FAIR and Real world

Requirements for being FAIR

Daniele Bailo, EPOS IT Officer

What are the **requirements** to comply with FAIR principles?

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What are the **requirements** to comply with FAIR principles?

What **work needs to be done** for a datacenter/RI to be FAIR?

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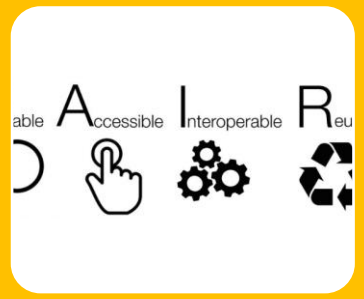
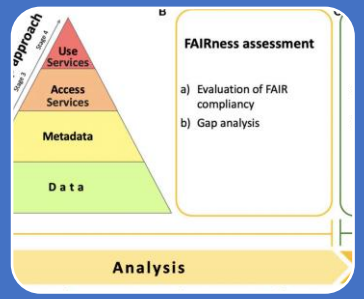


FAIR analysis

2

Reated IT concepts

3



Implementation process

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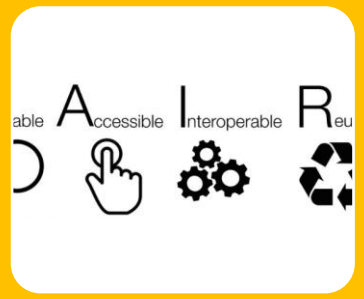
1 FAIR analysis



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Fair Guiding principles

To be 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 it describes
F4. (meta)data are registered or indexed in a searchable resource

To be Accessible:
A1. (meta)data are retrievable by their identifier using a standardized communications protocol
A1.1 the protocol is open, free, and universally implementable
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To be 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

To be Reusable:
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Standards

Semantics

policy & provenance

2  Reated IT concepts

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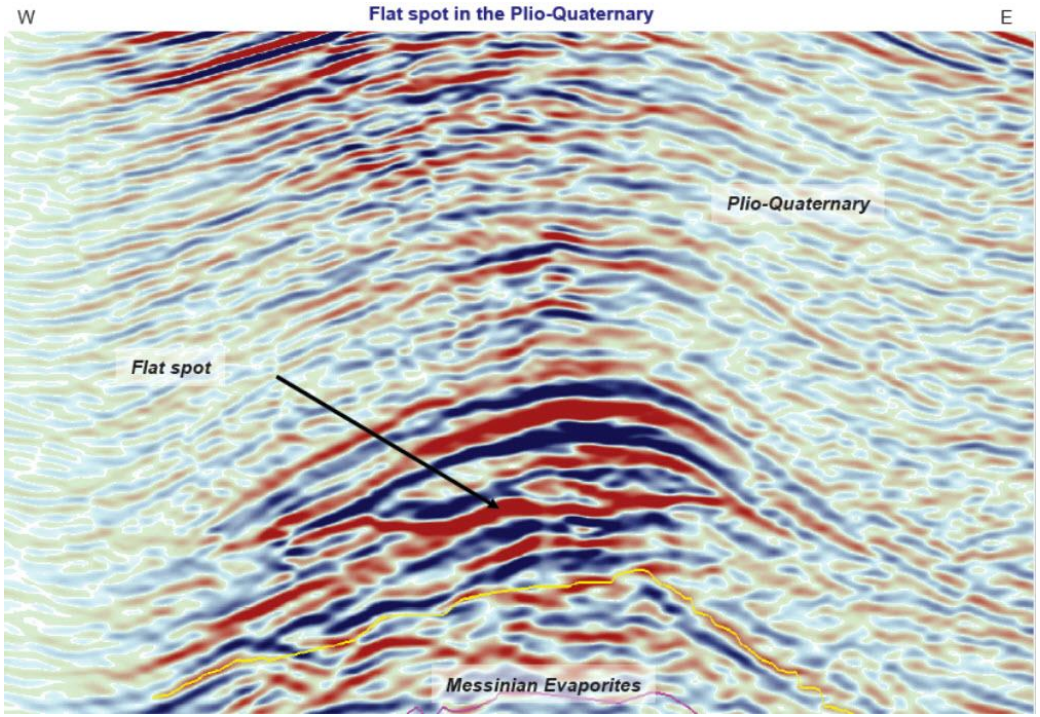

Courtesy of Joshua Doubek

Data

Our greatest wealth

Function

Describe (physical) phenomena

Issues

- *Format & serialization*
- *Harmonization & standards*
- *Proliferation standards*
- *Data storage*

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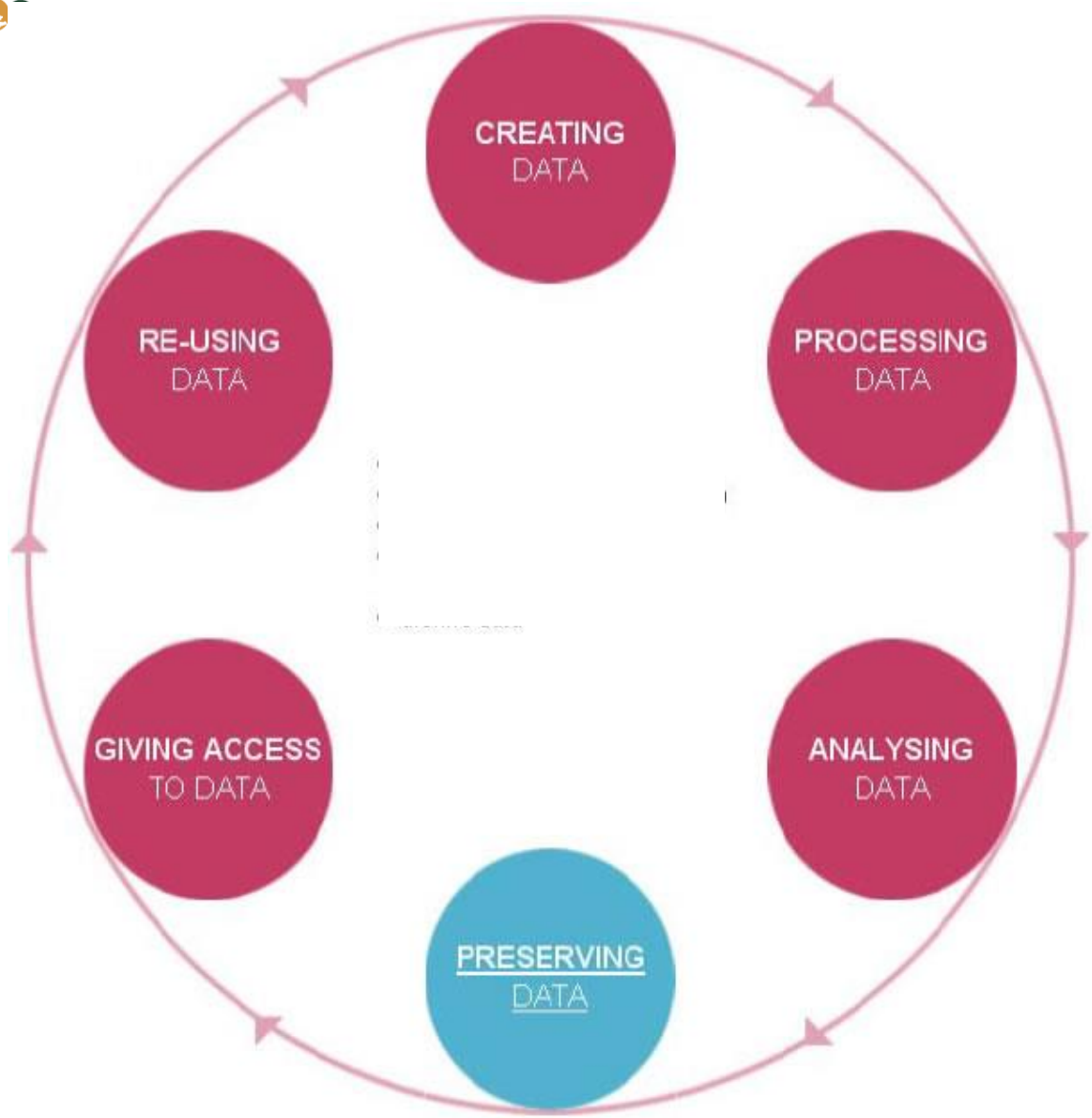

[UK data Archive http://www.data-archive.ac.uk/]

Data Lifecycle

What?

Identifies mechanisms, standard, components and interfaces making data science efficient and cost effective

Data Management Plan

- *Data management*
- *Data analysis*
- *Data preservation*
- *Data publication*
- *Data sharing*

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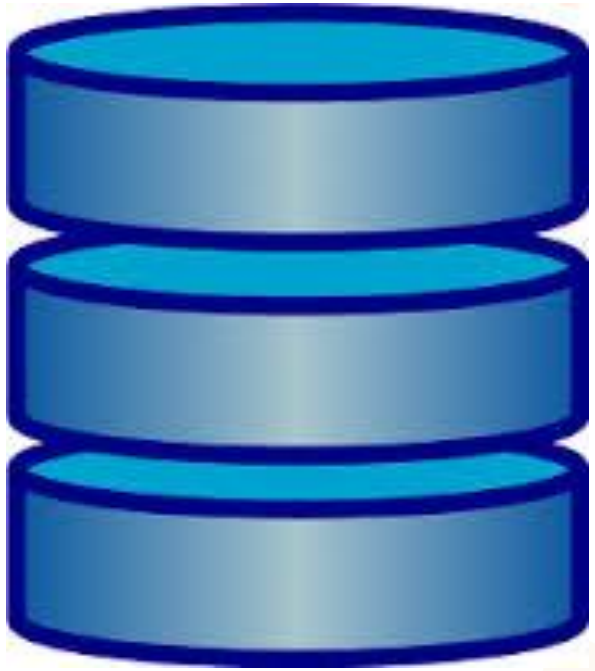
CORE TRUST SEAL

TRUST

Transparency | Responsibilty | User focus | Sustainability | Technology



How to store data?

Trusted data repository

Certifications ensure

- *Storage*
- *Preservation*
- *Sustainability*
- *Access*
- *Integrity*
- *Documentation availability*
- *Couple with PIDs*
- *…*

Question

- *Should we certify our repos?… DEPENDS*

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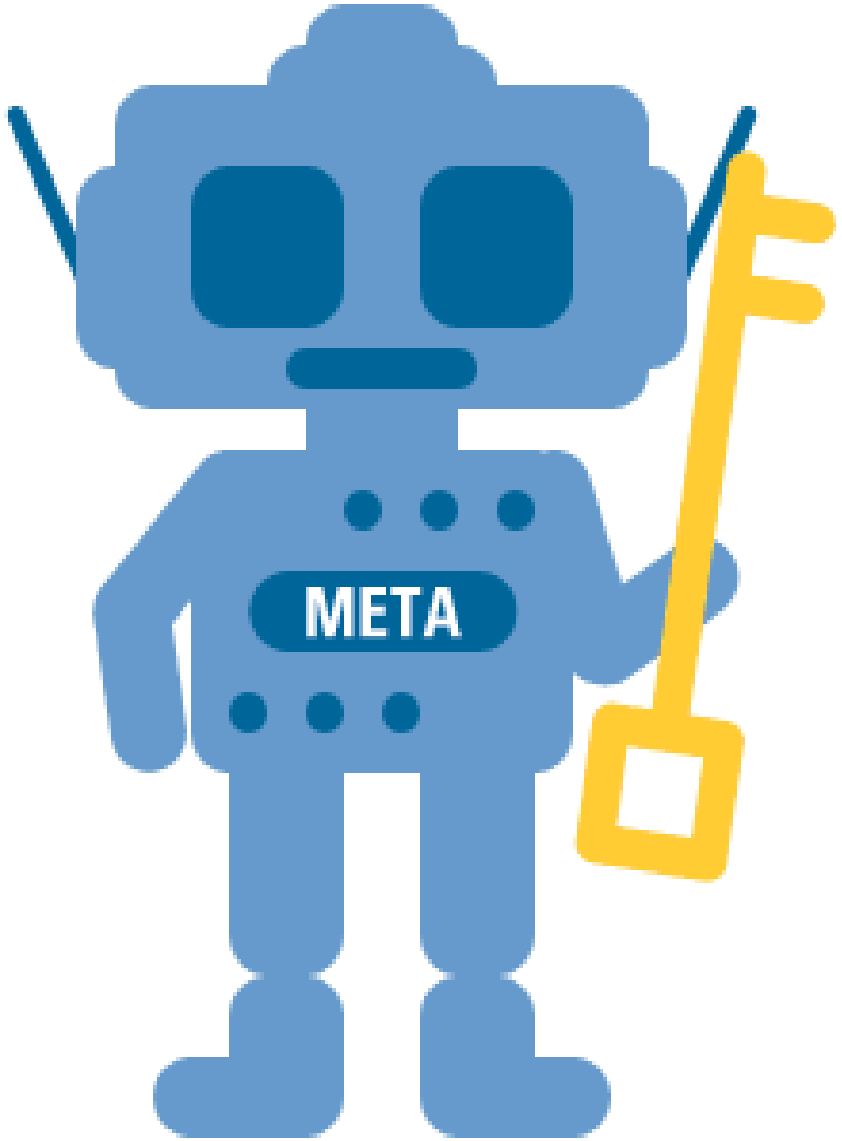

Metadata

Data about Data (really?)

Purposes

1. *Discovery (humans & machines)*
2. *Contextualization*
3. *Use it for processing or other advanced tasks*

Usually attached to D.O.

Issues (selection of)

- *Data or metadata?*
- *Many standards*
- *Catalogue*
- *Ontologies*

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(Metadata) standards in speficic scientific domain

…a real story…

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GeoJSON

DCAT APPLICATION PROFILE FOR EUROPEAN DATA PORTALS

DCAT-AP

ckan

CERIF

Dublin Core Metadata Initiative®
Making it easier to find information.

Metadata

What is the best standard?

DEPENDS ON THE REQUIREMENTS

Fair principles require for

- *Rich metadata standard*
- *Usage of formal, accessible, shared, and broadly applicable language for knowledge representation.*

Serialization and format:
two different things (almost)

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http://dx.doi.org/doi:10.30/tqb
http://hdl.handle.net/hdl:13030/tqb
http://purl.org/tqb
... urn:13030:tqb
http://n2t.net/ark:/13030/tqb
http://OwlBike.example.org/ark:/13030/tqb

How to register/cite data or publications?

PID system

Purpose

- *DO / publication can be uniquely referenced*
- *Assign a PID at data creation times*

Issues

- *Need for a simple mechanism to implement it*
- *Data and publications*

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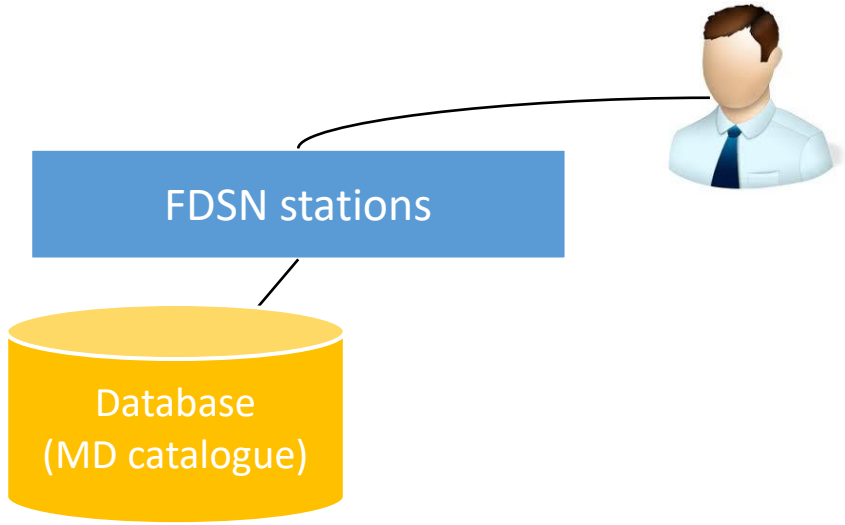

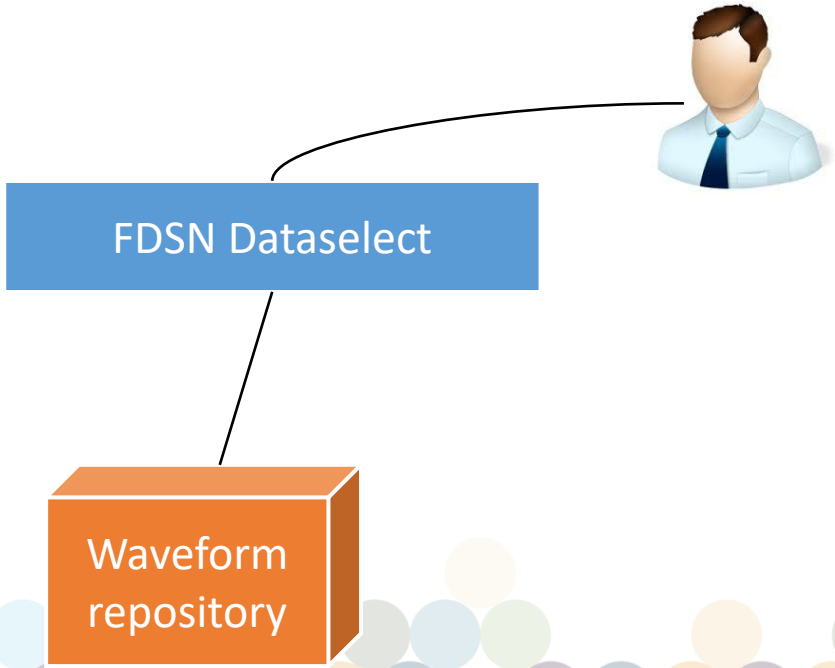

Protocols
web service

What is it?

It does something for the user
*(deliver value to customer)**

A "thin layer"

We usually don't know what's under the hood

Examples

- *FDSN stations*
- *FDSN dataselect*

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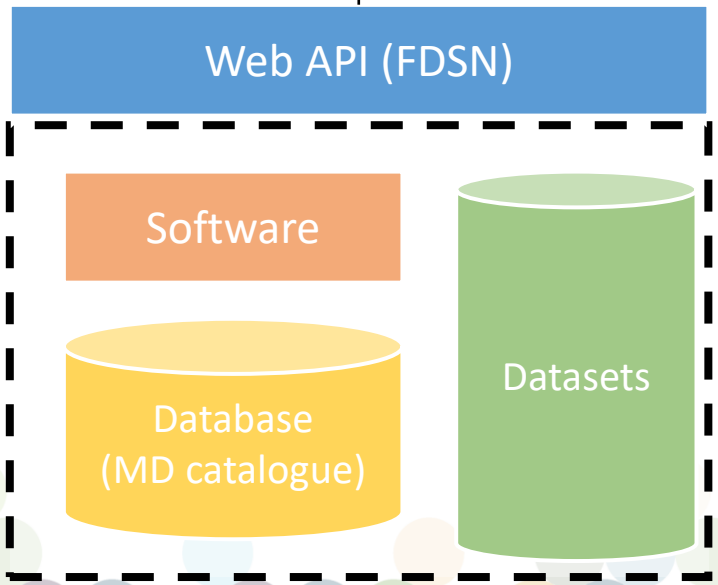
System 1
GUI Client



System 2
(Black Box
model)

Protocols
Interoperability

What & Why

Enables 2 system to

1. *Exchange information*
2. *Understand information*

Usually achieved through:

- *Agreed language (protocols)*
- *Software "translators" interfaces → thin layers → webapis*

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AARC

ORCID

Sign in with EGI CheckIn

Sign in with TCS-AH AAI

Google

facebook

How to access data?

AAI system
(federeated & distributed)

Purpose

- *Authenticate users*
- *Authorize users*

Issues

- *Identity Provider*
- *Federation*
- *Authorization*
- *Unity – integrates AAI*

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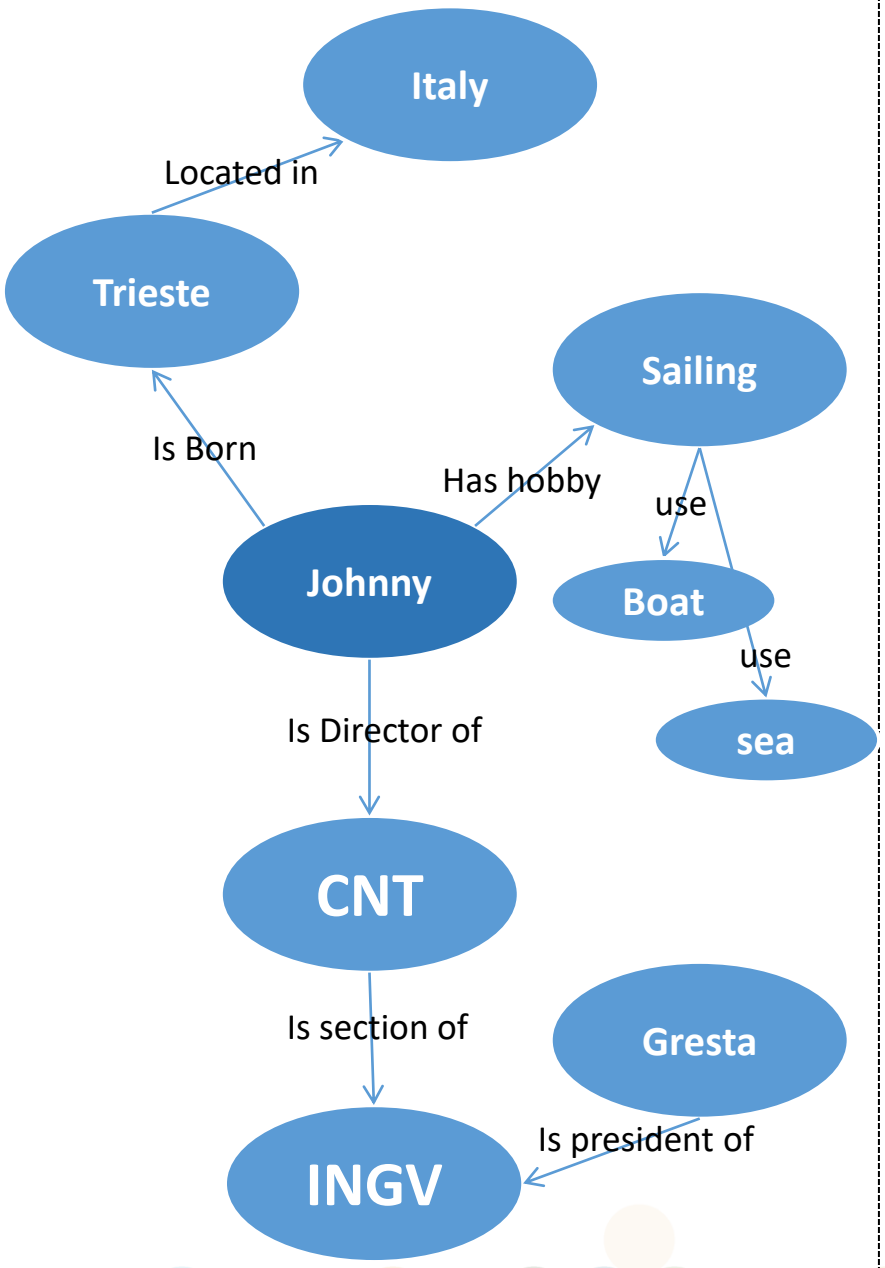

Ontologies & semantics

Why an ontology?

It is the way machines manage “meaning”

How does it work?

1. *Connects concepts*
2. *Needs vocabulary*

Issues

- Many ontologies exist
- Vocabulary Mapping

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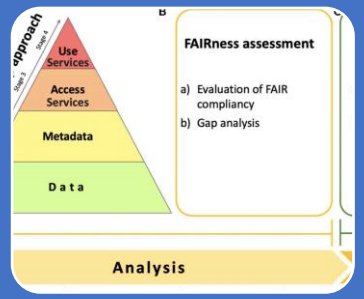
EPOS approach

3 Implementation process



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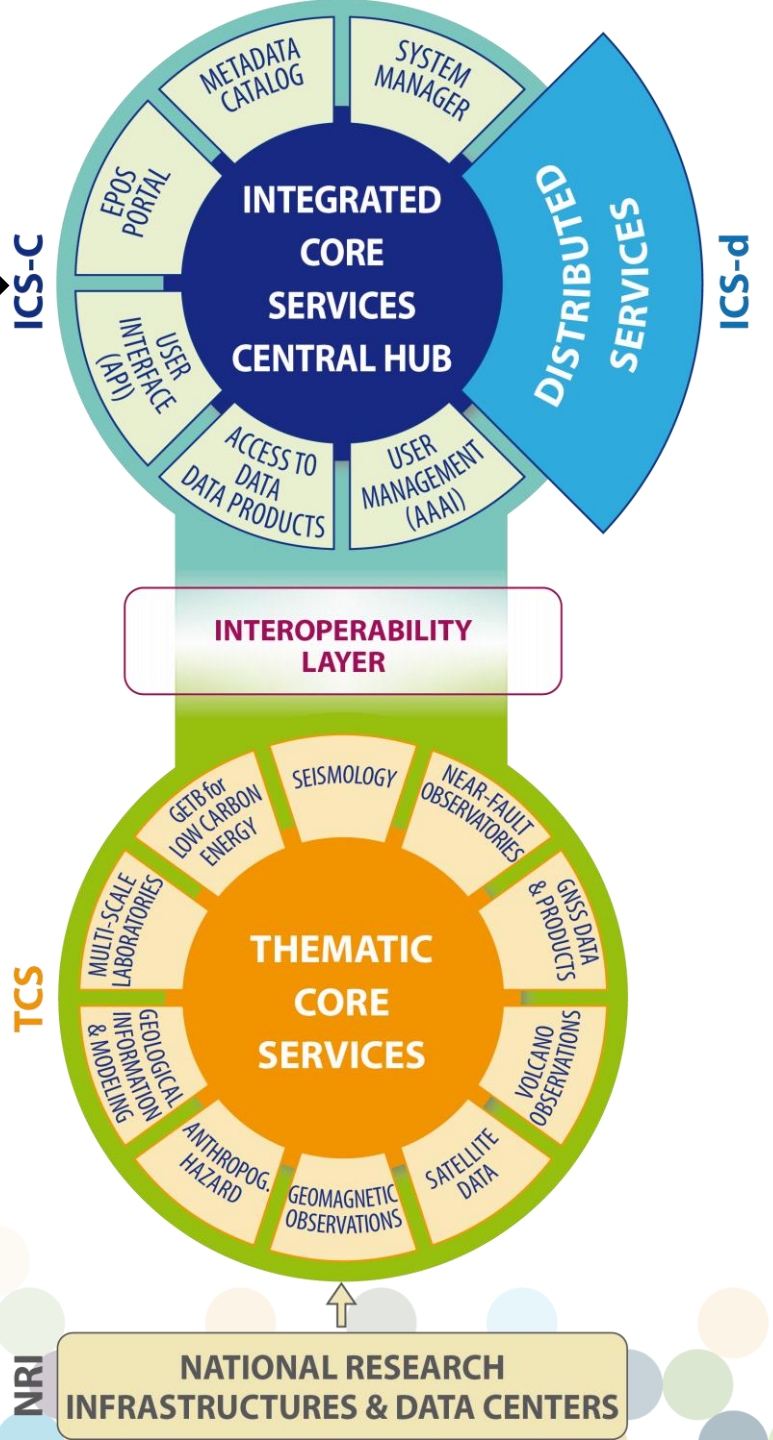
EPOS CONTEXT

Data & Service integration →

Interoperability →

Communities →



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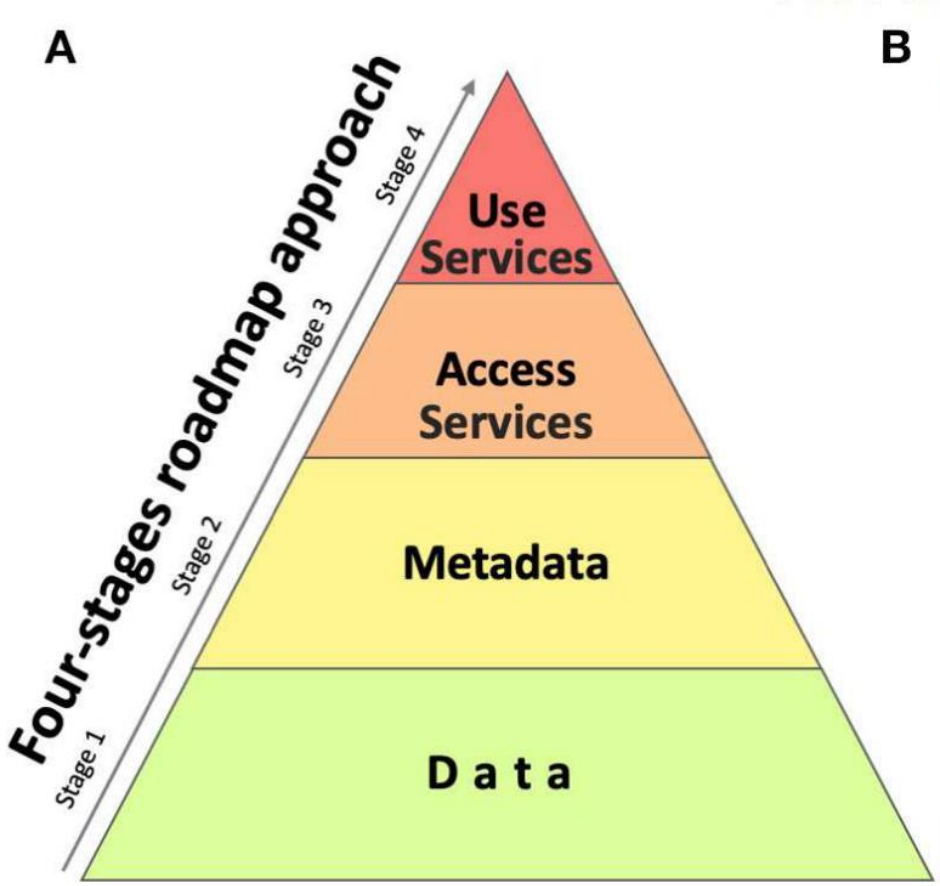

Process to achieve fairness

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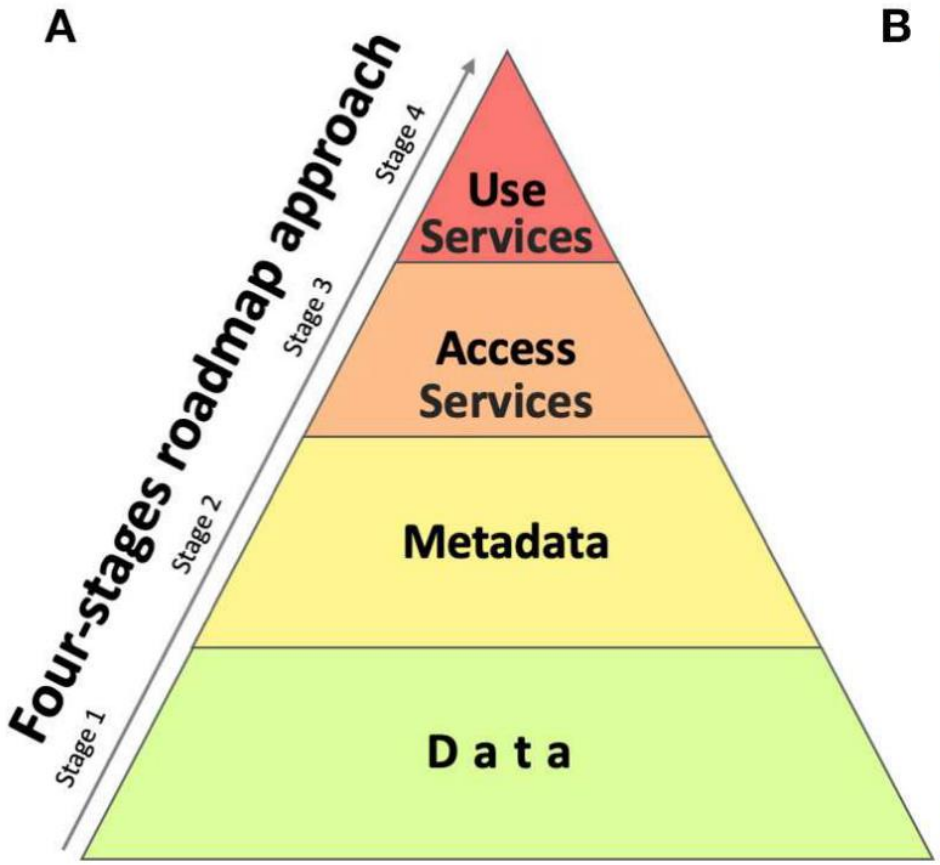

B

FAIRness assessment

a) Evaluation of FAIR compliancy

b) Gap analysis

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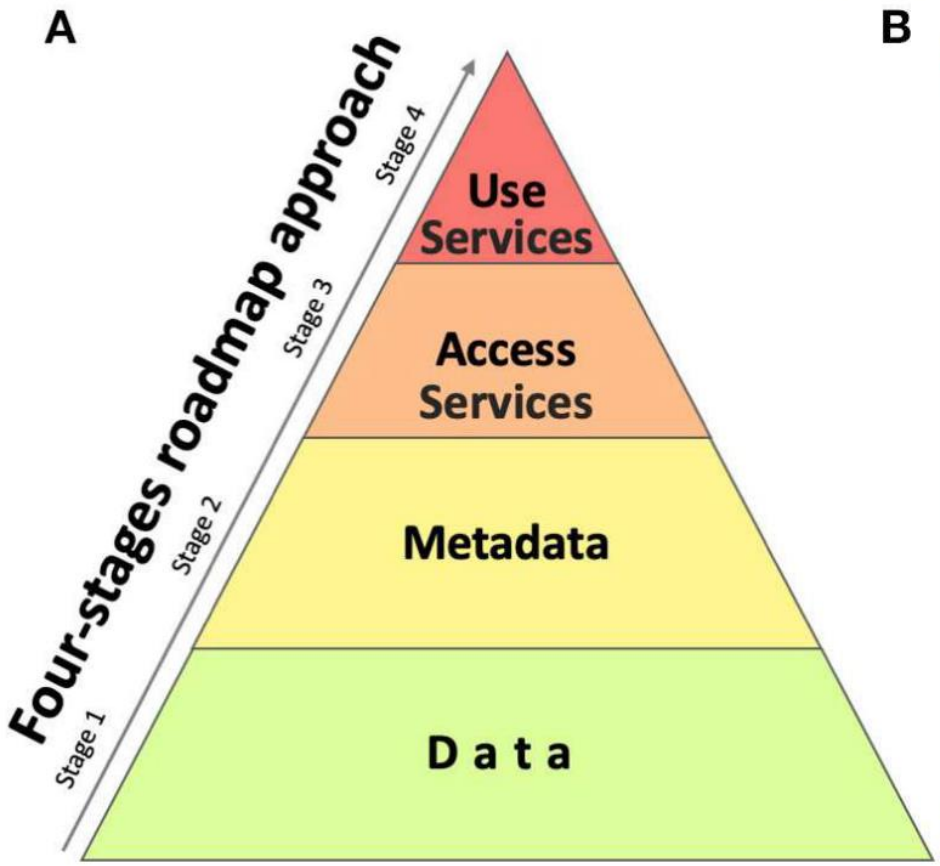

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C

Technical activities

a) Selection and definition of technical activities undertake

b) Design, selection of technologies, implementation, test and operation

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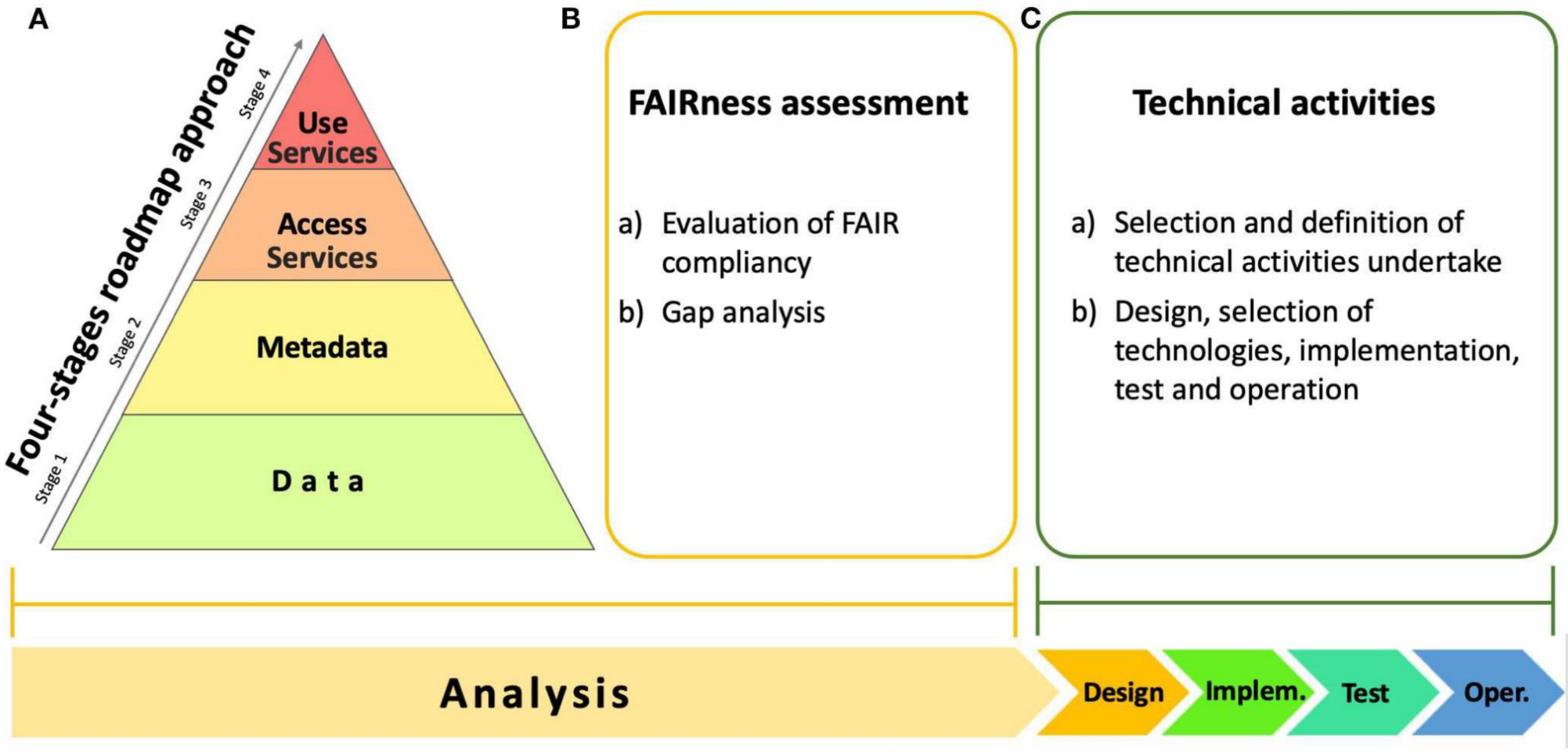

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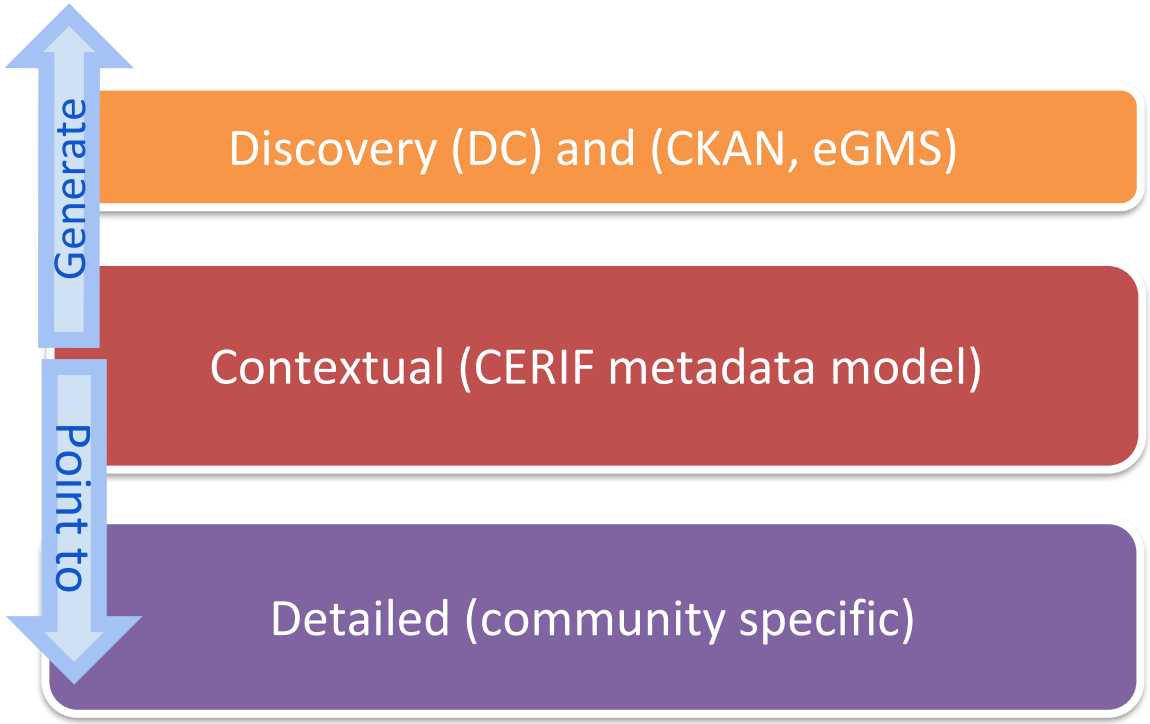
Compliant with A1, I3

EPOS Fair implementation examples (1)

Three layer metadata model



1. *Map & match only contextualization metadata*
2. *Pointers to detailed metadata*
3. *Export metadata in any standard*

[Keith Jeffery]

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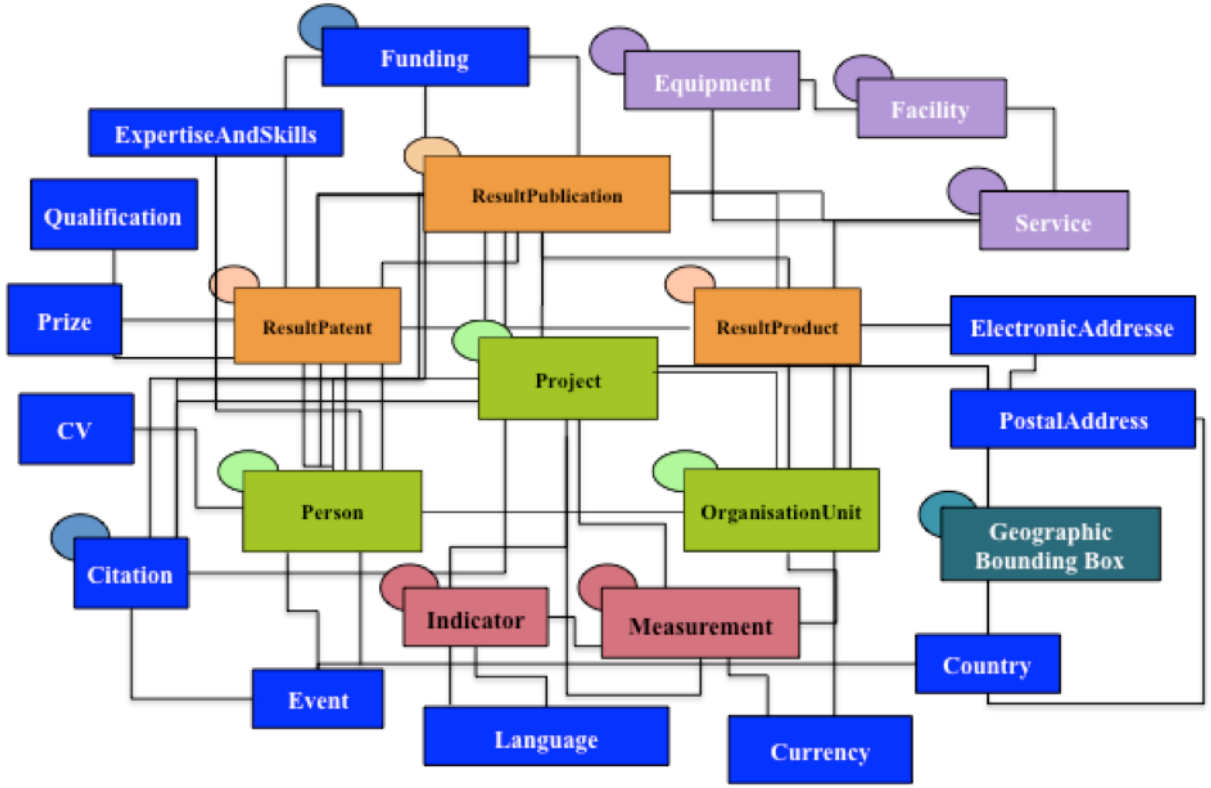
Compliant with F2, F3, F4, R1.3

EPOS Fair implementation examples (2)

Rich metadata model



- *Supports several concepts*
- *Superset of many metadata standards*
- *Referencial integrity*
- *Formal syntax, declared semantics*

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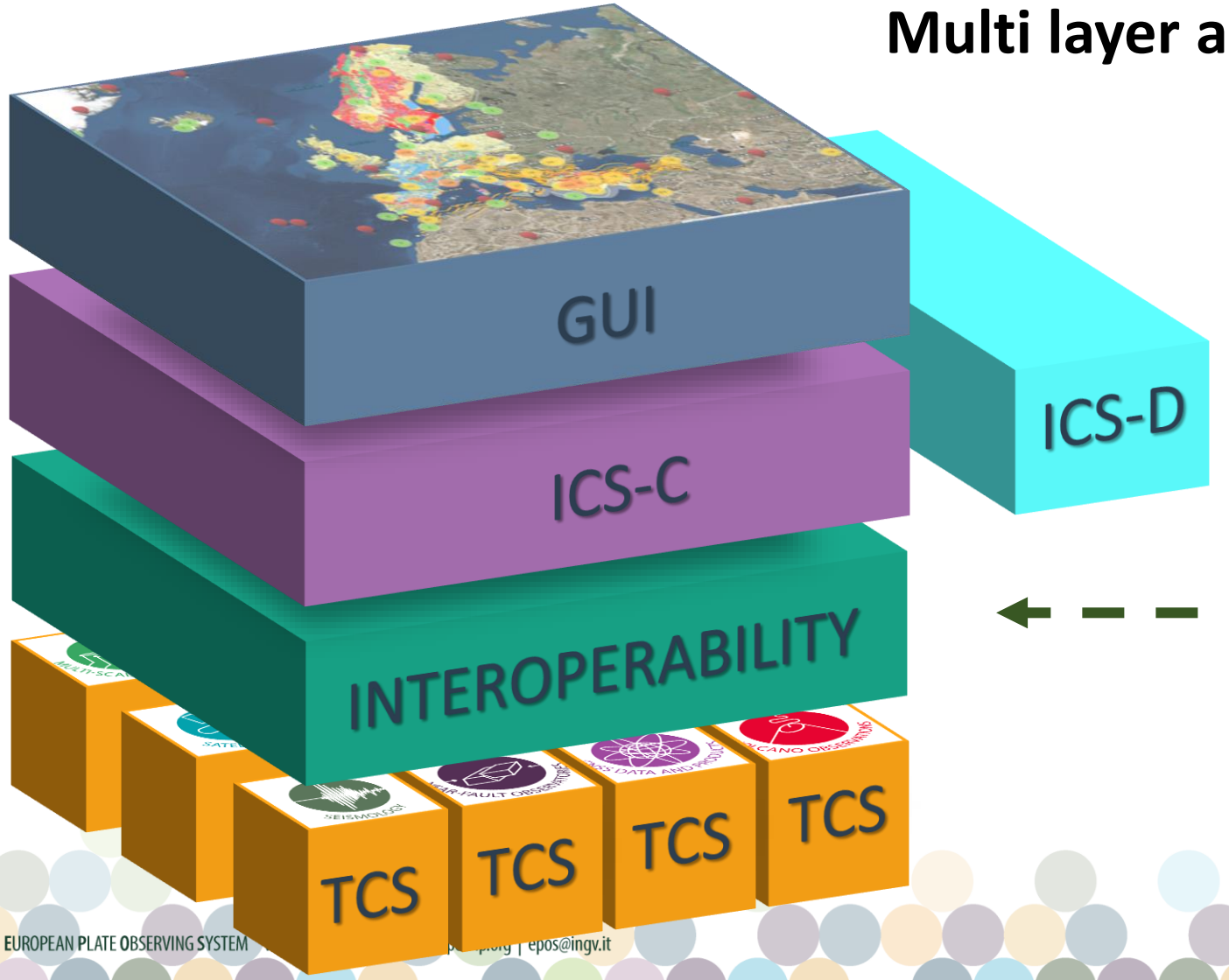
Compliant with A1.1

EPOS Fair implementation examples (3)

Multi layer approach



Web-Api based

(standard protocols)

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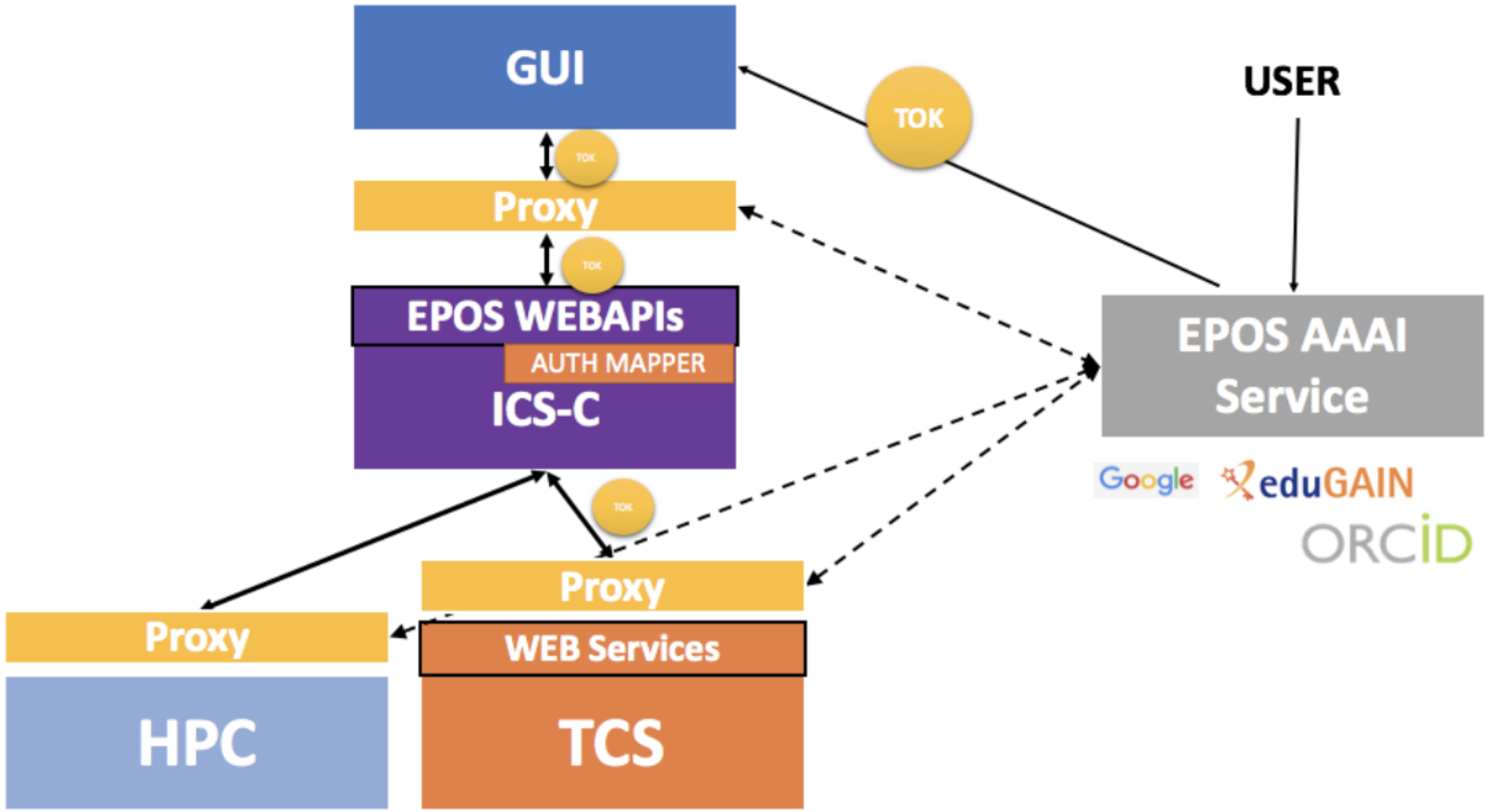
Compliant with A1.1, A1.2

EPOS Fair implementation examples (4)

AAI integration system



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EPOS Fair implementation examples (5)

Full list of implementation activities and FAIR compliancy

PERSPECTIVE ARTICLE

Front. Earth Sci., 31 January 2020 | https://doi.org/10.3389/feart.2020.00003

Check for updates

Perspectives on the Implementation of FAIR Principles in Solid Earth Research Infrastructures

 Daniele Bailo[1*], Rossana Paciello[1], Manuela Sbarra[2], Riccardo Rabissoni[2], Valerio Vinciarelli[2] and Massimo Cocco[1]

[https://www.frontiersin.org/articles/10.3389/feart.2020.00003/full]

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A pragmatic approach

- data harmonization
- metadata
- PID
- AAAI systems
- Web-services é communication protocols

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