Centre de Calcul de l'Institut National de Physique Nucléaire et de Physique des Particules

Data life cycle and Archiving

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Scientific data life cycle: motivations

CC-IN2P3:

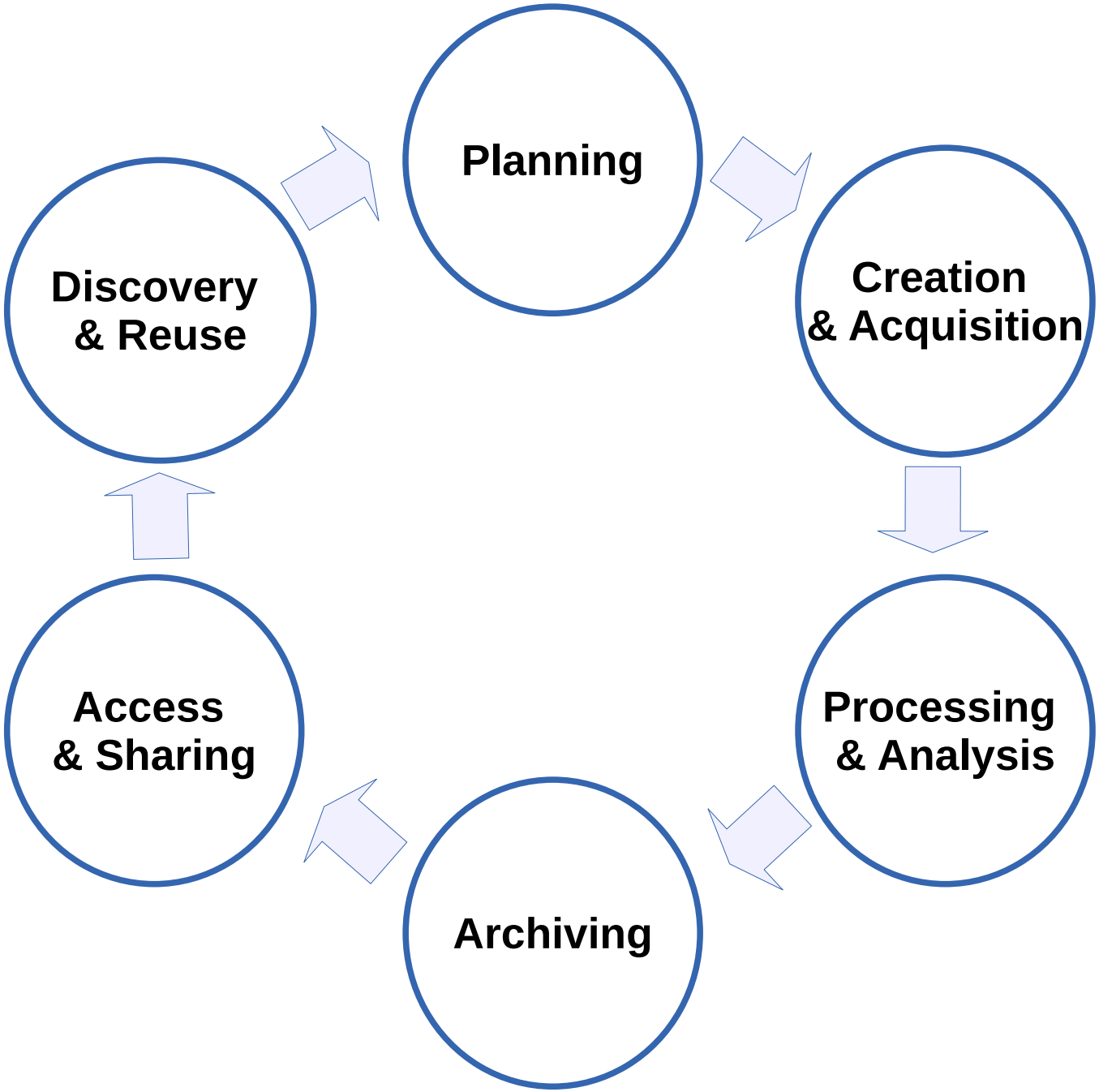
- *What will be the future of the data?* réunion des expériences 2015
  https://indico.in2p3.fr/event/10875
- a project become inactive, how about the data?
  - data become orphan and/or obsolete over time
  - nothing can be done !

- question important for the «current» and «future» projects
- data life cycle improvement
  - Archival service (OAIS) to ensure data reusability
  - Data Management Plan

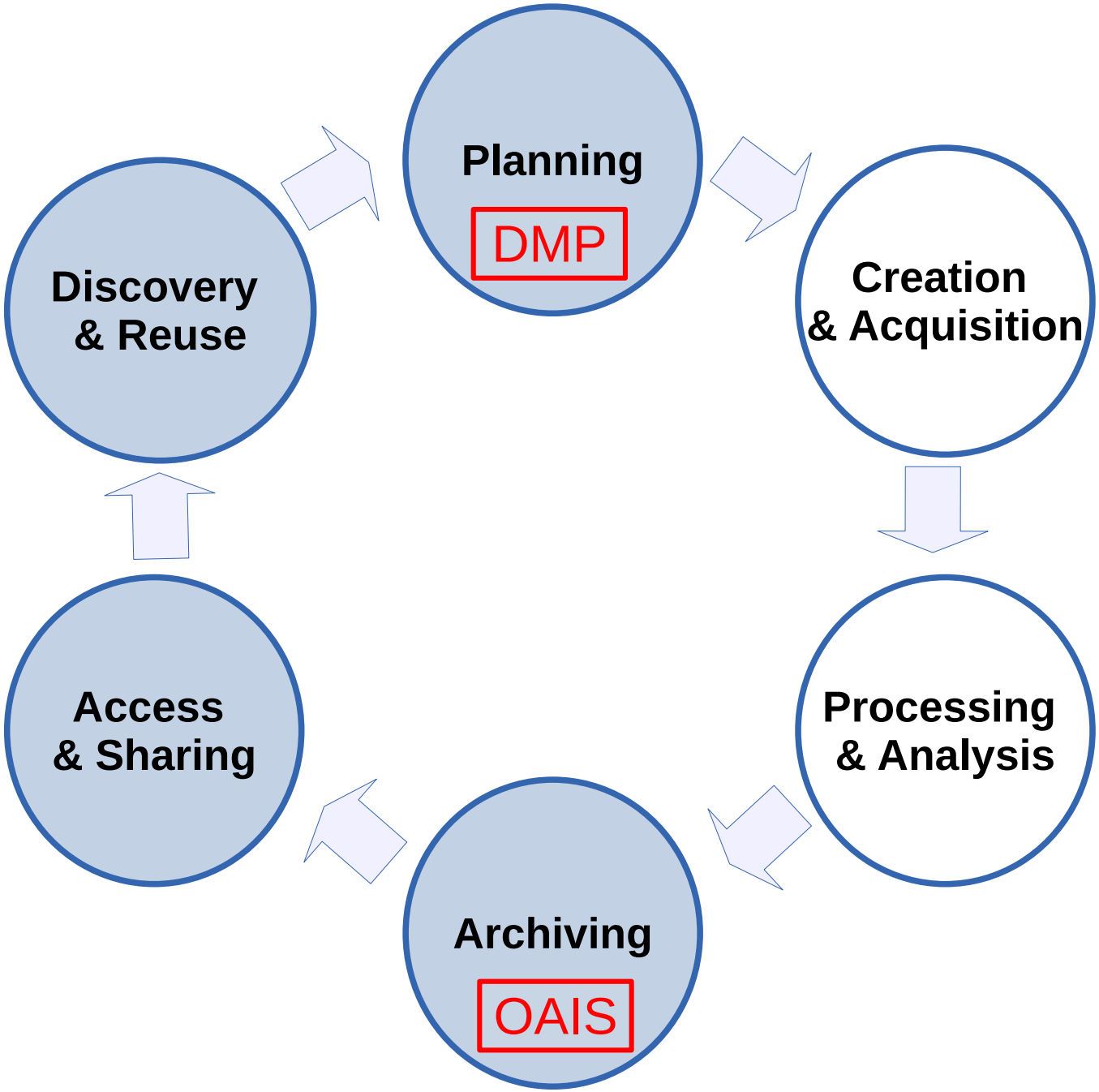
Global context:

- movement Open Data and Open Science
  - scientific research data must be accessible to all
- funding agencies constrains access to resources
  - principles F.A.I.R (findability, accessibility, interoperability, and reusability)
  - Data Management Plan

Scientific data live cycle



Scientific data live cycle



Data Management Plan

A DMP describes the data management life cycle for the data.

A DMP should include information on:

- general description (purpose of the data)
- the handling data during & after the end of the project (responsibility)
- data usage scenarios
- making data FAIR (including metadata)
- allocation of resources (costs)
- legal and ethical aspects
- how data will be curated & preserved (including after the end of the project)

Data Management Plan at IN2P3

- It is not an administrative form to fill !
- Keep in mind that is a planning process (make decisions)
- not all questions are relevant to your particular case
  - unanswered questions are possible
- Strategy proposed by astrophysics community
  - Leibniz Institute for Astrophysics Potsdam
  - generic questionnaire as guide (similar to an interview)
  - no references to specific technologies or services
  - the main objective is to encourage a global reflection
    - different aspects of data management

- Full questionnaire (printer version) at https://irods.in2p3.fr/dmp
- On line versions: https://dmp.in2p3.fr or https://dmp.opidor.fr

IN2P3 DMP Questionnaire

General

→ Topic
- Research field
- Project schedule
- Project coordination
- Project partners
- Funding
- Other requirements I
- Other requirements II

Content classification

→ Datasets
- Data origin
- Reuse
- Reproducibility

Technical classification

→ Date collection
- Data size
- Formats
- Tools
- Versioning

Data usage

→ Usage scenarios
- Data organisation
- Data storage and security
- Interoperability
- Data sharing and re-use
- Collaborative work
- Quality assurance
- Data integration
- Costs

Metadata and referencing

→ Metadata
- Metadata costs
- Structure, granularity, and referencing
- Persistent Identifiers (PIDs)
- PIDs costs

Storage and long-term preservation

→ Selection
- Long-term preservation
- Long-term preservation costs

Legal and ethics

→ General legal issues
- Personal data
- Data protection
- Sensitive data
- Other sensitive data
- Sensitive data costs
- Official approval
- Intellectual property rights I
- Intellectual property rights II
- Intellectual property rights costs

Archiving Service

Service for the management and preservation of large amount of scientific data.

Objectives:

- Data life cycle improvement
- Preserve scientific data to ensure that remains accessible and reusable.
- Respond to the specific requirements of IN2P3 experiments
- Improve CC-IN2P3 storage services offer

Backup vs Archiving

Backup	Archiving
• operational continuity	• patrimony preservation
• data in production • data modifiable, in progress • all data is potentially concerned • frequency:many times(versions)	• precious or finished data • frozen, validated data • only selected data • frequency:one time
• short-term content retention (hours,days,weeks,months)	• long-term content retention (years,decades,…)
• use proprietary technologies • strong dependencies • low interoperability • create and restitution time must be (very)short	• use open and free technologies • weak dependencies • full interoperability • create and restitution time are not critical
• automatic process (humanless) • automatic data removing	• semi-automatic (curation) • only manual data removing
• Internal (operational)	• external: dissemination

Digital Archiving: some principles

- predict the scene of a great disaster
  - recover information directly from storage support (e.g. tape)
- information packages
  - wrapped: data object + metadata + administrative information
  - complain with standard specifications
  - self-contained and self-described
  - human-readable and machine-actionable
  - implementation: tar file
- strong reduction of technical dependencies
  - the minimum possible
  - use standard, open and widely known technologies
  - archive cannot depend of archive management software (disposable)
  - proprietary solutions are forbidden
- several copies
  - minimal two, three recommended
  - on different technologies (e.g. tape and disk)
  - on different locations (a copy more than 300 km away)

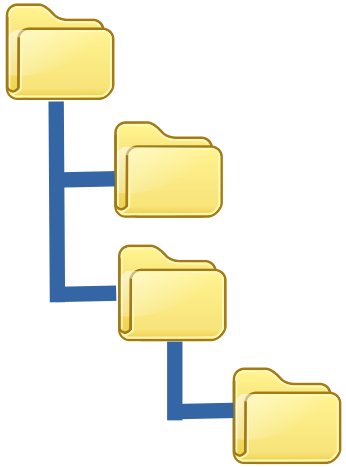
Archiving Service: features at IN2P3

- target large datasets (from several terabytes)
- based on the OAIS reference model
- implements European specifications E-ARK/CSIP
- compatible with F.A.I.R. process (producer: research project)
- preservation during a defined time period
- not addressed to administrative documents (not probatory value)
- on demand and adapted to the producer (scientific experiments)
- simplified procedures to cover all use cases
- uses the existing CC-IN2P3 infrastructure

Archiving research data

I want archive and disseminate my data !

Archiving research data

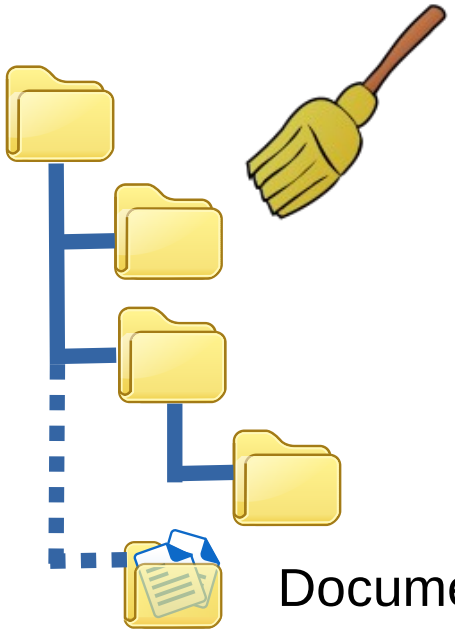


DATA

Metadata

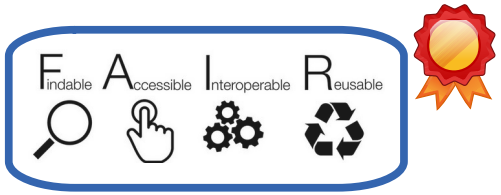
DMP

Cycle live data and Archiving



DATA

Documentation



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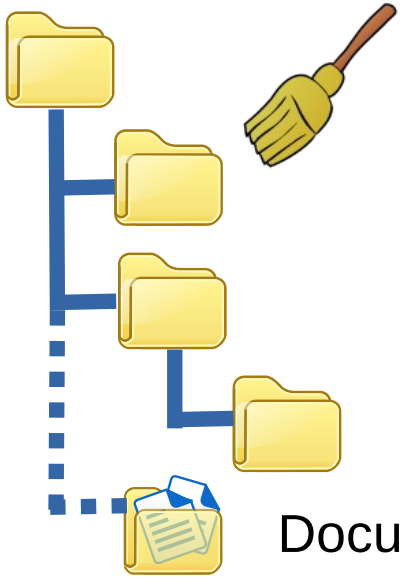

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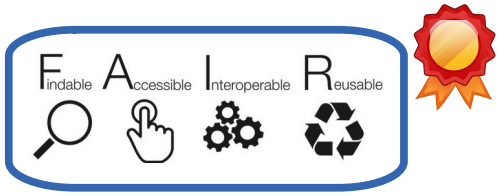
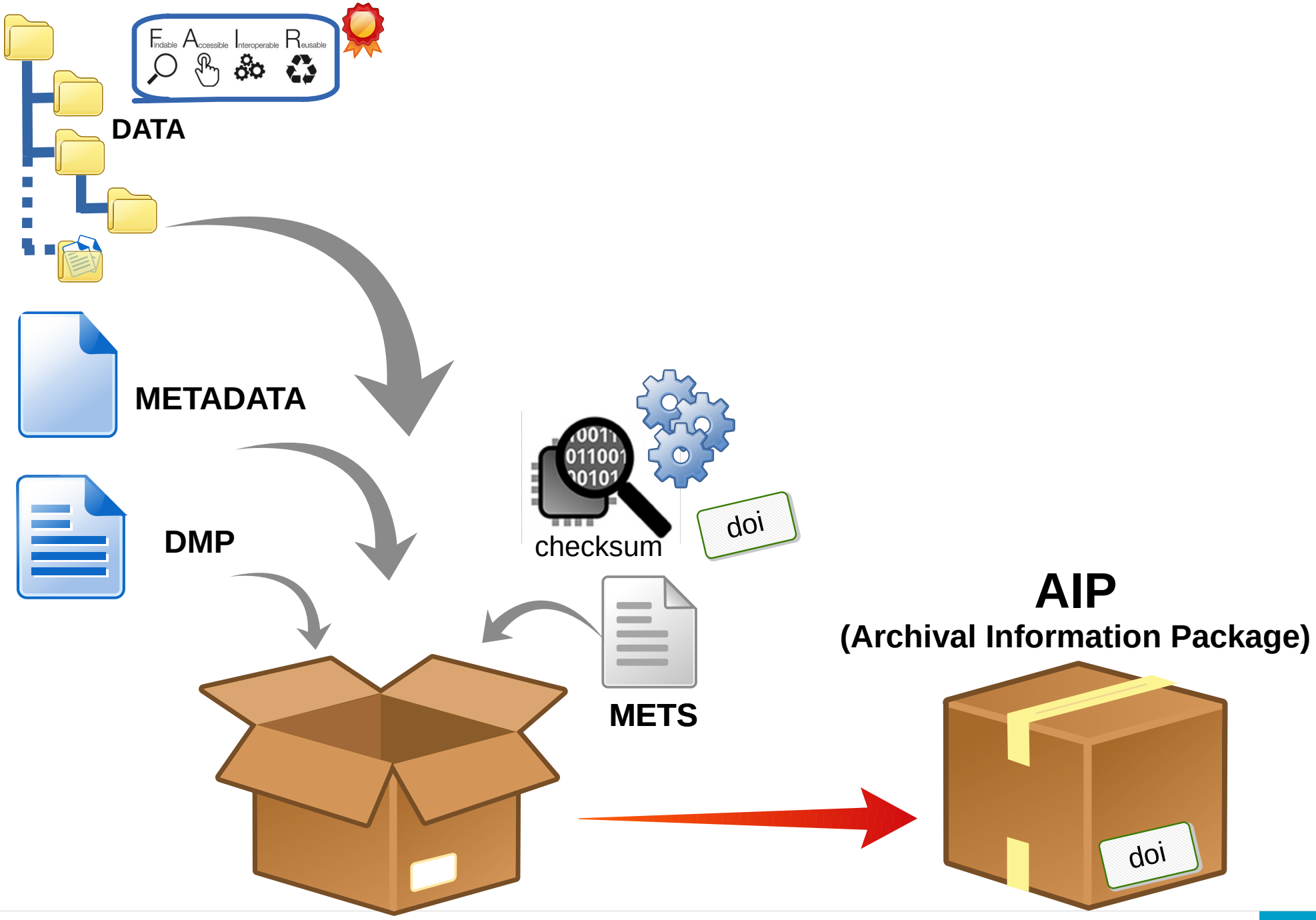
Documentation



Metadata

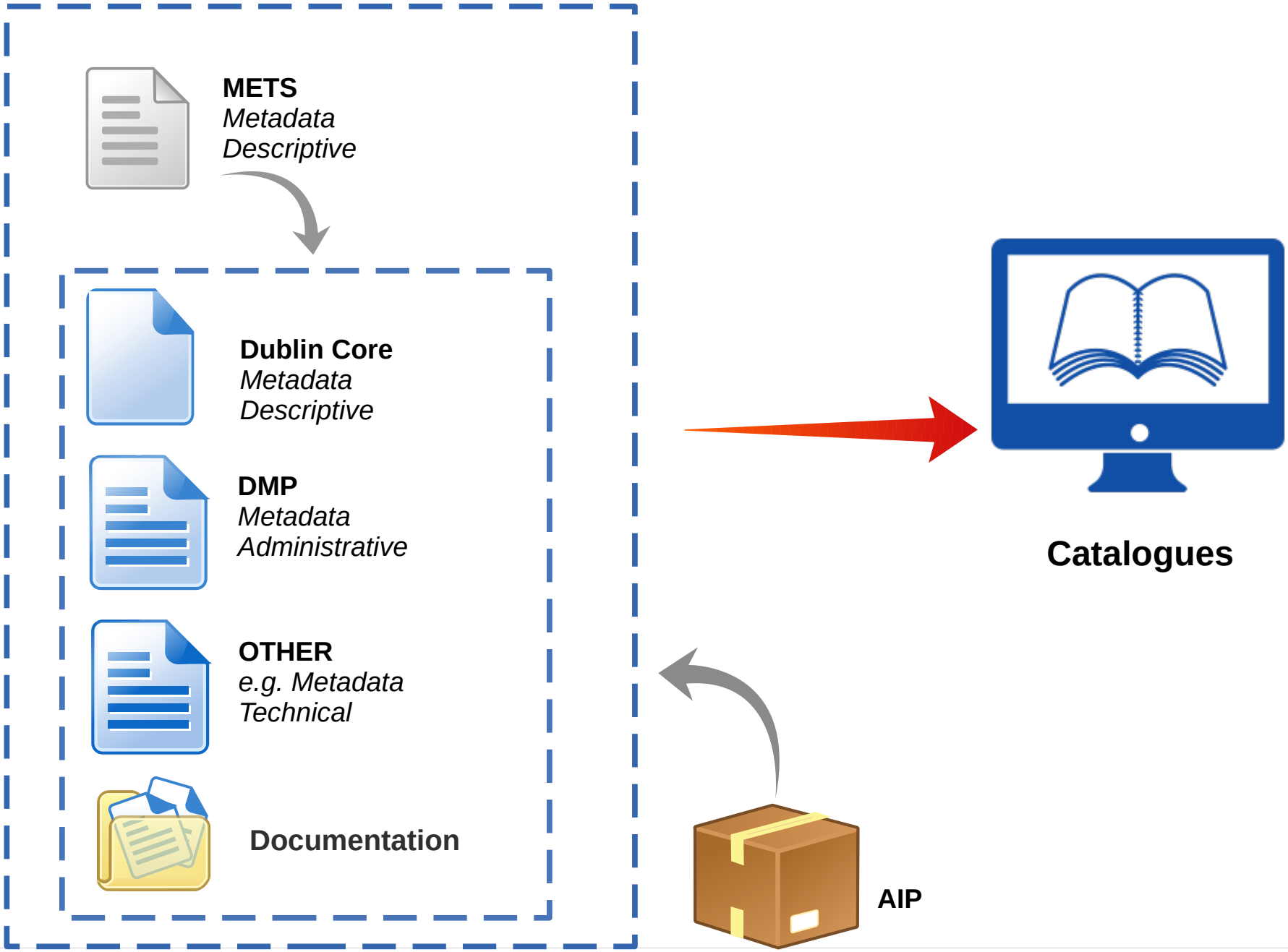
DMP

Archiving process



Archiving = preserve + dissemination

Using metadata and DMP



Archiving = preserve + dissemination

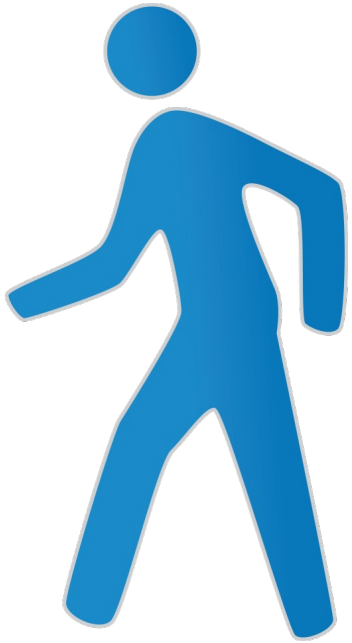
Catalogue

Archiving = preserve + dissemination

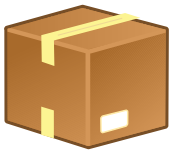
Archive

Catalogue

Search



User



DIP

(Dissemination Information Package)

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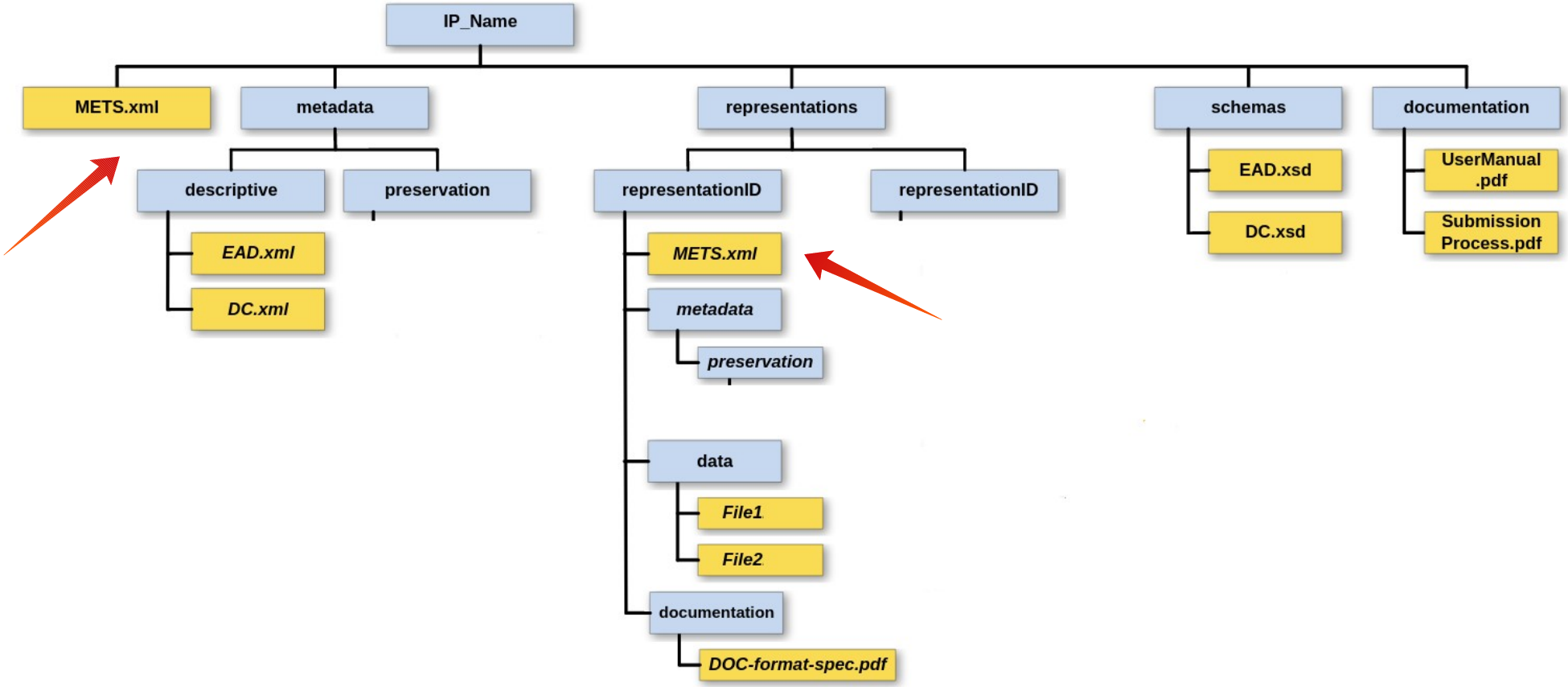
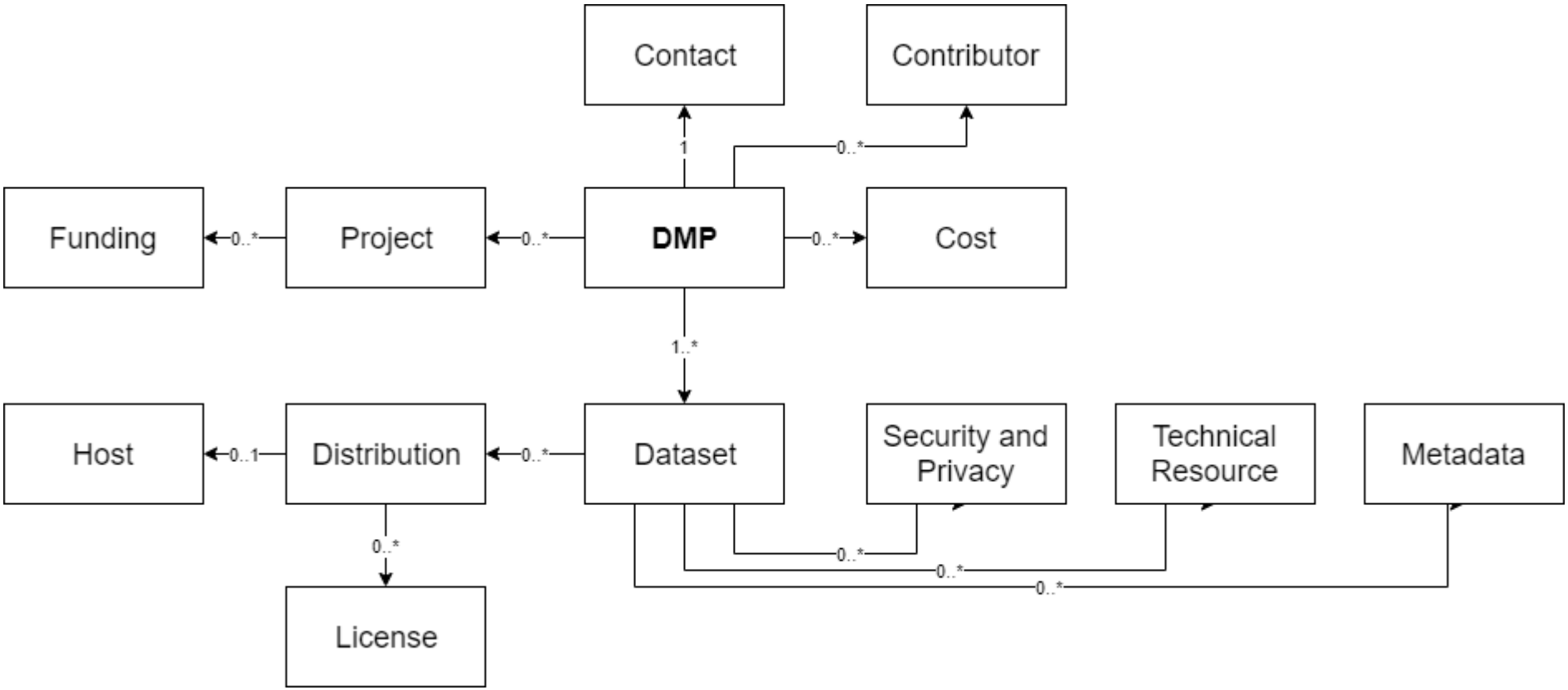
Common Specification for Information Packages

CISP information package structure



DMP Common Standard Model



Archivage : planification

ICPSR

Inter-university Consortium for Political and Social Research

- https://www.icpsr.umich.edu
- DMP + letter of commitment
- *"A letter of commitment from ICPSR confirming that it will archive the data should accompany the plan."*