Preservation and Long Term Access of Data at the World Data Centre for Climate

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Hamburg, Germany

Overview

- The World Data Centre for Climate
- Data Storage: Technology – Tapes and Disks
- Data Storage: LObStER – the Tape Storage Tool
- Storage Policy
- Long Term Archiving
- DOI – Digital Object Identifier

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The World Data Centre for Climate

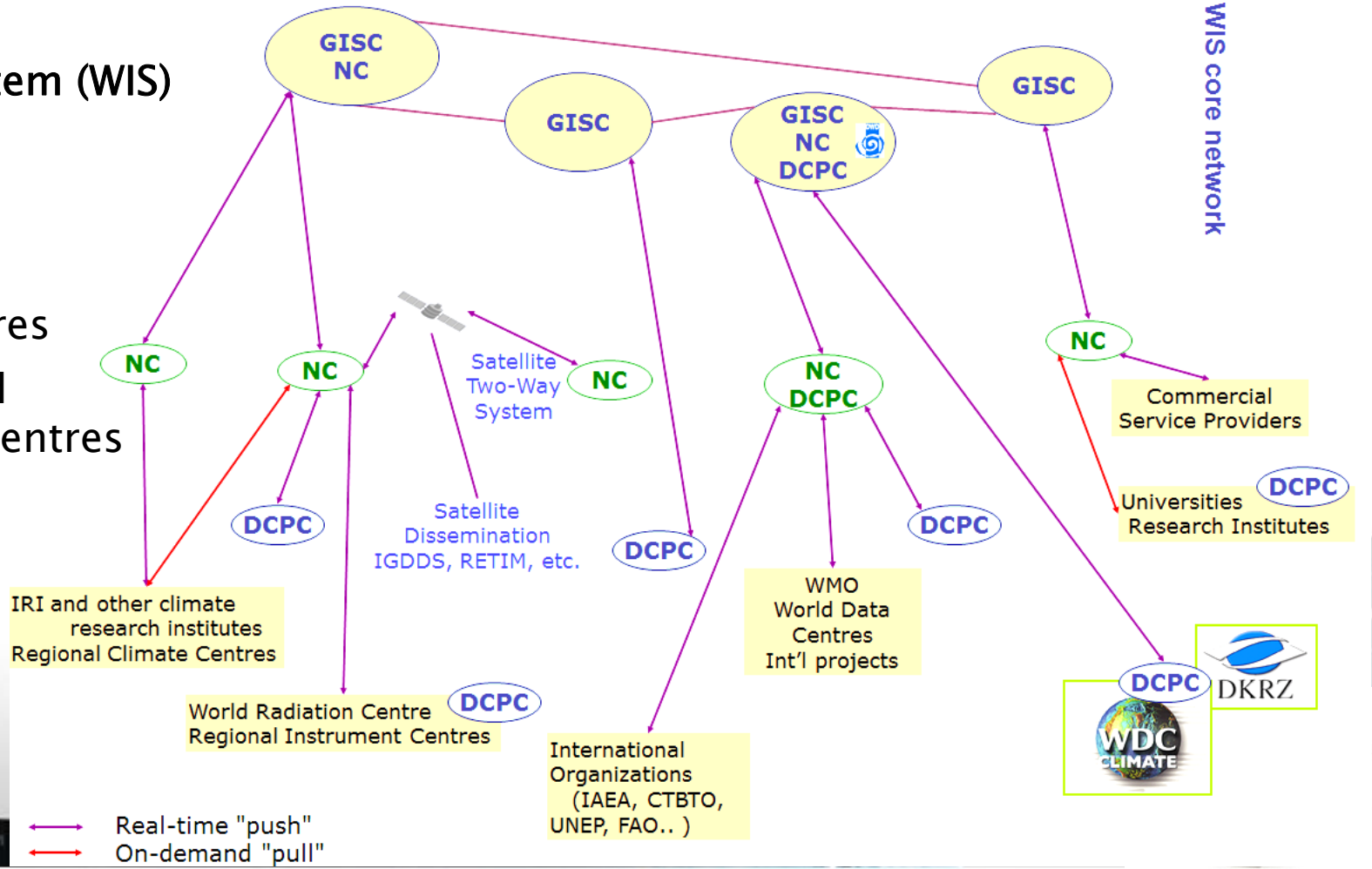
The German Climate Computing Centre (DKRZ) is held by…

- Max Planck Society, University of Hamburg, and others.
- Mission:
  Provide HP computing power and storage for the German Earth Science community (mainly)

The WDCC as WIS Data Collection & Production Centre

WMO Information System (WIS)

- National Centres
- Global Information System Centres
- Data Collection and Production Centres



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The WDCC in the ICSU World Data System

- International Council for Science (ICSU)

  World Data System (WDS)

  World Data Centres (WDC)

- WDC Cluster Earth System Research:

  WDC-Mare, WDC-RSAT, WDC-Climate

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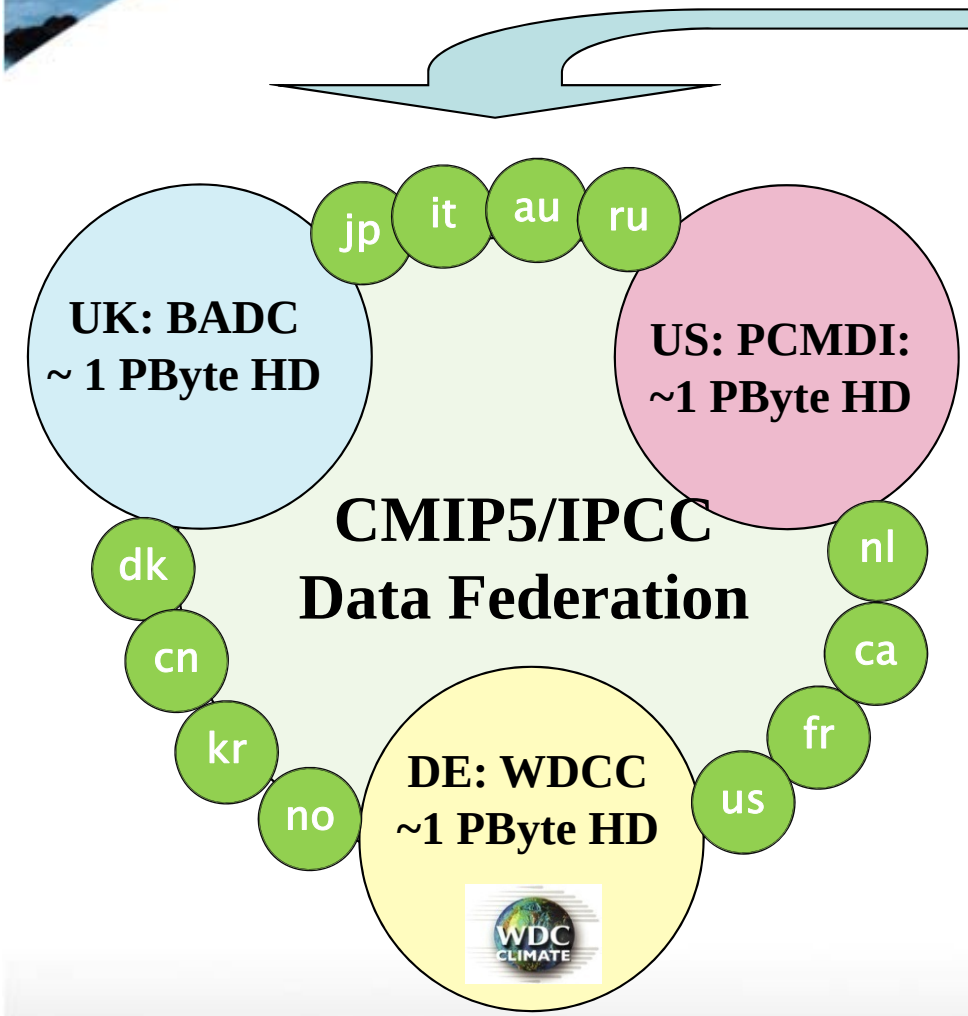
The ESG Data Nodes



Earth System Grid Federation (ESGF):

>10 data nodes

Primary responsibility for CMIP5/IPCC-AR5: PCMDI, BADC, & WDCC

About 1 PB Data are replicated

The Evolution of Data Quantities

Climate Model Data:

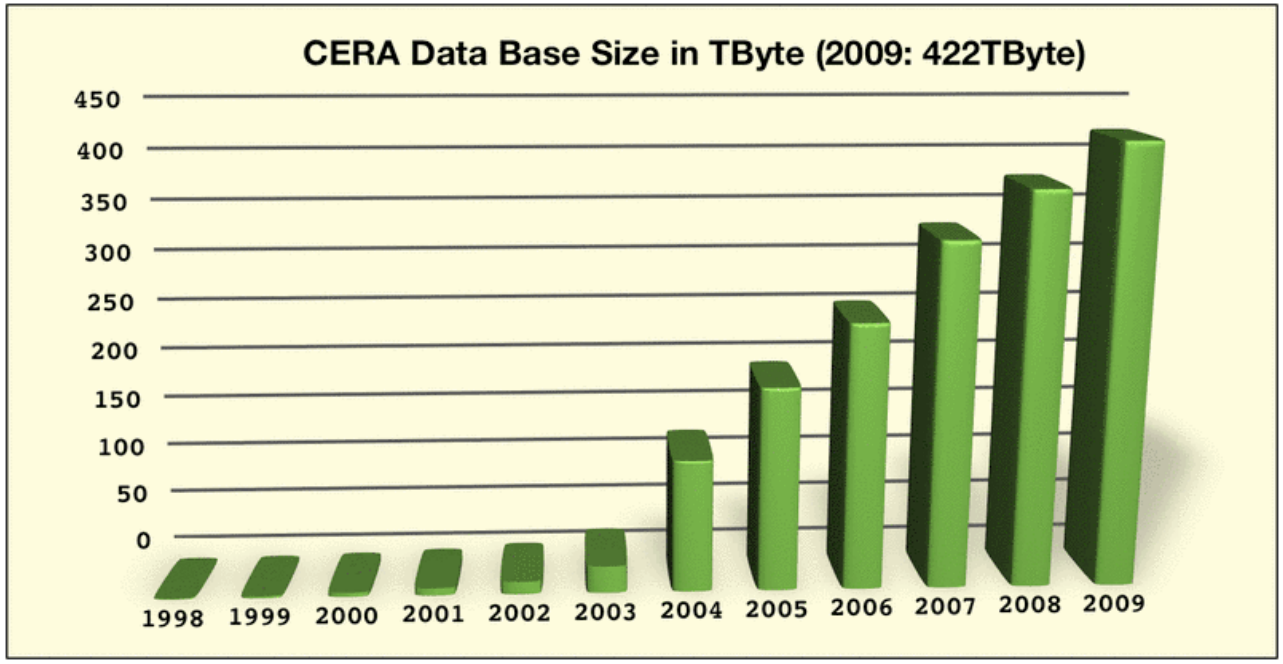
Relative

homogeneous

but huge amounts!

Needed: Tape

access (nearline)



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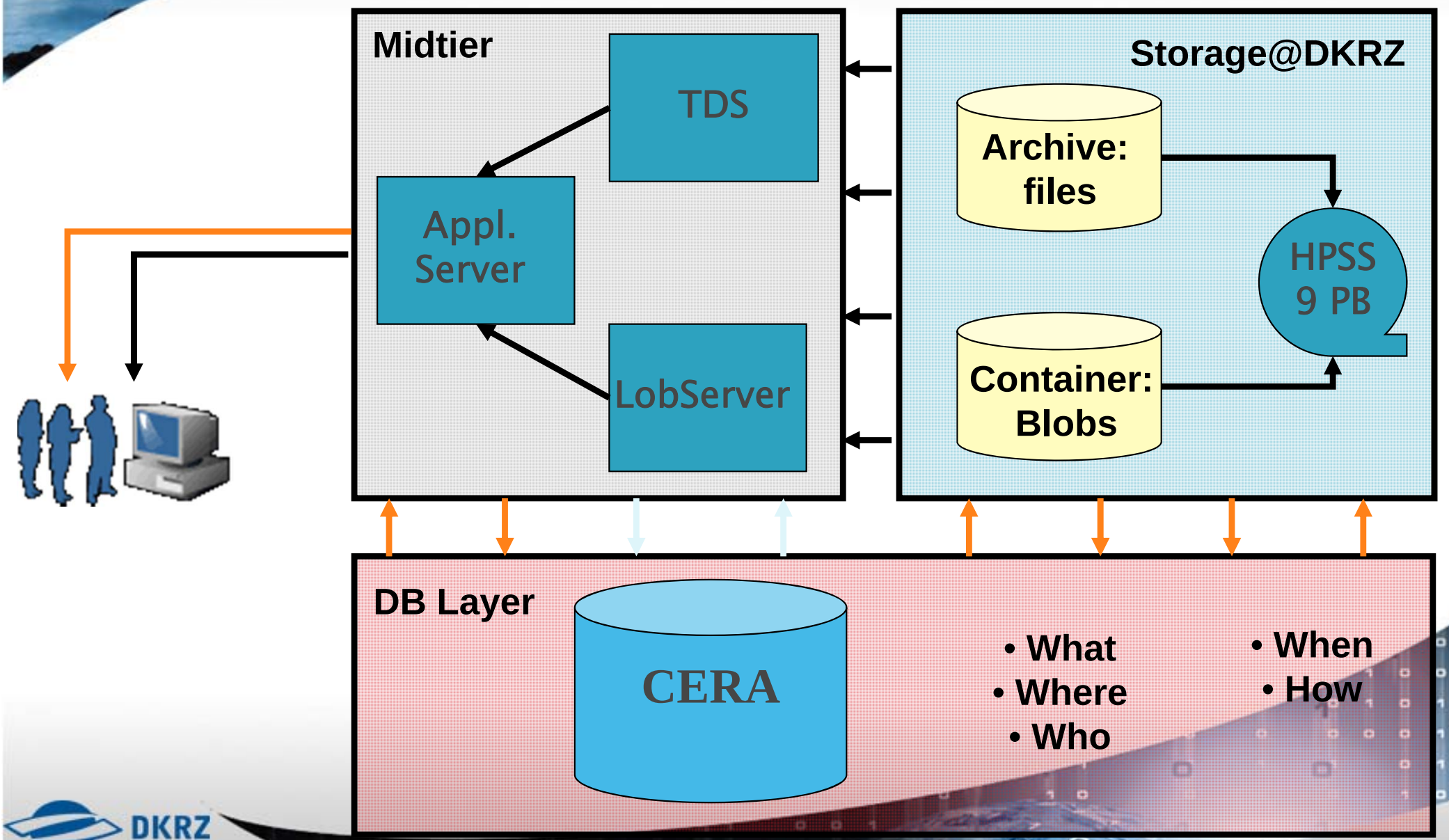
The Data Flows



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LObStER: Large Object Storage and Efficient Retrieval

- Huge amounts of data in each container file
- Very different sizes of records: 64b .. 2 Gb
- Efficient administration of all records
- Irregular access patterns
  (access latency independent of the record position)
- Transactional behaviour for read/write
- Fault tolerance for HD, controller, tapes, etc

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LObStER

Application

generic
JDBC-driver

①

Lobster
configuration
manager

②

Application

Internet

Intranet

specific JDBC-
drivers loaded

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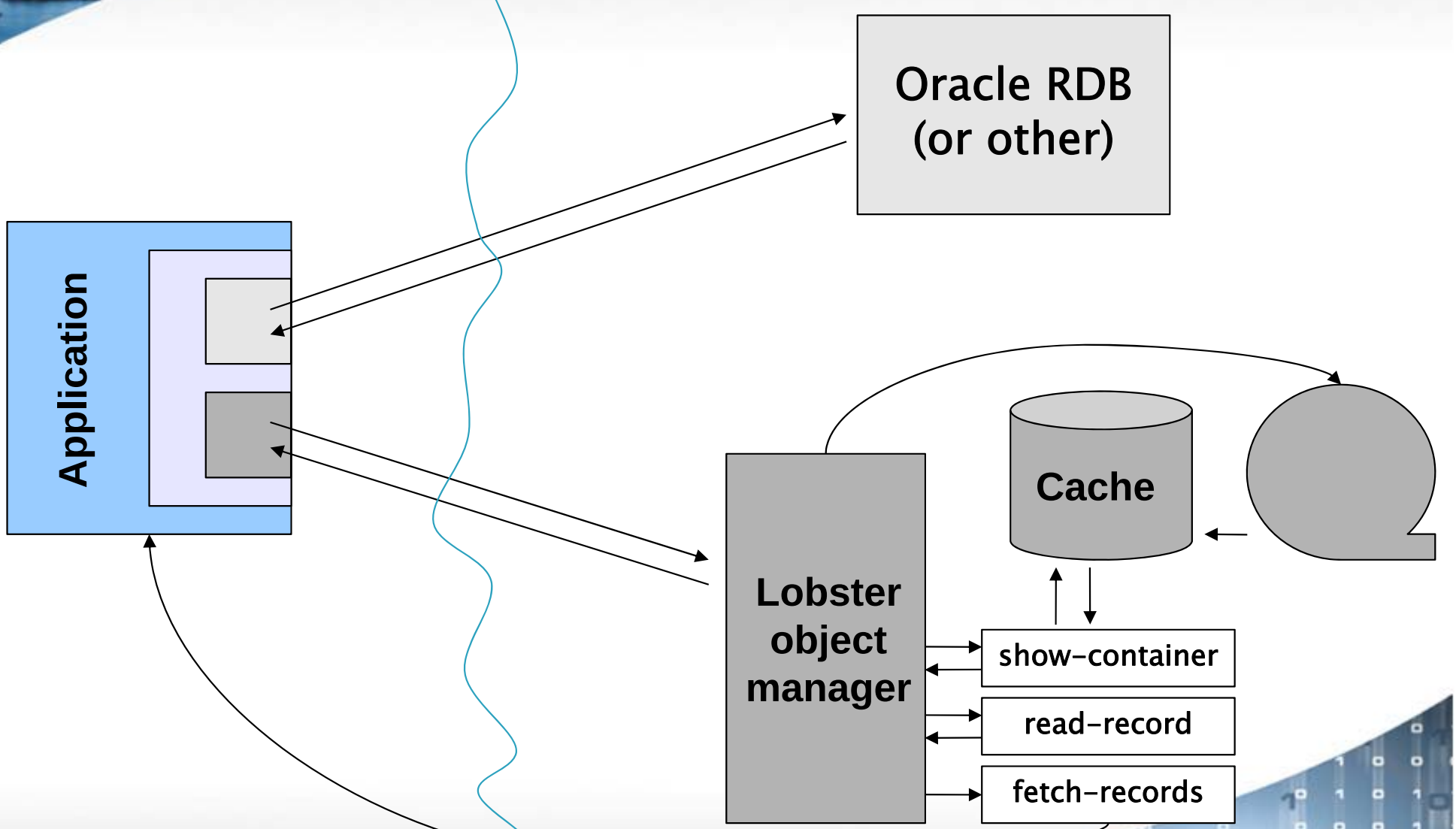
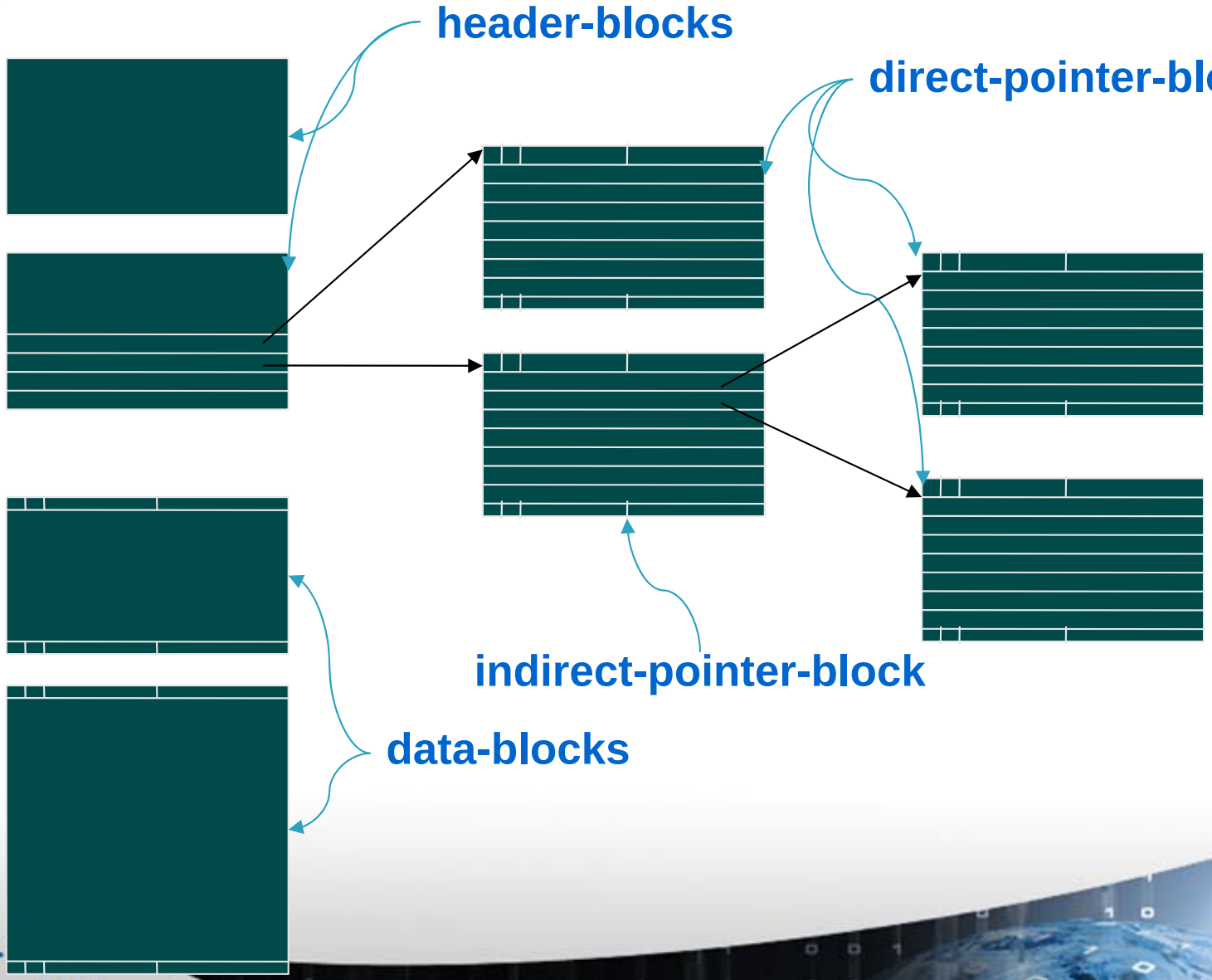
LObStER


Oracle RDB
(or other)
Application
Cache
Lobster
object
manager
show-container
read-record
fetch-records

LObStER: The Data Containers

- Container files with blocked format
- 64-bit files and 64-bit internal position referencing
- Max file size: 16384 PBytes
- Entries stored in ≥1 blocks
- Block sizes 2^k, $k \in \{ 8, 9, 10, \ldots, 62 \}$

LObStER: The Data Containers



Long Term Archiving

Several steps:

- specification & concept
- filling of metadata & data
- quality checks & DOI

- LTA for, e.g., EUCLIPSE, MedCLIVAR, combine

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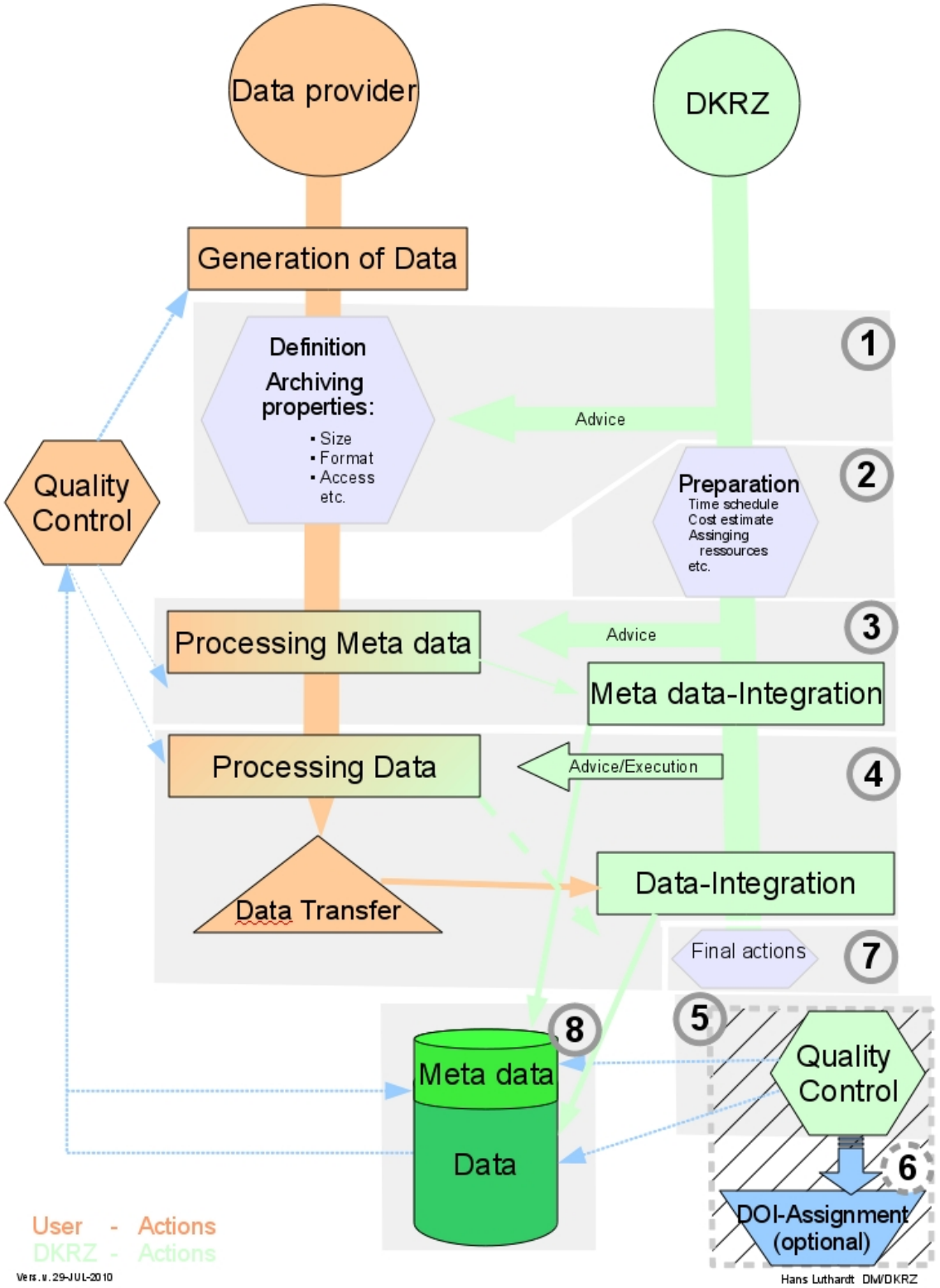

LTA

Costs depend on complexity and efforts at our site:

- metadata
- reformatting
- etc

Long Term Archiving

- Quality Checks on three levels for LTA

QC L1: conformity to general standards

(format, ...)

QC L2: coarse automated content checks

QC L3: detailed spot checks:

TQA – Technical Quality Assurance

SQA – Scientific Quality Assurance

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The WDC-Climate as Publishing Agency of the IDF

International DOI Foundation	doi.org
Registration Agencies	DataCite.org
National Organizations	tib-hannover.de
Publisher	wdc-climate.de

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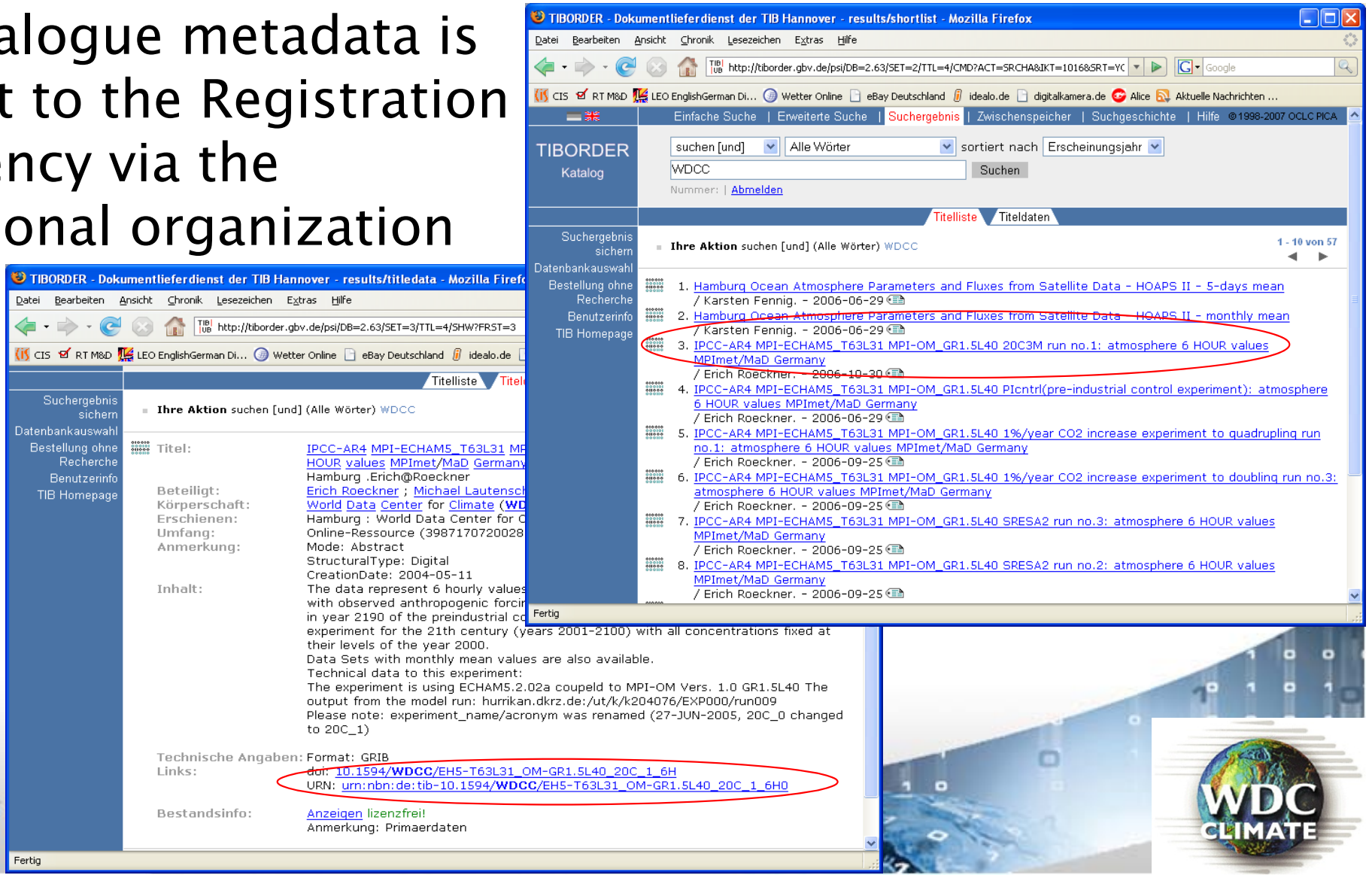
The Visibility of LTA Data in Public Catalogues

- DOI is given
- Catalogue metadata is sent to the Registration Agency via the national organization



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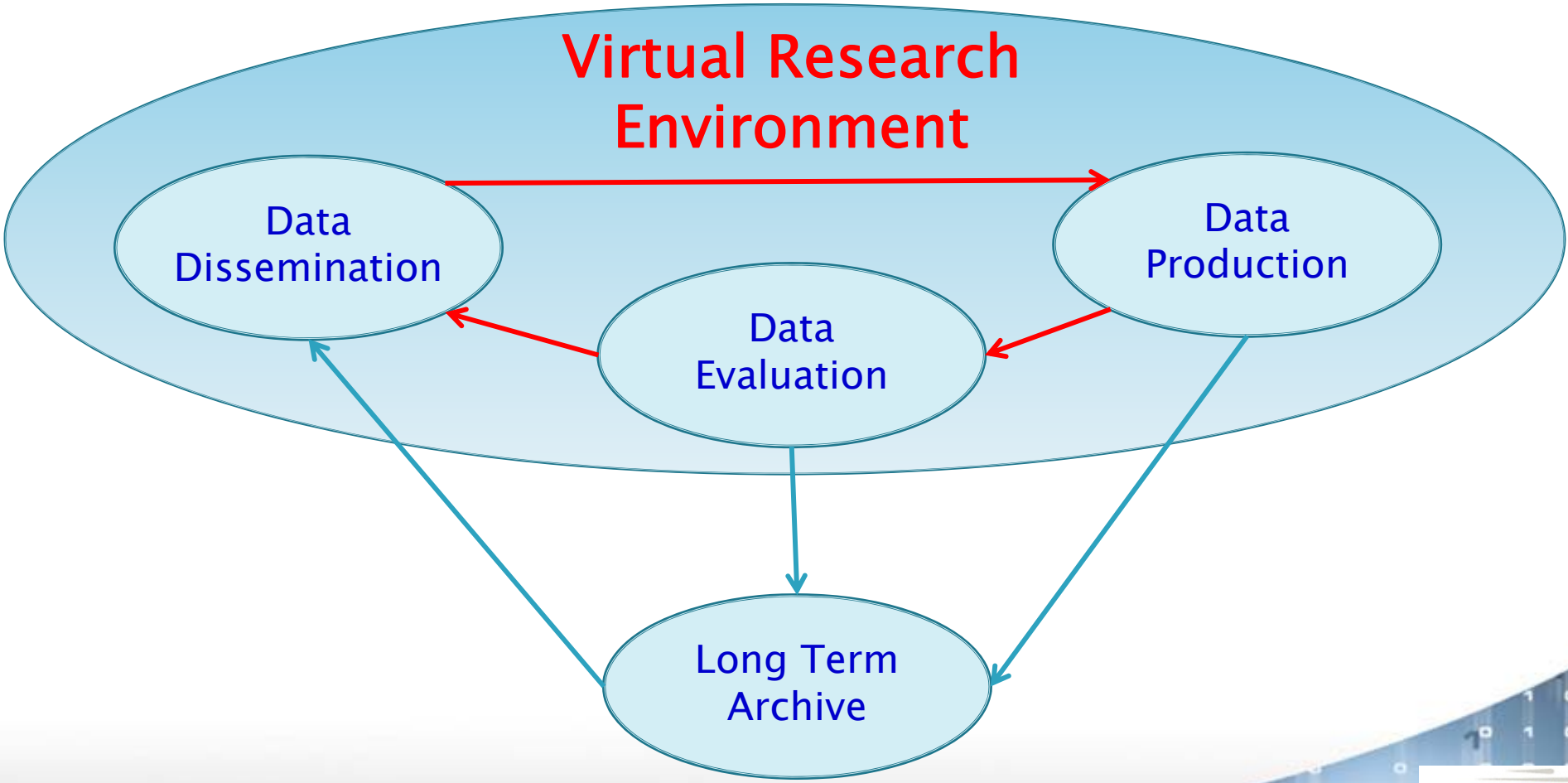
The Data Life Cycle Management



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THANK YOU.

QUESTIONS?

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