Langzeitarchivierung von Forschungsdaten

Jens Ludwig
ludwig@sub.uni-goettingen.de
28.4.2011, ZIH Dresden

NIEDERSÄCHSISCHE STAATS- UND UNIVERSITÄTSBIBLIOTHEK GÖTTINGEN


NATURE INSIGHT TRANSCRIBING THE GENOME
nature
DATA — WHAT DATA?
Learning to share your results
LUNAR EXPLORATION
Highland games
THE HUMAN BRAIN
Procrastination pathways
VERTEBRATE EVOLUTION
What jawless fish say about us


Science
11 February 2011 | $10
scientific
data
research
information
climate
science
new
analysis
researchers
visualization
many
access
human
example knowledge
AAAS

DFG 1998

„Primärdaten als Grundlagen für Veröffentlichungen sollen auf haltbaren und gesicherten Trägern in der Institution, wo sie entstanden sind, für zehn Jahre aufbewahrt werden.“

DFG, Vorschläge zur Sicherung guter wissenschaftlicher Praxis, 1998

DFG 2010

„[…] Wenn aus Projektmitteln systematisch (Mess-)Daten erhoben werden, die für die Nachnutzung geeignet sind, legen Sie bitte dar, welche Maßnahmen ergriffen wurden bzw. während der Laufzeit des Projektes getroffen werden, um die Daten nachhaltig zu sichern und ggf. für eine erneute Nutzung bereit zu stellen [...]“

DFG, Antragsformular, Kapitel 3.7 Umgang mit den im Projekt erzielten Forschungsdaten, 2010

NSF 2010/2011

„Proposals submitted or due on or after January 18, 2011, must include a supplementary document of no more than two pages labeled ‚Data Management Plan'. This supplementary document should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results."

NSF, http://www.nsf.gov/bfa/dias/policy/dmp.jsp

Schwerpunktinitiative „Digitale Information“ der Allianz der deutschen Wissenschaftsorganisationen

Handlungsfelder:

- Nationale Lizenzierungen
- Open Access
- Nationale Hosting-Strategie
- Forschungsdaten
- Virtuelle Forschungsumgebungen
- Rechtliche Rahmenbedingungen

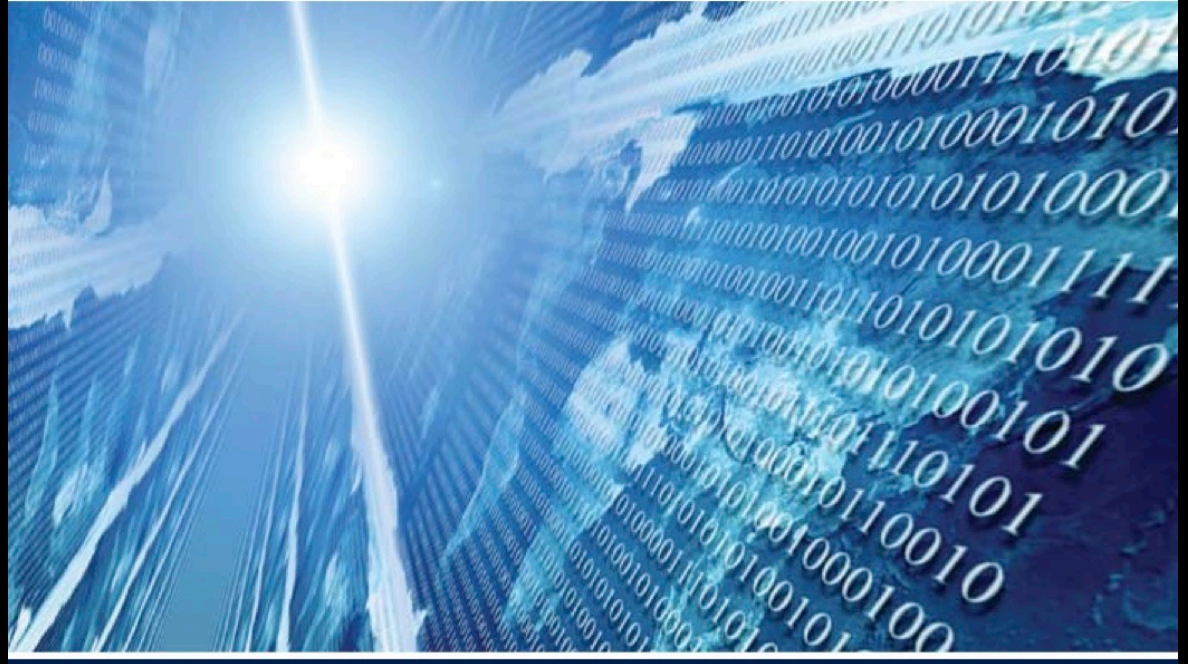
Kommission Zukunft der Informationsinfrastruktur

Themen:

- Lizenzierung
- Hosting / Langzeitarchivierung
- Nichttextuelle Materialien
- Retrodigitalisierung / kulturelles Erbe
- Virtuelle Forschungsumgebungen
- Open Access / elektronisches Publizieren
- Forschungsdaten
- Informationskompetenz / Ausbildung

The End of Science

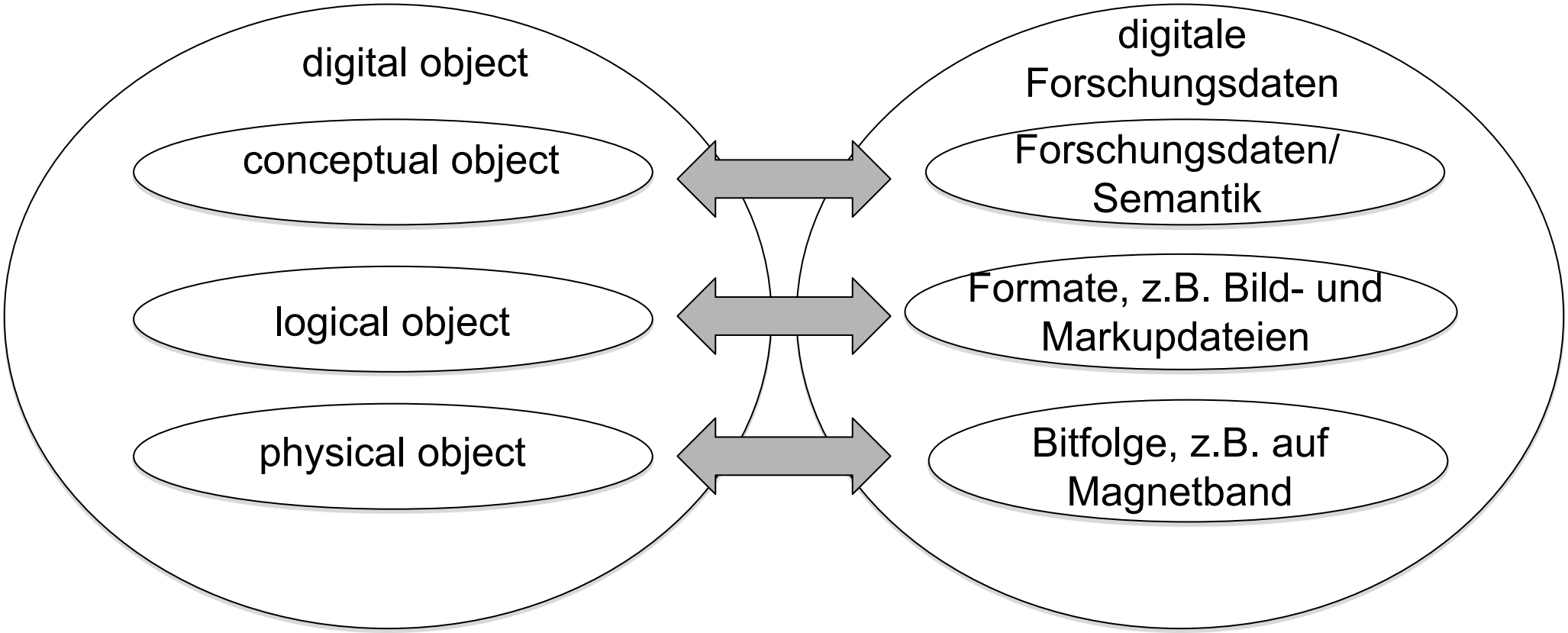
The quest for knowledge used to begin with grand theories. Now it begins with massive amounts of data. Welcome to the Petabyte Age.



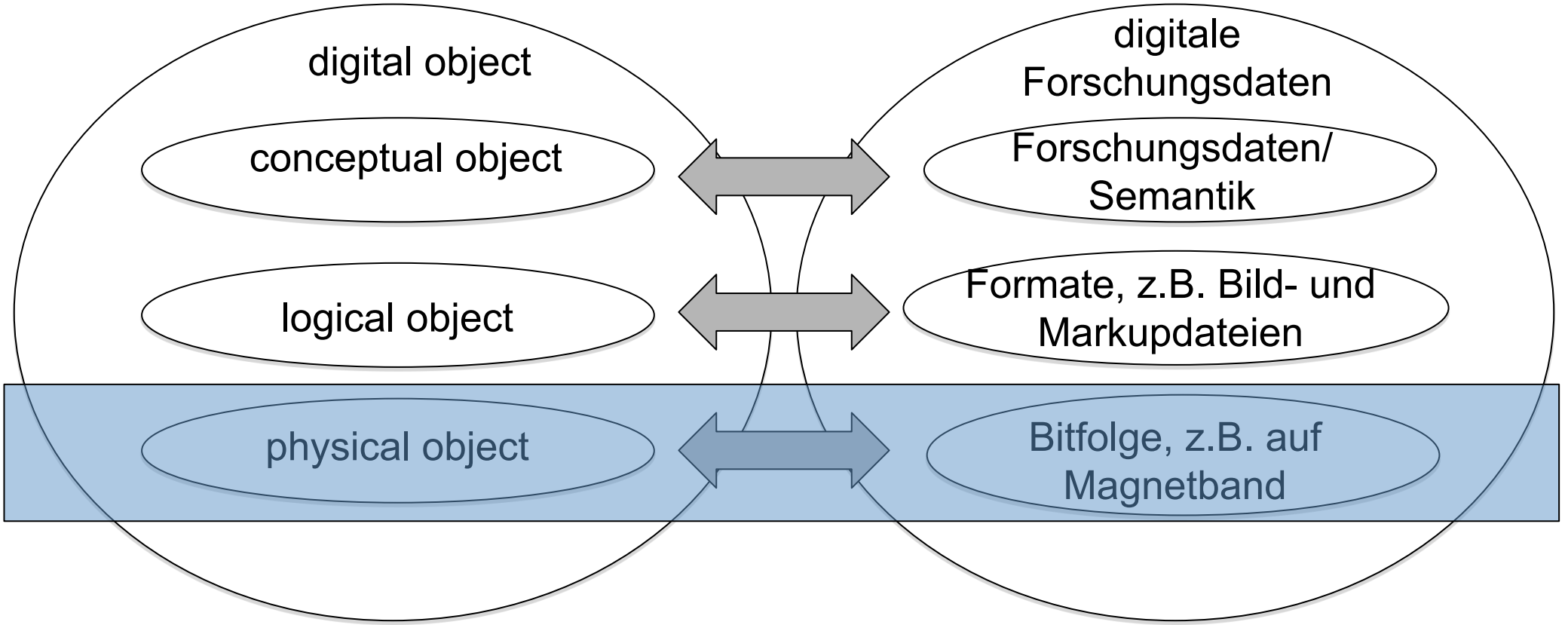
The FOURTH PARADIGM

DATA-INTENSIVE SCIENTIFIC DISCOVERY

EDITED BY TONY HEY, STEWART TANSLEY, AND KRISTIN TOLLE


digital object
conceptual object
logical object
physical object
digitale Forschungsdaten
Forschungsdaten/ Semantik
Formate, z.B. Bild- und Markupdateien
Bitfolge, z.B. auf Magnetband

Bitstream Preservation



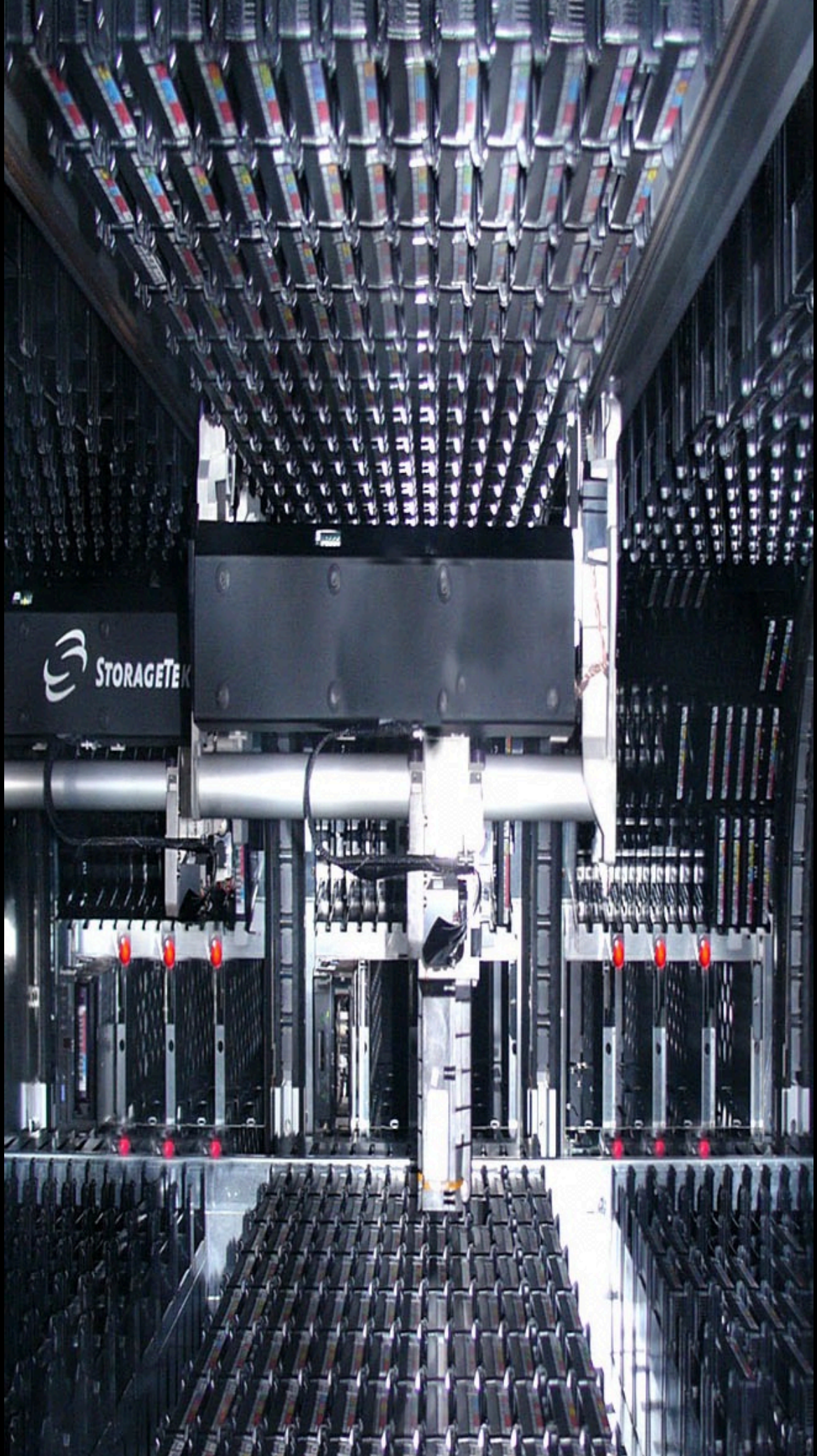
DOI:10.1145/1839676.1839692

Article development led by acmqueue
queue.acm.org

As storage systems grow larger and larger, protecting their data for long-term storage is becoming ever more challenging.

BY DAVID S.H. ROSENTHAL

Keeping Bits Safe: How Hard Can It Be?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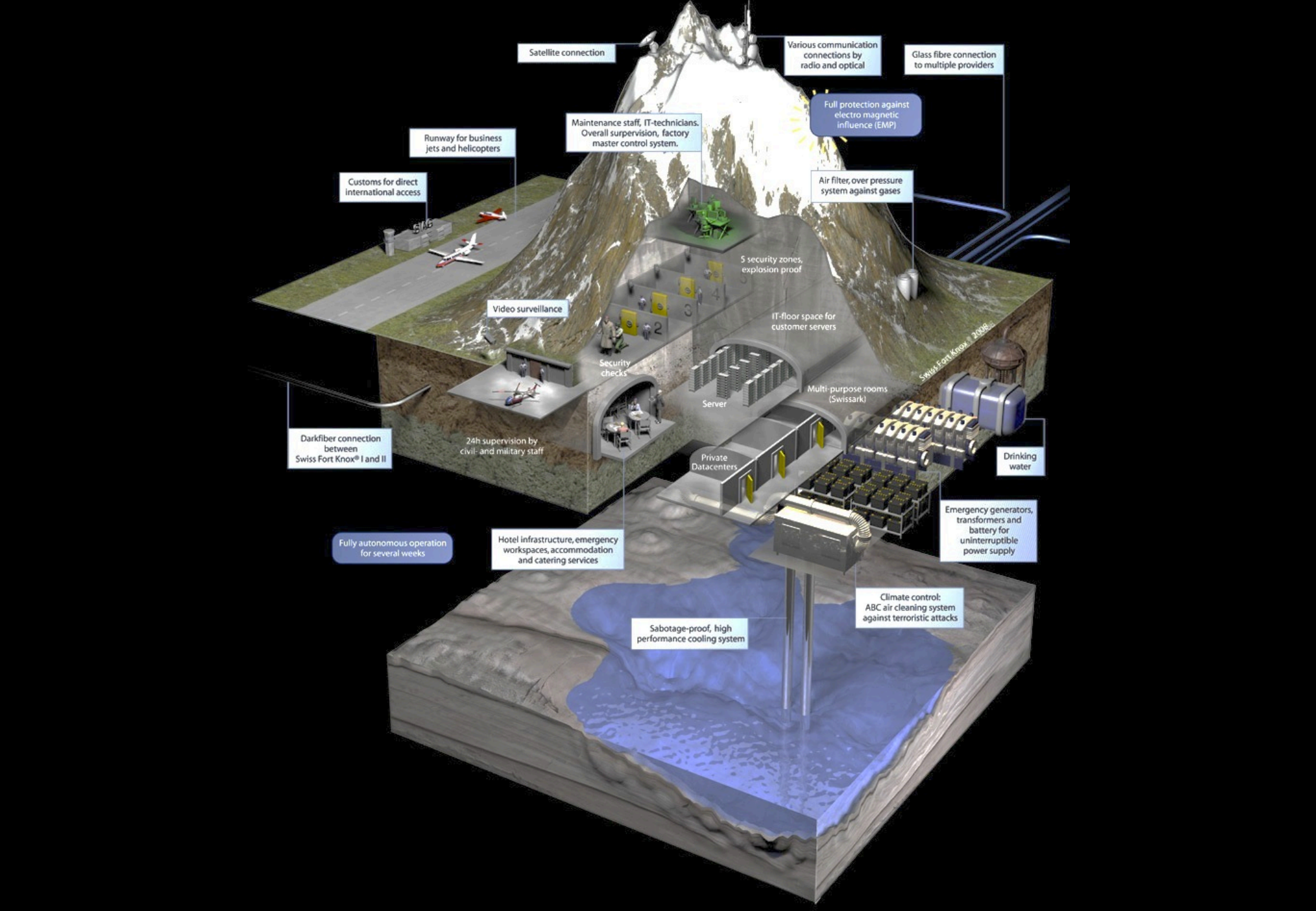
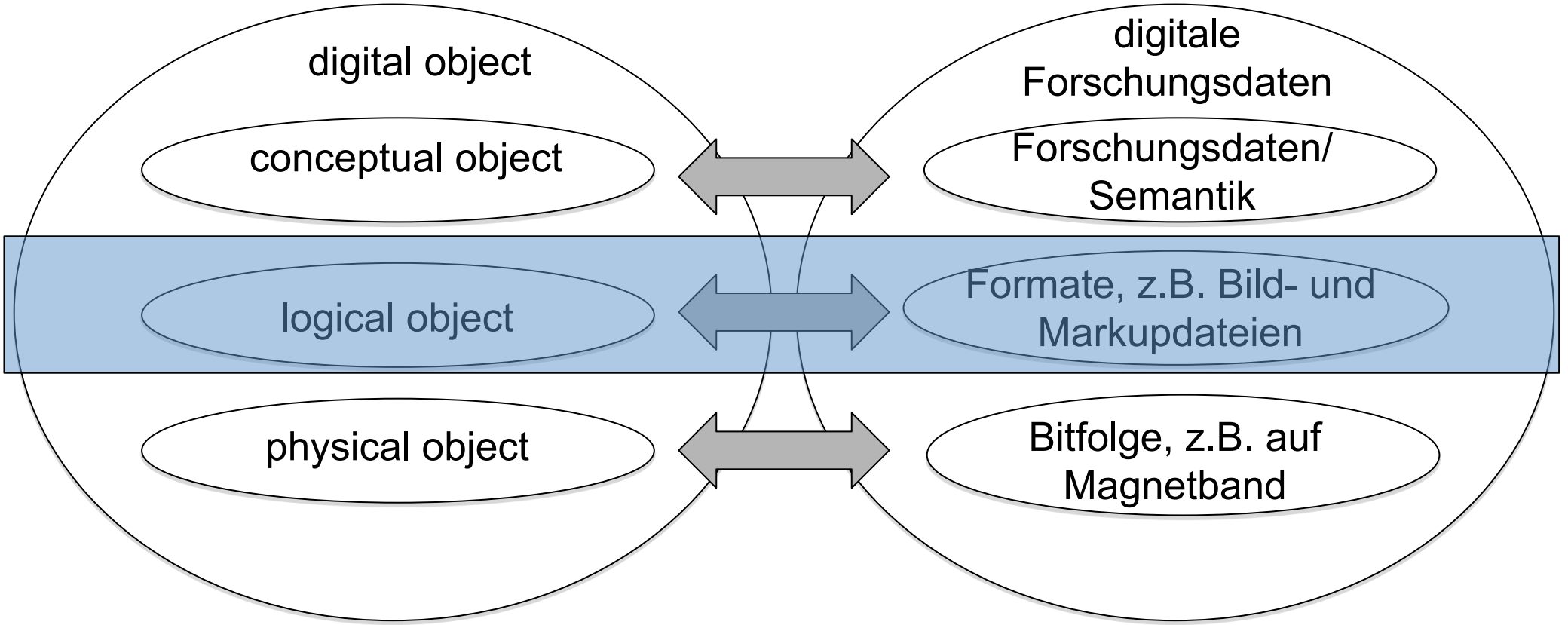

Satellite connection
Various communication connections by radio and optical
Glass fibre connection to multiple providers
Full protection against electro magnetic influence (EMP)
Maintenance staff, IT-technicians. Overall surpervision, factory master control system.
Runway for business jets and helicopters
Customs for direct international access
Air filter, over pressure system against gases
5 security zones, explosion proof
Video surveillance
IT-floor space for customer servers
Swiss Fort Knox © 2008
Security checks
Server
Multi-purpose rooms (Swissark)
Darkfiber connection between Swiss Fort Knox® I and II
24h supervision by civil- and military staff
Private Datacenters
Drinking water
Fully autonomous operation for several weeks
Hotel infrastructure, emergency workspaces, accommodation and catering services
Emergency generators, transformers and battery for uninterruptible power supply
Climate control: ABC air cleaning system against terroristic attacks
Sabotage-proof, high performance cooling system

„The requirement of a 50% chance that a petabyte will survive for a century translates into a bit half-life of 8×10^{17} years. The current estimate of the age of the universe is 1.4×10^{10} years [...]“

„We can place an upper bound on the bit half-life in [CERNs] storage systems [...] the result is 2×10^{8} [...]“

David Rosenthal, Keeping Bits Safe: How Hard Can It Be? Communications of the ACM, 2010, Vol. 53, No. 11

Technische Nachnutzbarkeit/ Content Preservation



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JPEG
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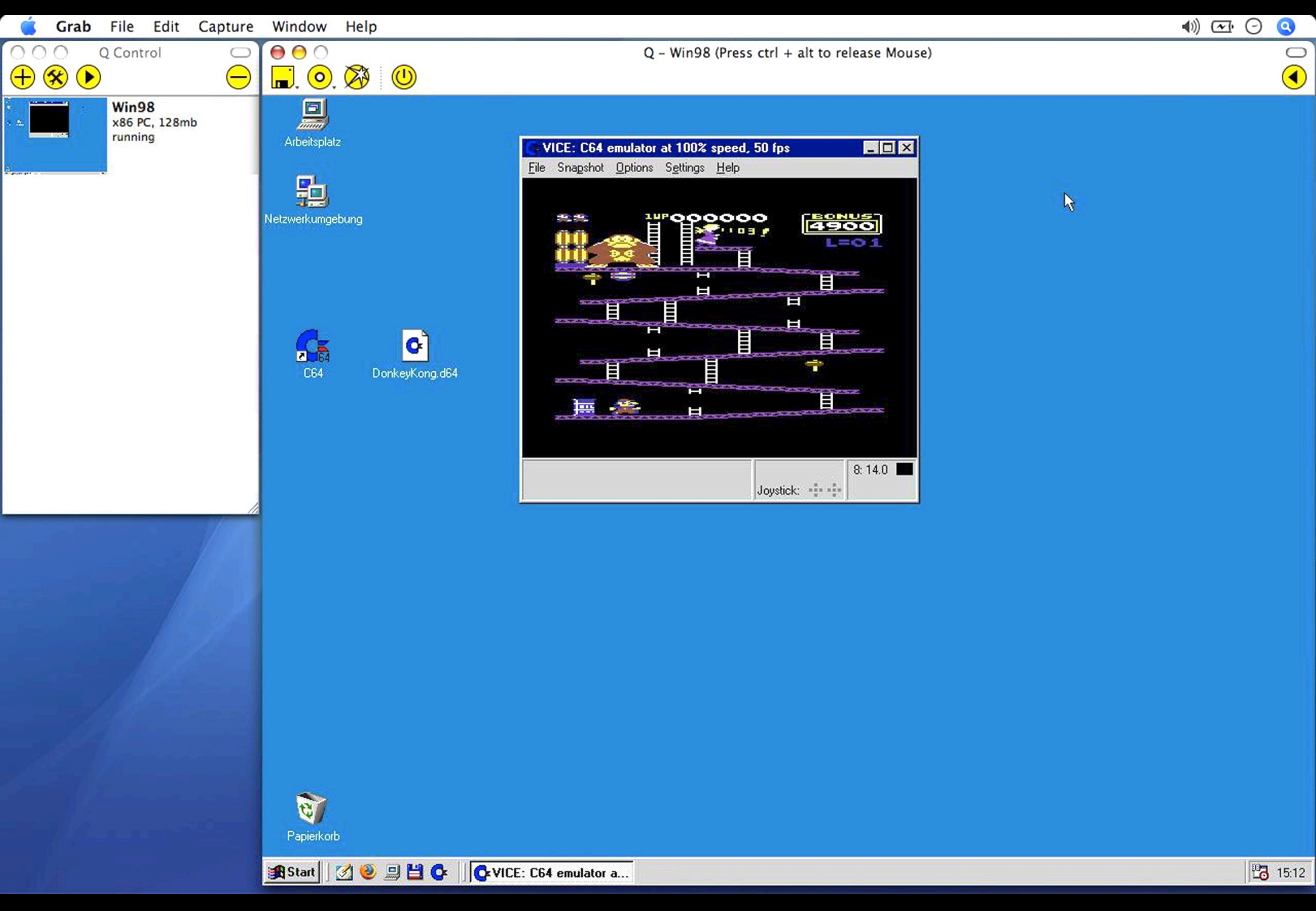

Grab File Edit Capture Window Help
Q Control
Win98
x86 PC, 128mb
running
Q – Win98 (Press ctrl + alt to release Mouse)
Arbeitsplatz
Netzwerkumgebung
C64
DonkeyKong.d64
Papierkorb
VICE: C64 emulator at 100% speed, 50 fps
File Snapshot Options Settings Help
1UP
BONUS
4900
L=01
Joystick:
8: 14.0
Start
VICE: C64 emulator a...
15:12

Not Found

The requested URL /forschungsdaten.html was not found on this server.

Apache/2.2.14 (Ubuntu) Server at www.uni-goettingen.de Port 80

All | Water | Sediment | Ice | Atmosphere

Pleistocene temperature | Search

Help | Advanced Search | Preferences | more...

You are not logged in (LOG IN)

Always quote citation when using data!

125 datasets found on search for **»Pleistocene...«** | Show Map

<< PREV | **1** | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NEXT >>

1. **Becquey, S; Gersonde, R (2002):** Distribution of planktonic foraminifera and paleotemperature reconstruction for the Subantarctic Zone of the South Atlantic

   Supplement to: **Becquey, S; Gersonde, R (2002):** Past hydrographic and climatic changes in the Subantarctic Zone of the South Atlantic - The Pleistocene record from ODP Site 1090. *Palaeogeography, Palaeoclimatology, Palaeoecology*

   Size: 3 datasets

   doi:10.1594/PANGAEA.706226 - Score: 100% - Similar datasets

DataCite

Helping you to find, access, and reuse data

What do we do?

We bring together the datasets community to collaboratively address the challenges of making data visible and accessible. Members of DataCite meet in person every six months at summer and winter conferences, and collaborate in established working groups.

Through collaboration, we:

- support researchers by helping them to find, identify, and cite research datasets with confidence
- support data centres by providing persistent identifiers for datasets, workflows and standards for data publication
- support journal publishers by enabling research articles to be linked to the underlying data

Currently we are working primarily with organisations that host data, such as data centres and libraries.

Assigning persistent identifiers to datasets

Why cite data?

What is DataCite?

What do we do?

EPIC

European Persistent Identifier Consortium

Home
Partner MoU
Activities
PID Structure
Process PIDs
Documentation

EPIC -- the *European Persistent Identifier Consortium* provides a Service for the European Research Community

Since the beginning of 2009 GWDG runs on behalf of the Max Planck Society a PID service, based on the *handle system* (TM, http://www.handle.net/), for the allocation and resolution of persistent identifiers. Together with other european partners a consortium was build to provide this services to the european research community.

The purpose of persistent identifiers

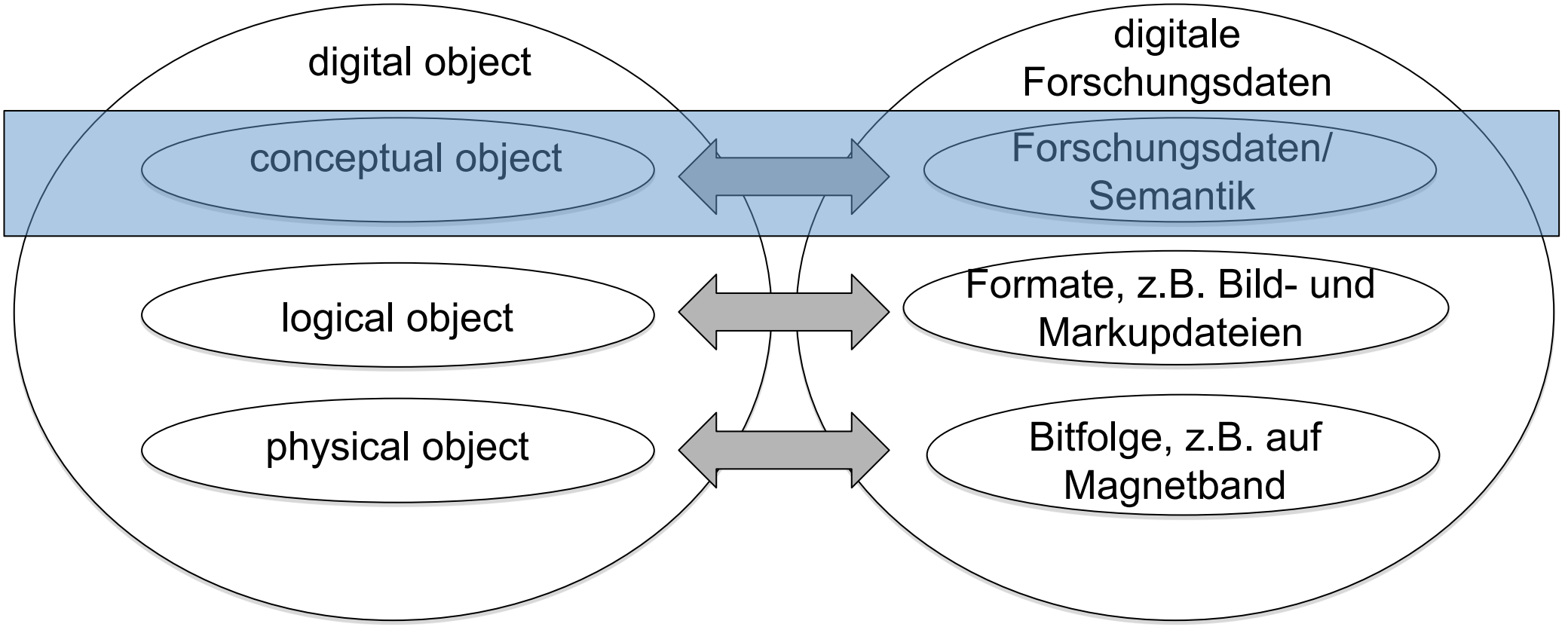
EPIC Partners

GWDG

SARA

CSC

Inhaltliche Nachnutzbarkeit/ Data Curation



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8.78	10.945	10.93	10.96	177-1090D-2H-1,138-140.5	3.56
8.88	11.030	11.03		177-1090D-2H-1,148-150.5	3.57
8.98	11.145	11.13	11.16	177-1090D-2H-2,8-10.5	3.55
9.08	11.245	11.23	11.26	177-1090D-2H-2,18-20.5	3.45
9.18	11.345	11.33	11.36	177-1090D-2H-2,28-30.5	3.36
9.28	11.445	11.43	11.46	177-1090D-2H-2,38-40.5	3.21
9.38	11.545	11.53	11.56	177-1090D-2H-2,48-50.5	3.25
9.48	11.645	11.63	11.66	177-1090D-2H-2,58-60.5	3.37
9.58	11.745	11.73	11.76	177-1090D-2H-2,68-70.5	3.38
9.68	11.845	11.83	11.86	177-1090D-2H-2,78-80.5	3.07
9.78	11.945	11.93	11.96	177-1090D-2H-2,88-90.5	3.06
9.88	12.045	12.03	12.06	177-1090D-2H-2,98-100.5	2.75
9.98	12.145	12.13	12.16	177-1090D-2H-2,108-110.5	2.72
10.08	12.245	12.23	12.26	177-1090D-2H-2,118-120.5	2.63
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10.28	12.445	12.43	12.46	177-1090D-2H-2,138-140.5	2.62
10.38	12.530	12.53		177-1090D-2H-2,148-150	2.65
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10.58	12.745	12.73	12.76	177-1090D-2H-3,18-20.5	3.12

Depth [m]	Depth c [mcd]	Depth top [m]	Depth bot [m]	Label	d18O [per mil PDB]	Uvigerina sp. d18O [per mil PDB]
8.68	10.845	10.83	10.86	177-1090D-2H-1,128-130.5		3.64
8.78	10.945	10.93	10.96	177-1090D-2H-1,138-140.5		3.56
8.88	11.030	11.03		177-1090D-2H-1,148-150.5	3.57	
8.98	11.145	11.13	11.16	177-1090D-2H-2,8-10.5	3.55	
9.08	11.245	11.23	11.26	177-1090D-2H-2,18-20.5	3.45	
9.18	11.345	11.33	11.36	177-1090D-2H-2,28-30.5	3.36	
9.28	11.445	11.43	11.46	177-1090D-2H-2,38-40.5	3.21	
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9.48	11.645	11.63	11.66	177-1090D-2H-2,58-60.5	3.37	
9.58	11.745	11.73	11.76	177-1090D-2H-2,68-70.5	3.38	
9.68	11.845	11.83	11.86	177-1090D-2H-2,78-80.5	3.07	
9.78	11.945	11.93	11.96	177-1090D-2H-2,88-90.5	3.06	
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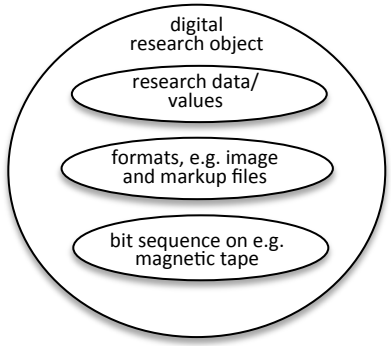
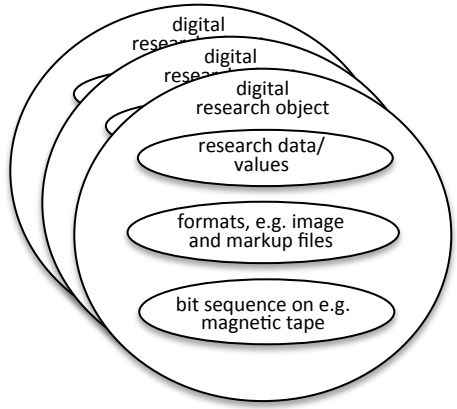
10.18	12.345	12.33	12.36	177-1090D-2H-2,128-130.5		2.65
10.28	12.445	12.43	12.46	177-1090D-2H-2,138-140.5		2.62
10.38	12.530	12.53		177-1090D-2H-2,148-150	2.65	
10.48	12.645	12.63	12.66	177-1090D-2H-3,8-10.5	2.77	
10.58	12.745	12.73	12.76	177-1090D-2H-3,18-20.5	3.12	

Project(s):	**Ocean Drilling Program** (ODP)
Coverage:	*Latitude:* -42.913617 * *Longitude:* 8.899817
Event(s):	**177-1090** * *Latitude:* -42.913617 * *Longitude:* 8.899817 * *Date/Time:* 1997-12-25T00:00:00 * *Elevation:* -3701.6 m * *Recovery:* 874.90 m * *Penetration:* 936.40 m * *Location:* South Atlantic * *Campaign:* Leg177 * *Basis:* Joides Resolution * *Device:* Composite Core * *Comment:* 101 cores; 936.4 m cored; 0 m drilled; 93.4% recovery
Comment:	For data of sediment core PS2489-2 see Becquey and Gersonde (2003) data sets: doi:10.1594/PANGAEA.706227


digital
research object
research data/
values
formats, e.g. image
and markup files
bit sequence on e.g.
magnetic tape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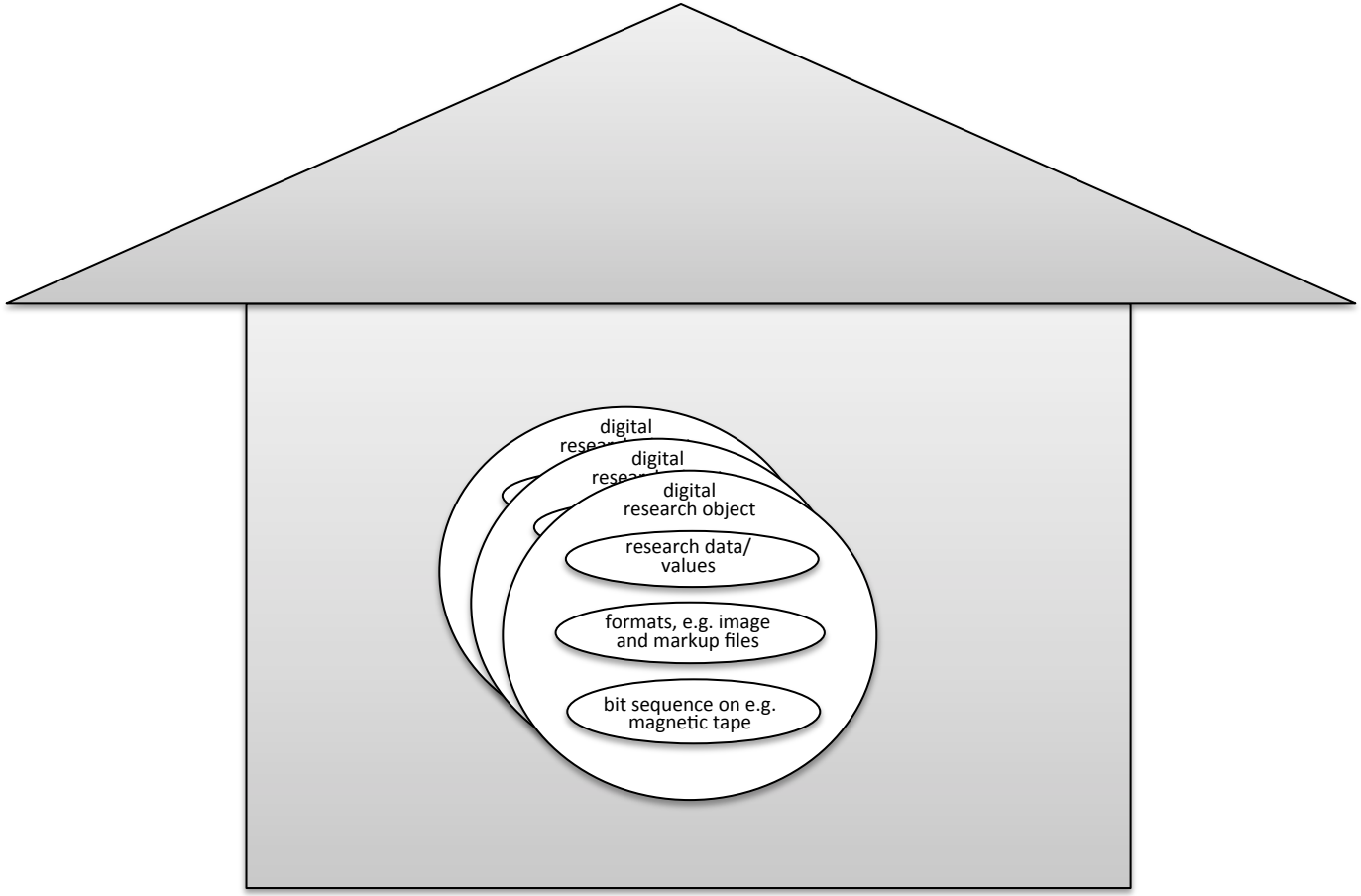
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formats, e.g. image
and markup files
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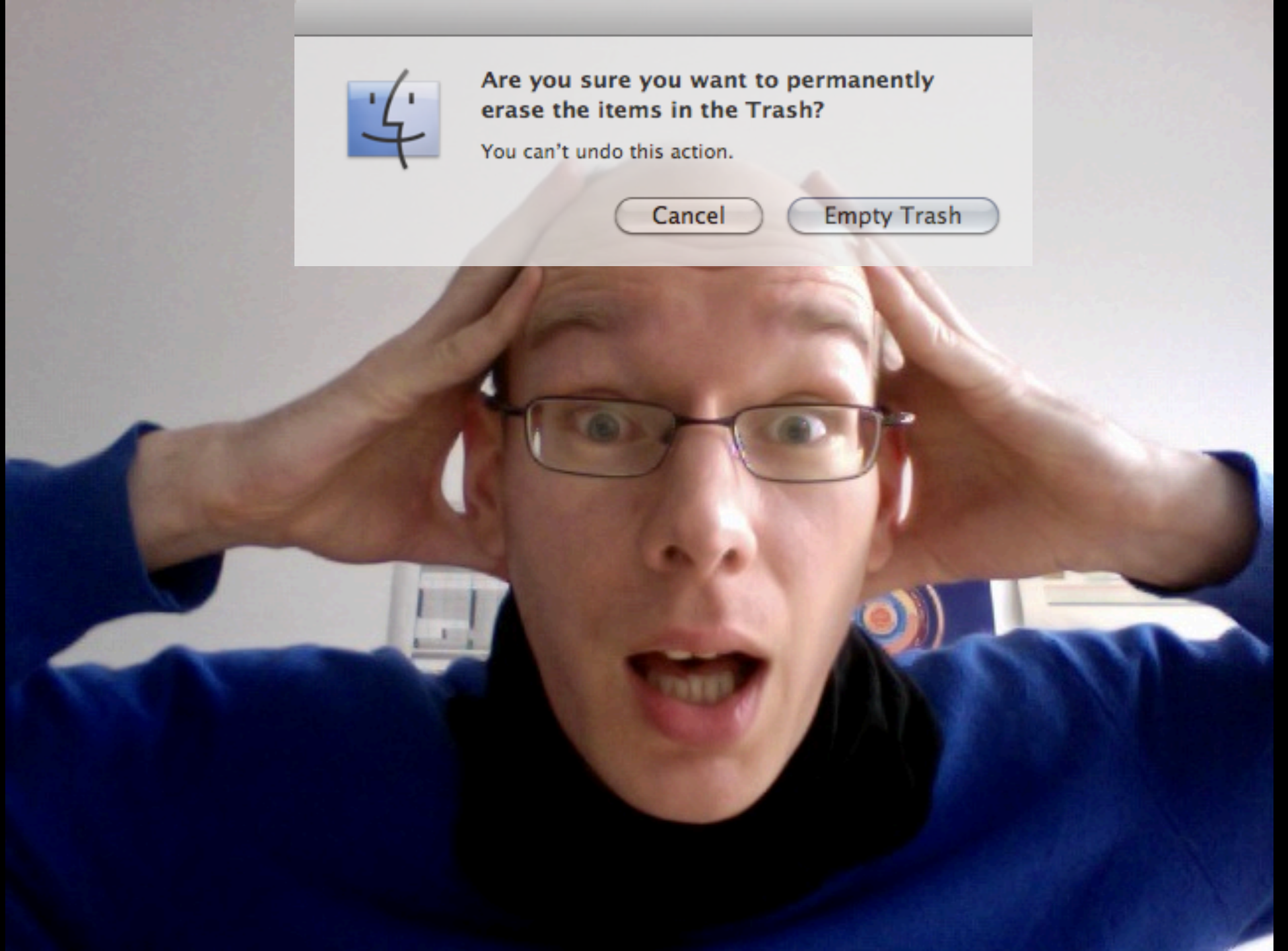
magnetic tape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You can't undo this action.
Cancel
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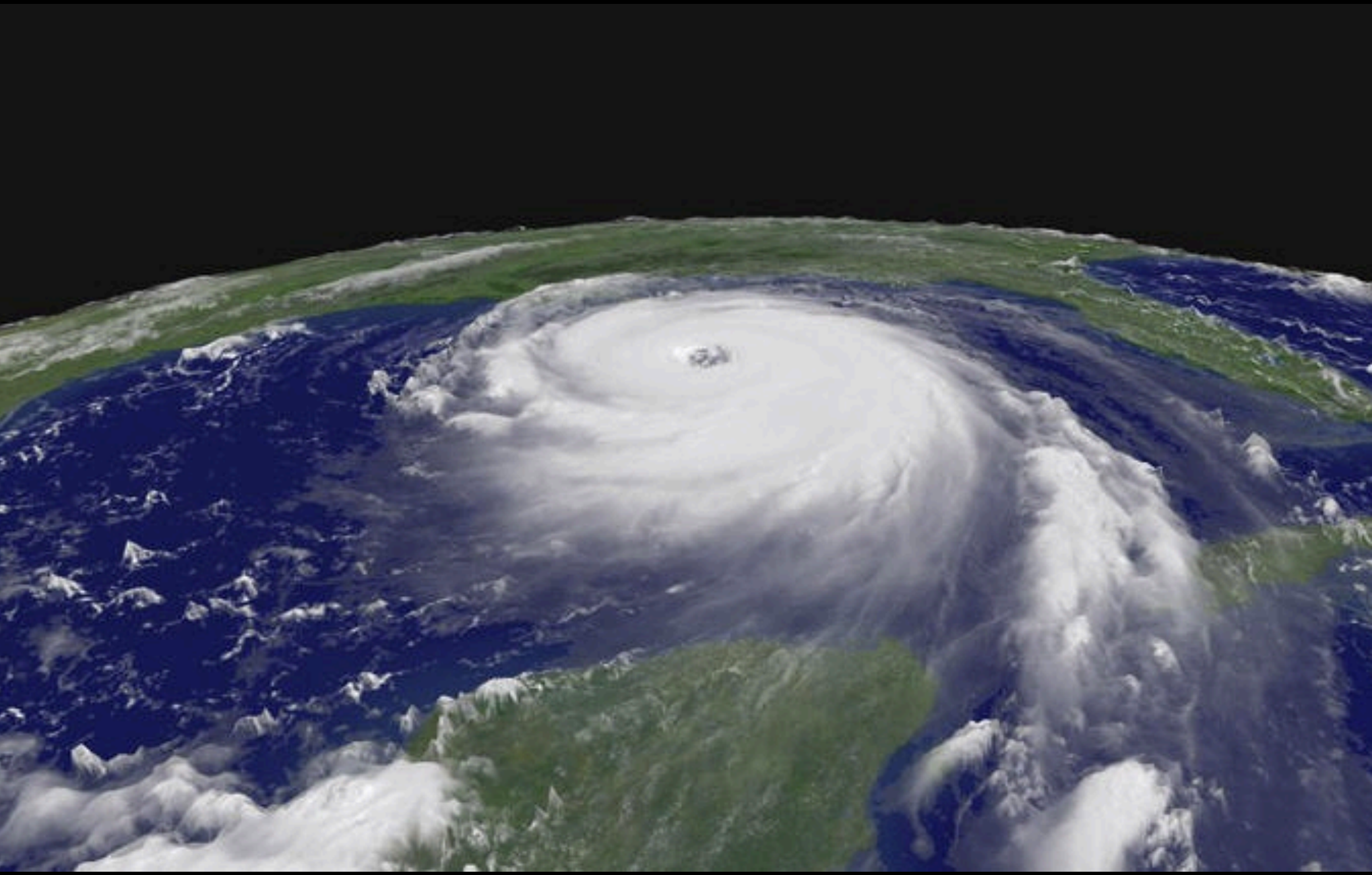


Trustworthy Repositories
Audit & Certification:
Criteria and Checklist

preservation repository CRL specifications certification criteria RLG Programs OCLC audit digital object management NARA trustworthy metadata preservation repository CRL specifications certification criteria RLG Programs OCLC audit digital object management NARA trustworthy metadata preservation repository CRL specifications certification criteria RLG Programs OCLC audit digital object management NARA trustworthy metadata preservation repository CRL specifications certification criteria RLG Programs OCLC audit digital object management NARA trustworthy metadata preservation repository CRL specifications certification criteria RLG Programs OCLC audit digital object management NARA trustworthy metadata

Contents:

Version 1.0
February 2007

nestor

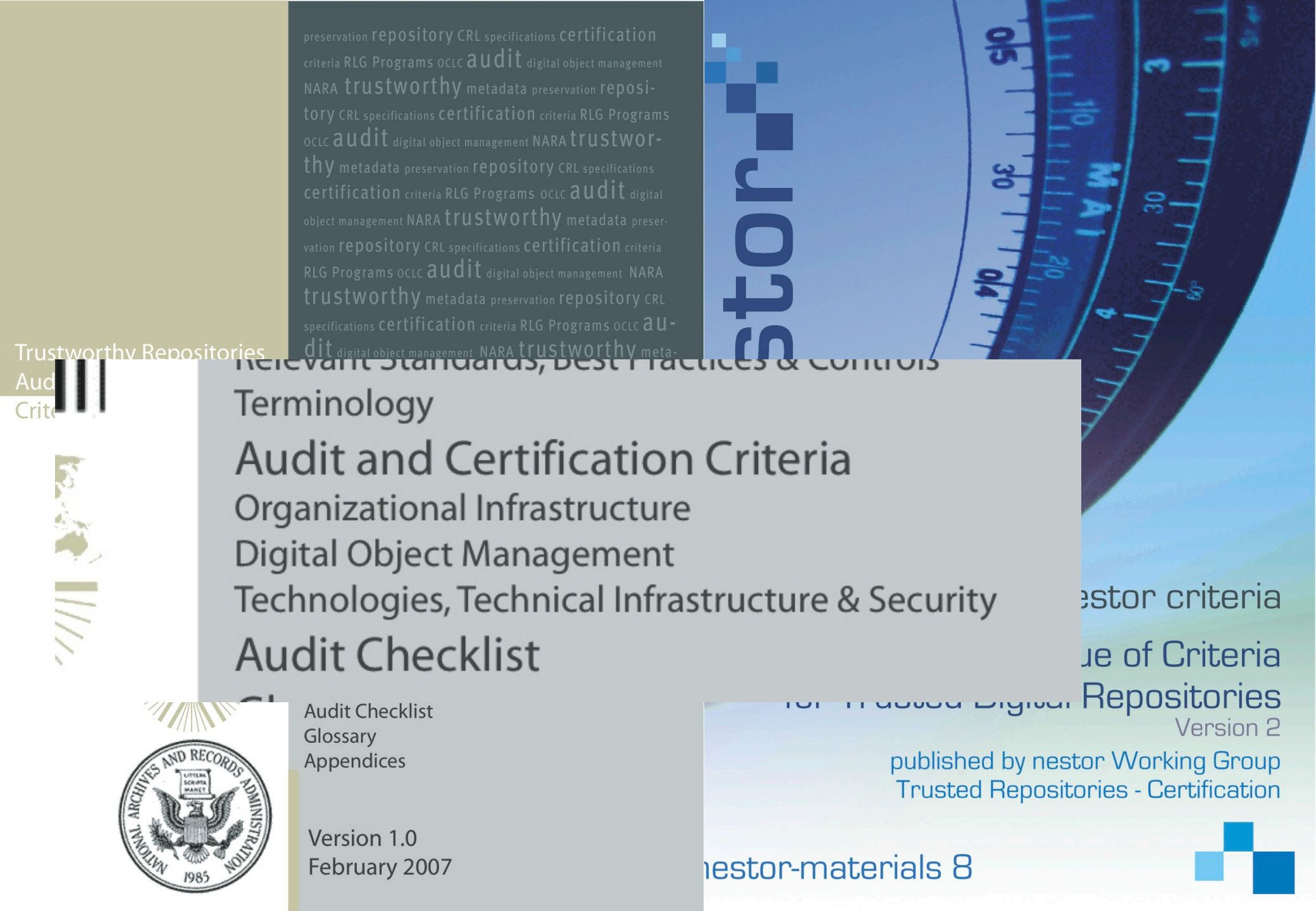
nestor criteria

Catalogue of Criteria for Trusted Digital Repositories

Version 2

published by nestor Working Group
Trusted Repositories - Certification

nestor-materials 8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Terminology
Audit and Certification Criteria
Organizational Infrastructure
Digital Object Management
Technologies, Technical Infrastructure & Security
Audit Checklist
Audit Checklist
Glossary
Appendices
Version 1.0
February 2007
estor criteria
ue of Criteria
Repositories
Version 2
published by nestor Working Group
Trusted Repositories - Certification
nestor-materials 8

Trustworthy Repositories Audit & Certification: Criteria C

Organization:		**Auditor:**	
Section:	**A. Organizational Infrastructure**	**Interviewee(s):**	
Aspect:	**A1. Governance & organizational viability**		

Criterion	Evidence (Documents) Examined	F
A1.1. Repository has a mission statement that reflects a commitment to the long-term retention of, management of, and access to digital information.		
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.		

Trustworthy Repositories Audit & Certification: Criteria C

Organization:		**Auditor:**
Section:	**A. Organizational Infrastructure**	**Interviewee(s)::**
Aspect:	**A2. Organizational structure & staffing**	

Criterion	Evidence (Documents) Examined
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.	
A2.2. Repository has the appropriate number of staff to support all functions and services.	

Trustworthy Repositories Audit & Certification: Criteria C

Organization:		**Auditor:**	
Section:	**A. Organizational Infrastructure**	**Interviewee(s):**	
Aspect:	**A4. Financial sustainability**		

Criterion	Evidence (Documents) Examined	
A4.1. Repository has short- and long-term business planning processes in place to sustain the repository over time.		
A4.2. Repository has in place processes to review and adjust business plans at least annually.		
A4.3. Repository's financial practices and		

Consultative Committee for Space Data Systems

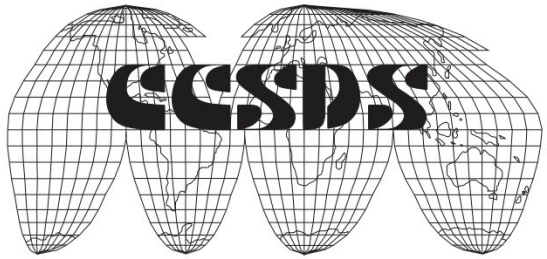
RECOMMENDATION FOR SPACE DATA SYSTEM STANDARDS

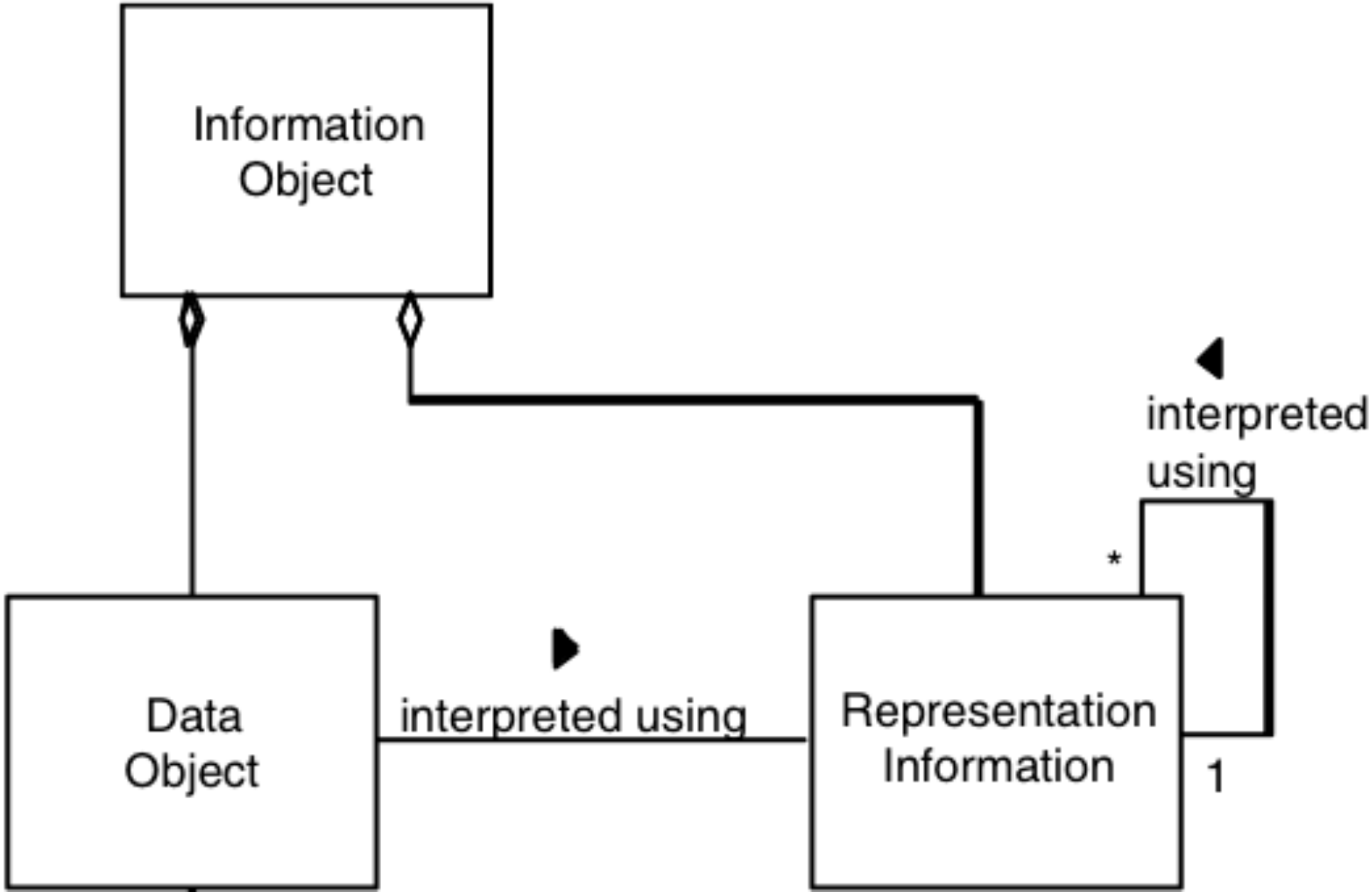
Reference Model for an Open Archival Information System (OAIS)

CCSDS 650.0-B-1

BLUE BOOK

January 2002

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interpreted using
Representation Information
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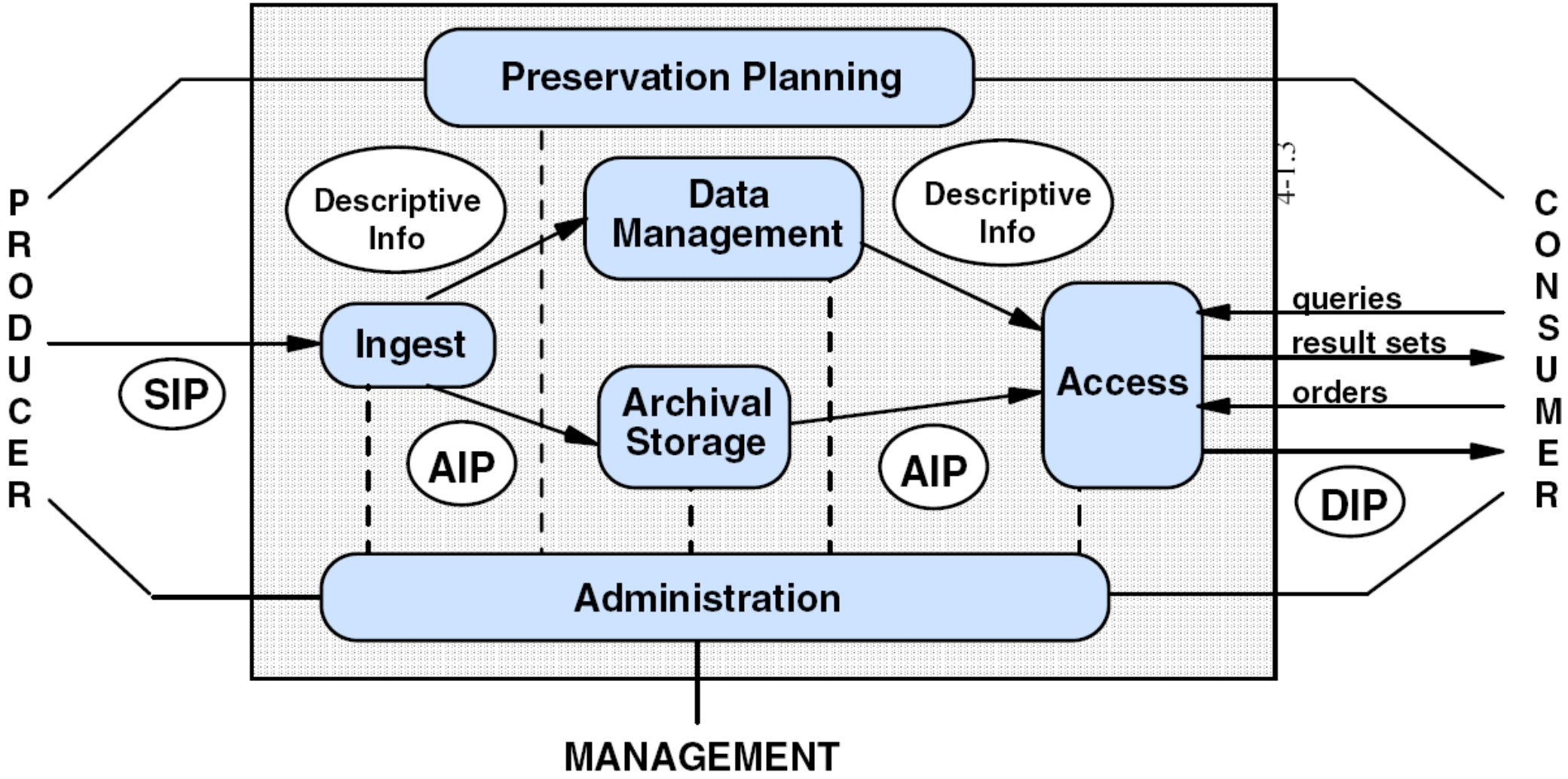
Preservation Planning
Descriptive Info
Data Management
Descriptive Info
4-1.3
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Archival Storage
Access
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result sets
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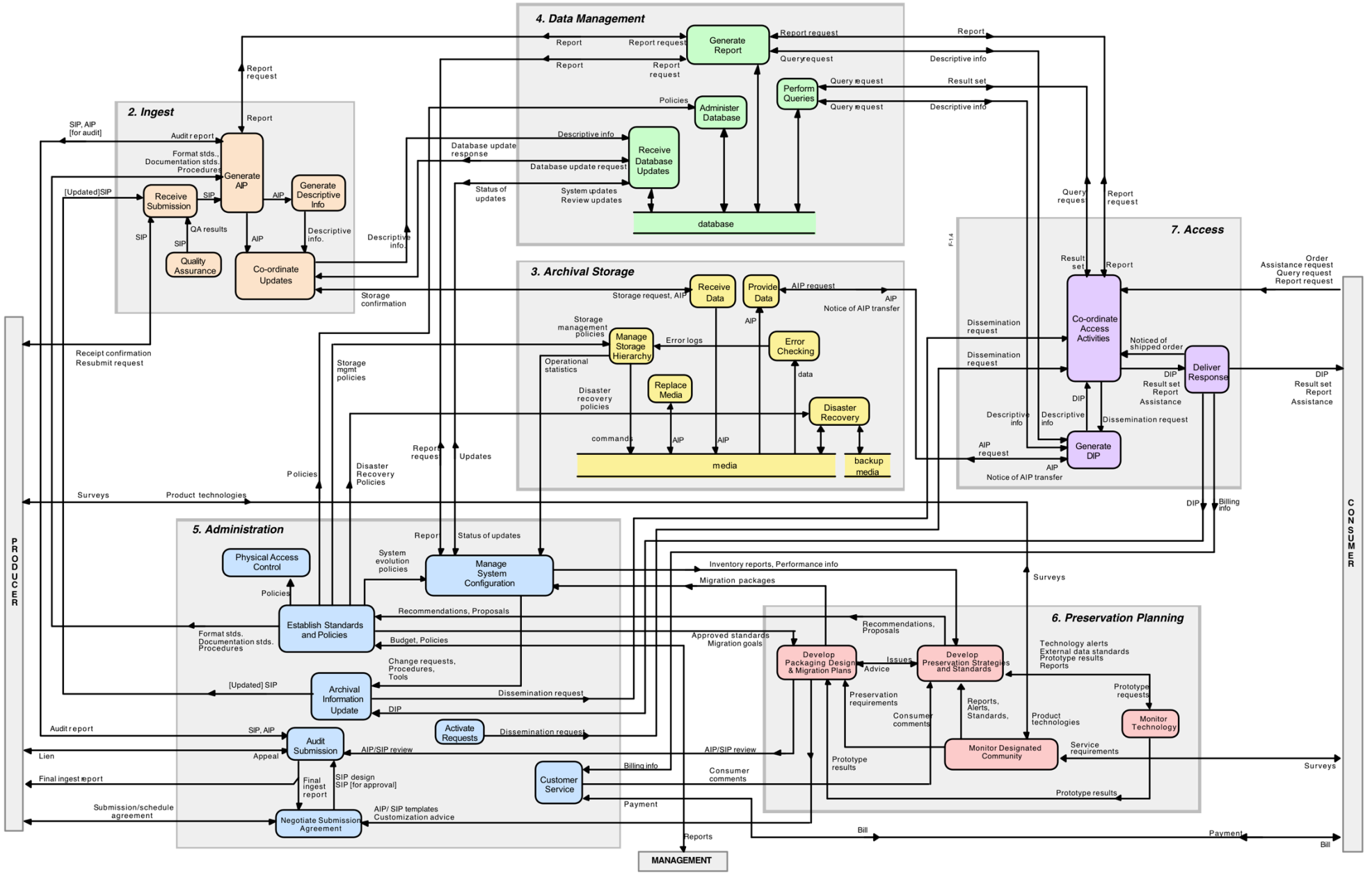
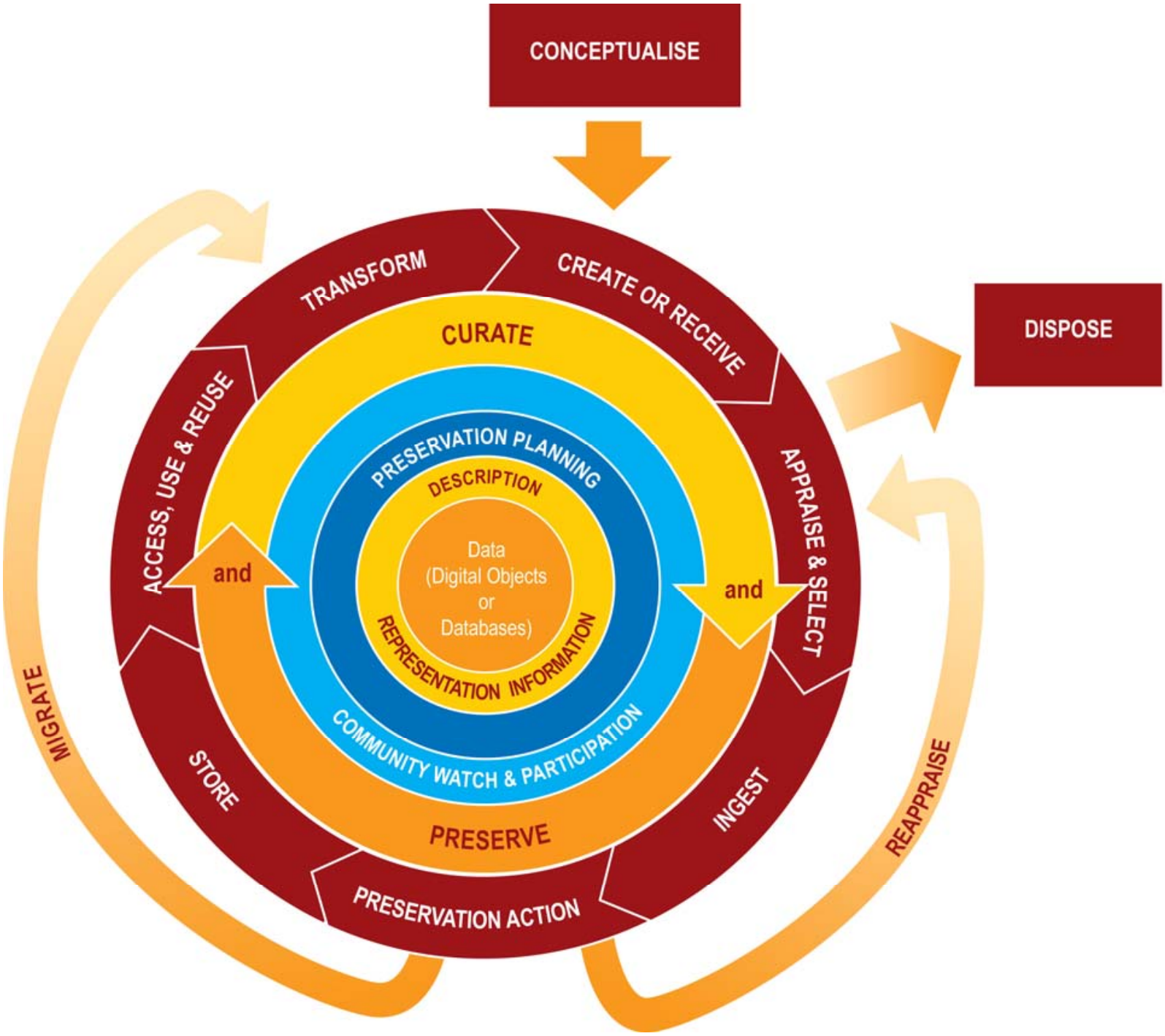
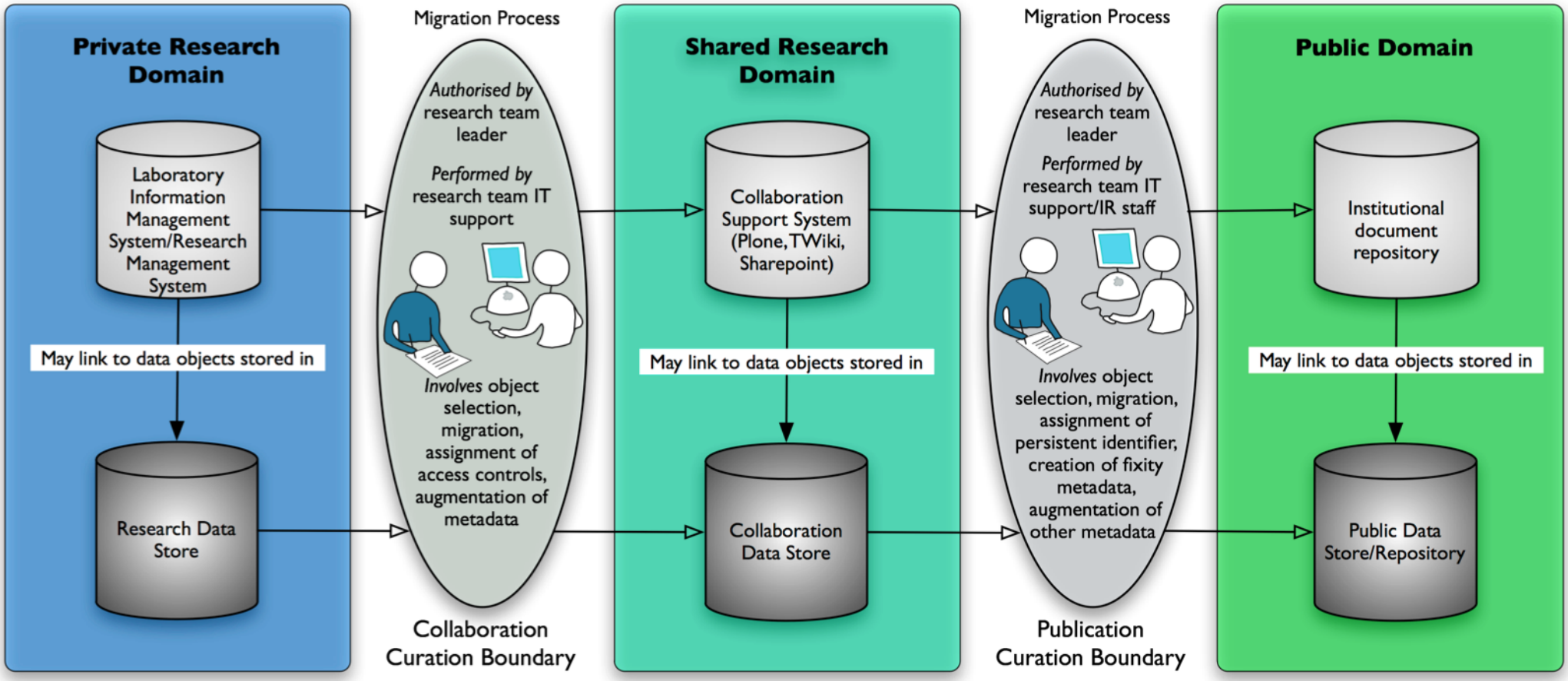
AIP
DIP
Administration
MANAGEMENT


4. Data Management
Generate Report
Report request
Report
Query request
Descriptive info
Perform Queries
Result set
Administer Database
Policies
Receive Database Updates
Descriptive info
Database update response
Database update request
Status of updates
System updates
Review updates
database
2. Ingest
SIP, AIP [for audit]
Audit report
Format stds., Documentation stds., Procedures
Generate AIP
Generate Descriptive Info
[Updated]SIP
Receive Submission
SIP
AIP
QA results
Descriptive info.
Quality Assurance
Co-ordinate Updates
Storage confirmation
3. Archival Storage
Storage request, AIP
Receive Data
Provide Data
AIP request
Notice of AIP transfer
Storage management policies
Manage Storage Hierarchy
Error logs
Error Checking
Operational statistics
Replace Media
data
Disaster recovery policies
Disaster Recovery
commands
media
backup media
7. Access
F-14
Result set
Report
Co-ordinate Access Activities
Order
Assistance request
Query request
Report request
Dissemination request
Noticed of shipped order
Deliver Response
DIP
Result set
Report
Assistance
Descriptive info
Generate DIP
AIP request
Notice of AIP transfer
Receipt confirmation
Resubmit request
Storage mgmt policies
Policies
Disaster Recovery Policies
Report request
Updates
Surveys
Product technologies
PRODUCER
CONSUMER
5. Administration
Physical Access Control
System evolution policies
Manage System Configuration
Status of updates
Inventory reports, Performance info
Migration packages
Establish Standards and Policies
Recommendations, Proposals
Budget, Policies
Format stds. Documentation stds. Procedures
Change requests, Procedures, Tools
Archival Information Update
[Updated] SIP
Dissemination request
DIP
Activate Requests
Audit report
SIP, AIP
Audit Submission
AIP/SIP review
Lien
Appeal
Final ingest report
SIP design
SIP [for approval]
Submission/schedule agreement
Negotiate Submission Agreement
AIP/ SIP templates
Customization advice
Billing info
Payment
Customer Service
Consumer comments
6. Preservation Planning
Develop Packaging Design & Migration Plans
Issues
Advice
Develop Preservation Strategies and Standards
Approved standards
Migration goals
Recommendations, Proposals
Technology alerts
External data standards
Prototype results
Reports
Preservation requirements
Reports, Alerts, Standards,
Prototype requests
Monitor Technology
Product technologies
Monitor Designated Community
Service requirements
Prototype results
Surveys
Billing info
Bill
Reports
MANAGEMENT


CONCEPTUALISE
DISPOSE
TRANSFORM
CREATE OR RECEIVE
APPRAISE & SELECT
INGEST
PRESERVATION ACTION
STORE
ACCESS, USE & REUSE
MIGRATE
REAPPRAISE
CURATE
PRESERVE
and
and
PRESERVATION PLANNING
DESCRIPTION
REPRESENTATION INFORMATION
COMMUNITY WATCH & PARTICIPATION
Data
(Digital Objects
or
Databases)



This domain involves the core research team as they undertake the research, usually within a single institution. Access is often tightly controlled as hypotheses and analyses are developed.

This domain involves researchers outside the core team as they collaborate with colleagues, often across institutions. Access is more open, but not everything is shared.

This domain involves the public sphere (publication in the sense of making public). Access will usually be open to all.

Version 1.4, http://andrew.treloar.net/, 07Dec07

Science

The more we understand about science and its complexities, the more important it is for scientific data to be shared openly. It's not useful to have ten different labs doing the same research and not sharing their results; likewise, we're much more likely to be able to pinpoint diseases if we have genomic data from a large pool of individuals. Since 2004, we've been focusing our efforts to expand the use of Creative Commons licenses to scientific and technical research.

Project(s):	**Ocean Drilling Program** (ODP)
Coverage:	*Latitude:* -42.913617 * *Longitude:* 8.899817
Event(s):	**177-1090** * *Latitude:* -42.913617 * *Longitude:* 8.899817 * *Date/Time:* 1997-12-25T00:00:00 * *Elevation:* -3701.6 m * *Recovery:* 874.90 m * *Penetration:* 936.40 m * *Location:* South Atlantic * *Campaign:* Leg177 * *Basis:* Joides Resolution * *Device:* Composite Core * *Comment:* 101 cores; 936.4 m cored; 0 m drilled; 93.4% recovery
Comment:	For data of sediment core PS2489-2 see Becquey and Gersonde (2003) data sets: doi:10.1594/PANGAEA.706227
License:	(cc) BY Creative Commons Attribution 3.0 Unported
Size:	3 datasets

Download Data

Download **ZIP** file containing all datasets as tab-delimited text *(use the following character encoding:*

ISO-8859-1: ISO Western (PANGAEA default) *)*

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  - Make Connections
- **Managing Data**
  - Guides
- **Publishing Data**
  - Licensing
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Australian National Data Service

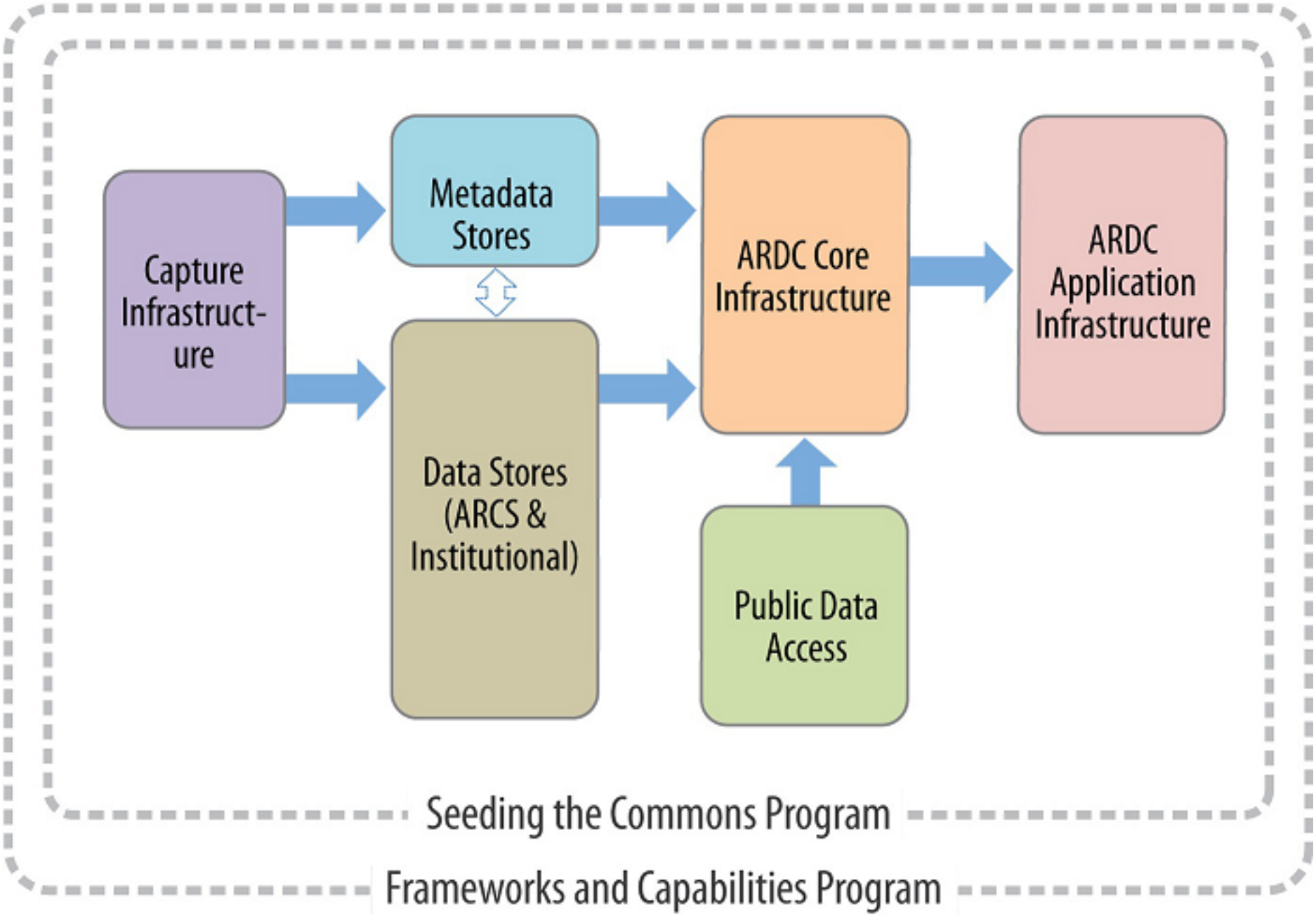
More Australian researchers reusing research data more often.

ANDS is building the **Australian Research Data Commons**: a cohesive collection of research resources from all research institutions, to make better use of Australia's research outputs.

ANDS enables the transformation of:

Data that are:		**to Structured Collections that are:**
Unmanaged	→	Managed
Disconnected	→	Connected
Invisible	→	Findable
Single-use	→	Reusable

...so that Australian researchers can easily publish, discover, access and use research data.


Capture Infrastruct-ure
Metadata Stores
Data Stores (ARCS & Institutional)
ARDC Core Infrastructure
Public Data Access
ARDC Application Infrastructure
Seeding the Commons Program
Frameworks and Capabilities Program

Zusammenfassung

- Aktualität:
  - Veränderung der Wissenschaft
  - Medien und Förderer
- Aufgaben:
  - Erhaltung der Bits
  - Erhaltung der tech. Nachnutzbarkeit
  - Erhaltung der intell. Nachnutzbarkeit
  - Vertrauenswürdigkeit und Nachhaltigkeit des Archivs
- Mittel:
  - weniger Technik als Richtlinien und Organisationen

Vielen Dank!

Nachweise

(alle Links nach Stand 24. April 2011)

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all other pictures: WissGrid project, self produced or as shown