilities
- Receiving independent advice
- Justification to publicly document processes
- Continuous Quality Improvement (CQI)
- Confirmation of organizational performance
- Professional development of repository staff
- Opportunity to improve documentation
- Introspection on service dependencies
- Opportunity to find and correct weaknesses
- Eligibility for World Data System membership
- Participation in the repository community



# Extrinsic Benefits of CoreTrustSeal Certification



- Demonstrated trustworthiness
- Evidence of digital preservation practices
- Stakeholder confidence
- Reputation with stakeholders
- Meeting stakeholder expectations
- Improving transparency of repository practices
- Recognition as trustworthy by stakeholders
- Branding as trustworthy to attract new opportunities
- Certified as meeting community requirements
- Improving confidence of data producers
- Increasing awareness of data stewardship role
- Distinction among competitor services
- Serve as an exemplar among data repositories



Questions?



# Overview of CoreTrustSeal Certification and Processes for Attaining CoreTrustSeal Certification


# CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025

- Current CoreTrustSeal Requirements are for 2023-2025
  - CoreTrustSeal Requirements will be revised in 2025 for 2026-2028
- Revisions reflect changes in community practices
  - Community needs, expectations, and practices change over time
- Consensus among community members guides revisions
  - Applicant and certified repositories comment on current requirements
  - Assembly of reviewers and CoreTrustSeal Board recommend changes
- CoreTrustSeal Requirements evolve incrementally
  - Revisions every 3 years enable repositories to improve over time
  - Recertification is required every 3 years.



# Application Process for CoreTrustSeal Certification




- Repository conducts self-assessment for compliance with CTS Requirements
-  • Repository improves processes and publicly available evidence to comply with CTS Requirements
- Repository describes how each CTS Requirement is met and self-assesses Compliance Levels
- Repository identifies links for publicly accessible evidence of compliance with each requirement
- Repository completes online application form to record responses and evidence
  - Repository enters application into the CTS Application Management Tool (AMT)
  - Repository pays CTS Administrative Fee before application is assigned for review (now 3,000 EUR)
- Compliance Levels
  - In Progress: The repository is in the implementation phase
  - Implemented: The requirement has been fully implemented by the repository

Derived from: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>



# Review Process for CoreTrustSeal Certification



- 
- 2 Members of the Assembly of Reviewers are assigned to review each CTS application
    - Reviews of new CTS applications are due from reviewers in 2 months
    - New reviewers are paired with experienced reviewers to ensure consistency among reviews
    - Reviewers reassign a Compliance Level to each response and add comments, if needed
  - CoreTrustSeal Standards and Compliance Board reviews applications and reviews
    - Recommendations for improvement or for CTS Certification are sent to applicants
    - Applications can be submitted 4 additional times to receive recommendations for revision
    - CTS Certification is valid for 3 years before renewal is required for subsequent certification
  - Compliance Levels
    - In Progress: The repository is in the implementation phase
    - Implemented: The requirement has been fully implemented by the repository

Derived from: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>

# Steps to Meet the CoreTrustSeal Requirements: Improvement, Self-Assessment and Certification



- Improvement
  - Identify opportunities for improving capabilities
  - **What must be done? What resources are needed?**
- Self-Assessment Using Current CoreTrustSeal Requirements
  - Identify areas to be improved and prepare for certification
  - **How have other repositories met a particular requirement?**
- Certification
  - Apply for external review of repository capabilities and request certification
  - **Based on the submitted application, what do the reviewers recommend?**
  - Validation period is 3 years from the date when certification is obtained

Questions?

# Overview of CoreTrustSeal Requirements 2023-2025

# Overview of CoreTrustSeal Certification Requirements 2023-2025



- Background Information
  - R0 Context
- Organizational Infrastructure
  - R01 Mission & Scope, R02 Rights Management, R03 Continuity of Service, R04 Legal & Ethical, R05 Governance & Resources, R06 Expertise & Guidance
- Digital Object Management
  - R07 Authenticity & Provenance, R08 Deposit & Appraisal, R09 Preservation Plan, R10 Quality Assurance, R11 Workflows, R12 Discovery & Identification, R13 Reuse
- Technology
  - R14 Storage & Integrity, R15 Technical Infrastructure, R16 Security

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>

# Overview of CoreTrustSeal Requirements 2023-2025: Context

## R0 Context

- General information about the repository
- Re3data identifier
- Repository Type. Select all relevant types from:
  - Generalist or Specialist; Specialist describes scope
- Overview – Brief Description of Repository
- Brief Description of the Designated Community
- Level of Curation Performed. Select all relevant types from:
  - Content distributed as deposited Basic curation – e.g., brief checking, addition of basic metadata or documentation. Enhanced curation – e.g., conversion to new formats during ingest, enhancement of documentation or metadata; Data -level curation – as in C above, but with additional editing of deposited data for accuracy
- Cooperation and Outsourcing to third parties, partners, and host organizations.
- Applicants renewing – Summary of Significant Changes Since Last Application



Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>

# CoreTrustSeal Requirements 2023-2025: Organizational Infrastructure

- R1 Mission & Scope
  - The repository has an explicit mission to provide access to and preserve digital objects.
- R2 Rights Management
  - The repository maintains all applicable rights and monitors compliance.
- R3 Continuity of Service
  - The Repository has a plan to ensure ongoing access to and preservation of its data and metadata.
- R4 Legal and Ethical
  - The repository ensures to the extent possible that data and metadata are created, curated, preserved, accessed and used in compliance with legal and ethical norms.
- R5 Governance & Resources
  - The repository has adequate funding and sufficient numbers of staff managed through a clear system of governance to effectively carry out the mission.
- R6 Expertise & Guidance
  - The repository adopts mechanisms to secure ongoing expertise, guidance and feedback-either in-house, or external.



# CoreTrustSeal Requirements 2023-2025: Digital Object Management

- R07 Provenance & Authenticity
  - The repository guarantees the authenticity of the digital objects and provides provenance information.
- R08 Deposit & Appraisal
  - The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for users.
- R09 Preservation Plan
  - The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.
- R10 Quality of Service
  - The repository addresses technical quality and standards compliance, and ensures that sufficient information is available for end users to make quality-related evaluations.
- R11 Workflows
  - Digital object management takes place according to defined workflows from deposit to access.
- R12 Discovery & Identification
  - The repository enables users to discover the digital objects and refer to them in a persistent way through proper citation.
- R13 Reuse
  - The repository enables reuse of the digital objects over time, ensuring that appropriate information is available to support understanding and use.





# CoreTrustSeal Requirements 2023-2025: Information Technology & Security



- **R14 Storage & Integrity**
  - The repository applies documented processes to ensure data and metadata storage and integrity.
- **R15 Technical Infrastructure**
  - The repository is managed on well-supported operating systems and other core infrastructural software and hardware appropriate to the services it provides to its Designated Community.
- **R16 Security**
  - The repository protects the facility and its data, metadata, products, services, and users.

# Overview of CoreTrustSeal Certification Requirements 2023-2025



- Background Information
  - R0 Context
- Organizational Infrastructure
  - R01 Mission & Scope, R02 Rights Management, R03 Continuity of Service, R04 Legal & Ethical, R05 Governance & Resources, R06 Expertise & Guidance
- Digital Object Management
  - R07 Authenticity & Provenance, R08 Deposit & Appraisal, R09 Preservation Plan, R10 Quality Assurance, R11 Workflows, R12 Discovery & Identification, R13 Reuse
- Technology
  - R14 Storage & Integrity, R15 Technical Infrastructure, R16 Security

Questions?

CoreTrustSeal Requirement 0

# Overview of CoreTrustSeal Requirements 2023-2025: Context

## R0 Context

- General information about the repository
- Re3data identifier
- Repository Type. Select all relevant types from:
  - Generalist or Specialist; Specialist describes scope
- Overview – Brief Description of Repository
- Brief Description of the Designated Community
- Level of Curation Performed. Select all relevant types from:
  - Content distributed as deposited Basic curation – e.g., brief checking, addition of basic metadata or documentation. Enhanced curation – e.g., conversion to new formats during ingest, enhancement of documentation or metadata; Data -level curation – as in C above, but with additional editing of deposited data for accuracy
- Cooperation and Outsourcing to third parties, partners, and host organizations.
- Applicants renewing – Summary of Significant Changes Since Last Application

# CoreTrustSeal Requirement 0, Background Information and Context

- Re3data identifier
  - Re3data is a **Registry of Research Data Repositories**
  - Internationally recognized global registry of repositories
  - Assists potential depositors, users, and others in discovering data repositories
  - Users of Re3data can search for a repository by entering a topic as a query
- Repositories are described in the Re3data registry
  - Title of repository
  - Subject(s) covered by the content of the repository
  - Content type(s)
  - Country where the repository is located
  - Brief narrative description of the repository

# CoreTrustSeal Requirement 0, Background Information and Context

- Repository Type. Select all relevant types from:
  - Select a repository type (Generalist vs. Specialist - specialist must specify domain and/or disciplines(s))
  - The repository needs to describe the disciplines represented by the content that the repository disseminates. Additional information related to the discipline(s) represented provides context for the reviewers to understand the repositories role in supporting the represented disciplines.

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025 Extended Guidance (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051096>

## Questions for Discussion

- How might the disciplines represented by the repository be described?
- Since subsequent questions will ask about the Designated Community and its knowledge base, how might the holdings of the repository be described in terms of the disciplines or domains represented in the content that is distributed?



# CoreTrustSeal Requirement 0, Background Information and Context - Continued -

- Overview – Brief Description of Repository
  - *Provide a short overview of key characteristics of the repository, reflecting the repository type selected. This should include information about the scope and size of data collections, data types and formats. Further contextual information may also be added.*

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025 Extended Guidance (V01.00). Zenodo.  
<https://doi.org/10.5281/zenodo.7051096>

# Questions for Discussion

- In what ways can the repository be described for reviewers and the public?
- Which aspects of the repository should be described to provide an overview of the repository and the services offered?

## CoreTrustSeal Requirement 0, Background Information and Context - Continued -

- Brief Description of the Designated Community
  - *A clear definition of the Designated Community demonstrates that the applicant understands the scope, knowledge base, and methodologies-including preferred software/formats-of the group(s) of users at whom the curation and preservation measures are primarily targeted. The definition should be specific so that reviewers can assess whether that community is being served in the responses to other requirements.*

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025 Extended Guidance (V01.00). Zenodo.  
<https://doi.org/10.5281/zenodo.7051096>

## Questions for Discussion

- How will the Designated Community be described for reviewers and the public in terms of their disciplinary backgrounds and education?
- How will the knowledge base of the Designated Community be described in terms of its expertise and its understanding of the methodologies and software utilized to analyze data in the formats provided by the repository?

## CoreTrustSeal Requirement 0, Background Information and Context - Continued -

- Level of Curation Performed. Select all relevant types from:
  - A Content distributed as deposited
  - B Basic curation – e.g., brief checking, addition of basic metadata or documentation.
  - C Enhanced curation – e.g., conversion to new formats during ingest, enhancement of documentation or metadata;
  - D Data -level curation – as in C above, but with additional editing of deposited data for accuracy
- Level of Curation Explanation
  - Please add the description for your levels of curation.
  - The repository needs to describe how the level of curation or levels of curation are managed, as this will inform reviewers how the repository completes curation. Reviewers will look at the Curation Explanation frequently when reviewing responses to other requirements.

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025 Extended Guidance (V01.00). Zenodo.  
<https://doi.org/10.5281/zenodo.7051096>

## Questions for Discussion

- Is only one level of curation applied to all data products or is more than one level of curation applied in some circumstances?
- If a higher level of curation is applied to data products, are there cases where the lower level of curation also is applied?
- Is the level of curation that is applied completed in a manner that involves the submitter of the data?

## CoreTrustSeal Requirement 0, Background Information and Context - Continued -

- (6) Cooperation and outsourcing to third parties, partners and host organizations.
  - List or describe insource partners within the host organization that contribute to the repository and its operations.
  - List or describe outsource partners that are external to the host organization that contribute to the repository and its operations.

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025 Extended Guidance (V01.00). Zenodo.  
<https://doi.org/10.5281/zenodo.7051096>

## Questions for Discussion

- Which units of the host organization contribute to or support the work of the repository?
- What external entities, such as sponsors or other organizations supported by the same sponsors, are involved with the repository as either partners or collaborators?
- What contractors or service providers are working with the repository to meet its objectives?



## CoreTrustSeal Requirement 0, Background Information and Context - Continued -

- (7) Applicants renewing their CoreTrustSeal Certification
  - *Summary of significant changes since last application. CoreTrustSeal certification has an expectation of continuous improvement over time. Repositories undergoing recertification should highlight briefly any significant changes including to technical systems, Designated Community or funding during the previous three years. This could include any steps taken to move from 'In Progress' to 'Implemented' Requirements since the last certification.*
  - *Only applicable to repositories that have receive CoreTrustSeal Certification*

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025 Extended Guidance (V01.00). Zenodo.  
<https://doi.org/10.5281/zenodo.7051096>

# Questions for Discussion

- How can the repository and the Designated Community be described for reviewers and the public?
- Which aspects of cooperation, partnerships and outsourcing should be described?

Preparing for Next Session

## Preparing for Next Session: Activities in Your Repository

- Template assigned to each repository for self-assessment
- Review requirements for R0 within the context of your repository
- Discuss among managers and staff within your repository
- Draft description for an re3data identifier for your repository
  - Requirements: <https://www.re3data.org/suggest>
  - Search for descriptions of other repositories: <https://www.re3data.org/search>
- Draft responses to R0 for your repository within your template

Questions?

Looking Forward at the Remaining CoreTrustSeal Requirements

# CoreTrustSeal Requirements 2023-2025: Organizational Infrastructure



- R1 Mission & Scope
- R2 Rights Management
- R3 Continuity of Service
- R4 Legal and Ethical
- R5 Governance & Resources
- R6 Expertise & Guidance

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>

# CoreTrustSeal Requirements 2023-2025: Digital Object Management



- R07 Provenance & Authenticity
- R08 Deposit & Appraisal
- R09 Preservation Plan
- R10 Quality of Service
- R11 Workflows
- R12 Discovery & Identification
- R13 Reuse

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>



# CoreTrustSeal Requirements 2023-2025: Information Technology & Security



- R14 Storage & Integrity
- R15 Technical Infrastructure
- R16 Security

Source: CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>

## **Online Guidance and Related Resources for Improving Data Stewardship and Attaining CoreTrustSeal Certification 2023-2025**

- CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Requirements 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051012>
- CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Digital Repositories Requirements 2023-2025 Extended Guidance (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051096>
- CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Trustworthy Data Repositories Requirements: Glossary 2023-2025 (V01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051125>
- CoreTrustSeal Standards and Certification Board. (2022). CoreTrustSeal Revision Working Group Change Log and Associated Materials (v01.00). Zenodo. <https://doi.org/10.5281/zenodo.7051237>
- Apply for CoreTrustSeal Certification: <https://www.coretrustseal.org/apply/>
- CoreTrustSeal Requirements (& webinars): <https://www.coretrustseal.org/why-certification/requirements/>
- CoreTrustSeal Administrative Fee (& waiver): <https://www.coretrustseal.org/apply/administrative-fee/>
- CoreTrustSeal: <https://www.coretrustseal.org/>

## **Online Resources for Improving Data Stewardship and Attaining CoreTrustSeal Certification (Continued)**

- Consultative Committee for Space Data Systems. 2012. Reference Model for an Open Archival Information System (OAIS). CCSDS 650.0-M-2. Also published as ISO 14721:2012. <https://public.ccsds.org/Pubs/650x0m2.pdf>
- Consultative Committee for Space Data Systems (CCSDS). 2011. Audit and Certification of Trustworthy Digital Repositories. CCSDS 652.0-M-1. Also published as ISO 16363:2012. <https://public.ccsds.org/pubs/652x0m1.pdf>
- Group on Earth Observations (GEO). 2016. Global Earth Observations System of Systems (GEOSS) Data Management Principles. [http://earthobservations.org/open\\_eo\\_data.php#](http://earthobservations.org/open_eo_data.php#)
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## **Online Resources for Improving Data Stewardship and Attaining CoreTrustSeal Certification (Continued)**

- Carroll, S.R., et al. 2020. The CARE Principles for Indigenous Data Governance. *Data Science Journal*, 19(1). <https://doi.org/10.5334/dsj-2020-043>
- Lin, D., et al. 2020. The TRUST Principles for digital repositories. *Scientific Data* 7, 144. <https://doi.org/10.1038/s41597-020-0486-7>
- Wilkinson, M, et al. 2016. The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data* 3, 160018. <https://doi.org/10.1038/sdata.2016.18>

## **Online Resources for Improving Data Stewardship and Attaining CoreTrustSeal Certification (Continued)**

- International Science Council (ISC) CODATA international discussion list
  - [http://lists.codata.org/mailman/listinfo/codata-international\\_lists.codata.org](http://lists.codata.org/mailman/listinfo/codata-international_lists.codata.org)
- Research Data Alliance (RDA) <https://www.rd-alliance.org/>
  - <https://www.rd-alliance.org/groups/rdawds-certification-digital-repositories-ig.html>
- Group on Earth Observations (GEO)
  - <https://earthobservations.org/>
- World Data System (WDS)
  - <https://www.worlddatasystem.org/>

## Online Resources for Improving Data Stewardship and Attaining CoreTrustSeal Certification (Continued)

- Downs, 2021. Improving Opportunities for New Value of Open Data: Assessing and Certifying Research Data Repositories. *Data Science Journal*. <https://doi.org/10.5334/dsj-2021-001>
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- Downs RR, Lehnert KA, Zhang L, Donaldson DR, Silva JR. 2020. Selecting Research Data Repository Platforms for Open Science. RDA P16. <https://doi.org/10.7916/d8-051c-y379>

**Thank you!**

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