RESEARCH DATA ALLIANCE

Data Fabric IG
- plenary session –

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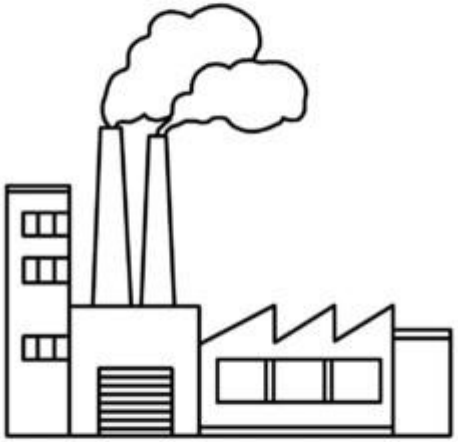
research data sharing without barriers
rd-alliance.org

Purpose of this plenary session

- Information on the Data Fabric IG and its intentions
- Synchronize on the “understanding” and scope with everyone in RDA
  - Are we starting from the same points and headed for the same goals?
- Agenda for this session
  - Rob: Introduction (what is DF, history, where we are)
  - Peter: Analysis of first use cases
  - Zhu: Use case template and participation
  - Q&A and discussion
- If you are interested – join
  - DFIG Core Session (Tuesday 4 pm breakout 6)
  - BoF on Repository Registry (Wednesday 11 am breakout 7)

What is the Data Fabric?



fabrik

fabric

- “Data Fabric” is ambiguous if you look across cultures
- Isn’t this at the core of RDA? We like this ambiguity and its possible connotations
- Can we describe what DF is?
- A short history

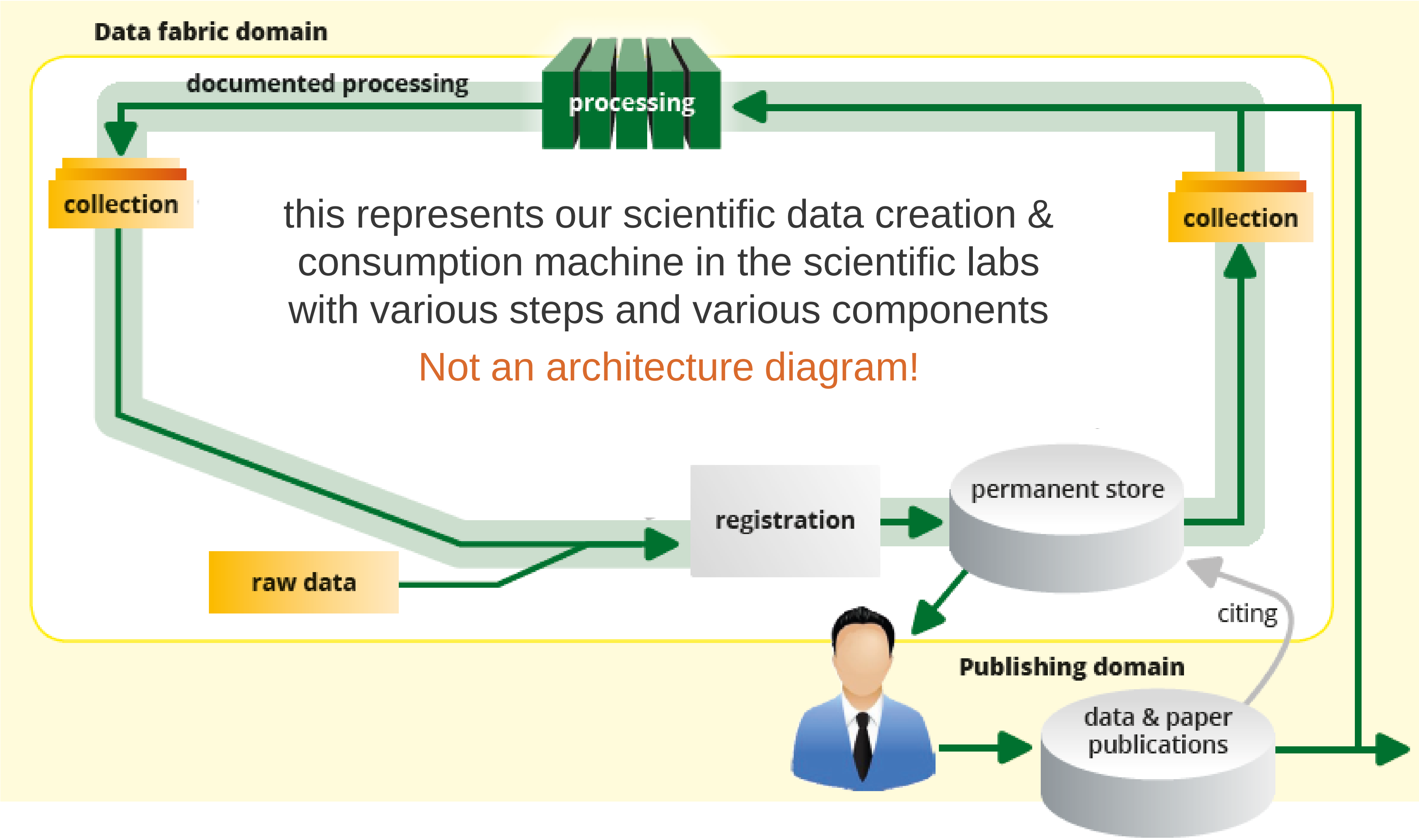
Data Fabric is a Bottom-up Effort

- At the first plenaries the first WGs started in a more or less isolated way under pressure to deliver artifacts
- It was understood that we all work on a larger picture of integration – call it a framework for processing our data
- Realization that the WG outputs and also the topics of other groups (WGs/IGs) are working on are

  components and their services

  with a place in this landscape.
- DF is a place to discuss such components and understand how they all will fit together
- So together with a number of chairs we started DF IG

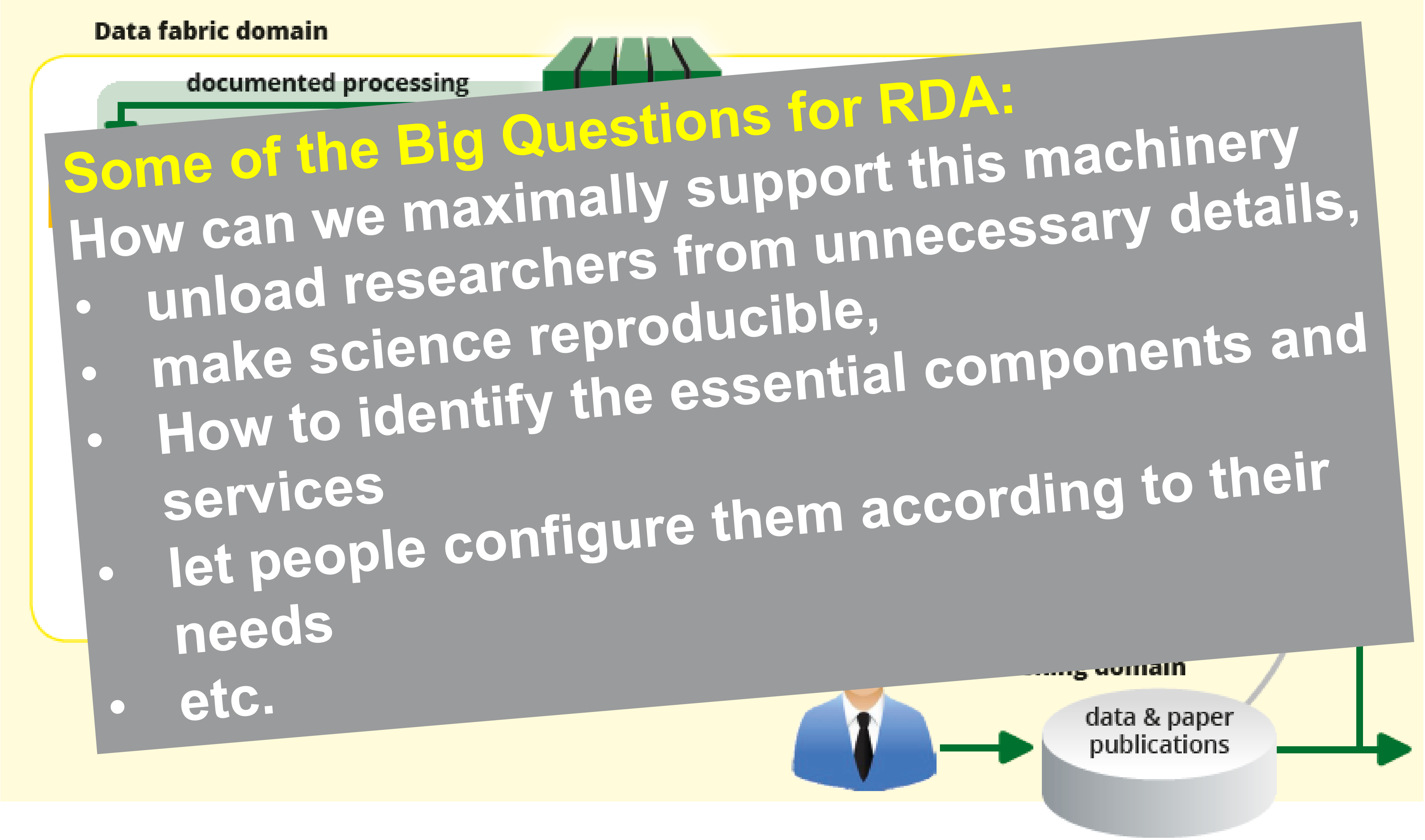
Data Fabric in a Simple Drawing



this represents our scientific data creation & consumption machine in the scientific labs with various steps and various components

Not an architecture diagram!

Data Fabric in a Simple Drawing

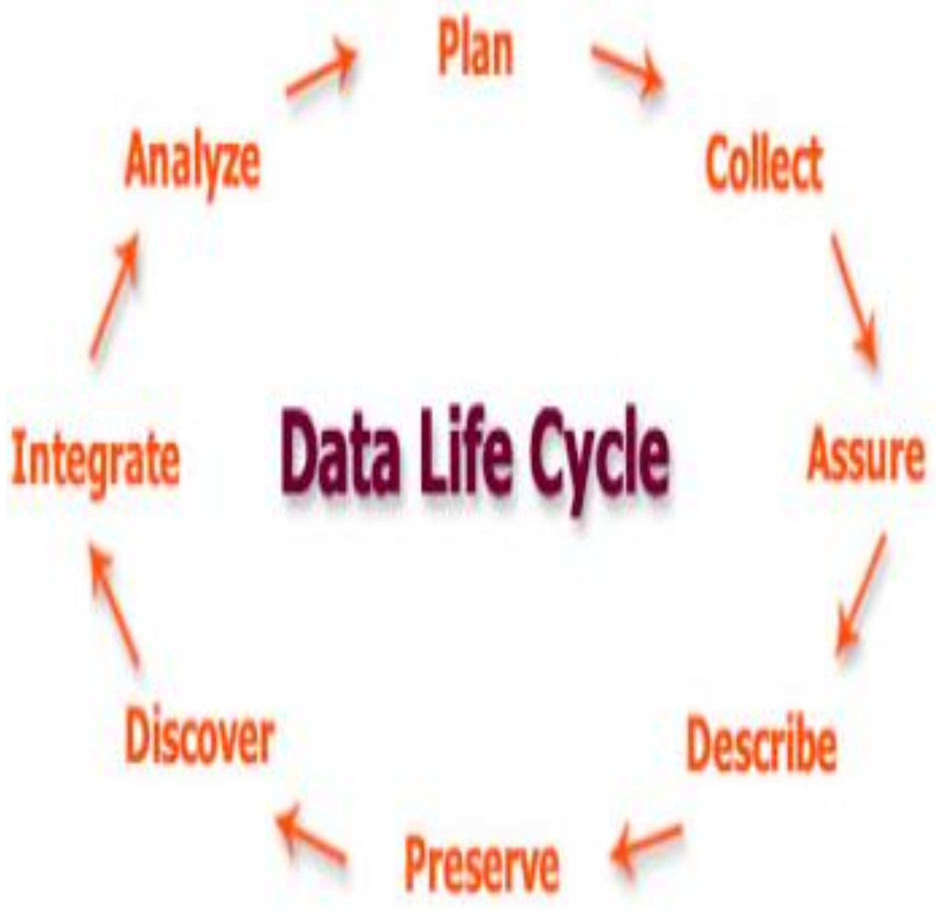


Some of the Big Questions for RDA:

How can we maximally support this machinery

- unload researchers from unnecessary details,
- make science reproducible,
- How to identify the essential components and services
- let people configure them according to their needs
- etc.

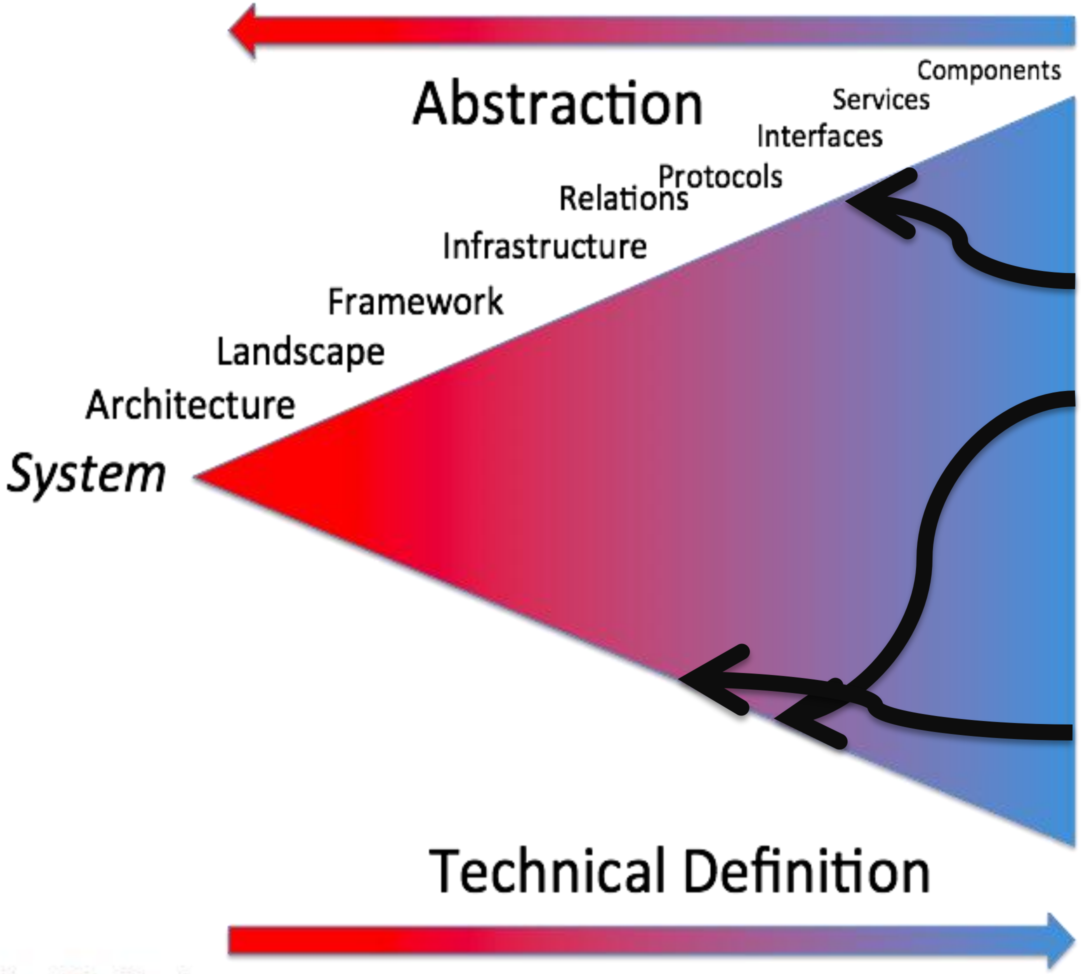
Thinking about How People Work with Data in their Research



Originally from DataONE

all phases must be considered in DF IG

Data Fabric Challenges in Context



Terminology Is still being worked out!

Data Fabric where we are

- 2nd WG Chairs meeting
- Draft White Paper
- 1st DFIG Session at P4 in Amsterdam
- Updated draft version of WP
- Several meetings where DFIG was presented & discussed
- Lots of commenting in DFIG wiki
- First real WP version
- Start of collecting Use Cases
- 2nd DFIG Session at P5 in San Diego

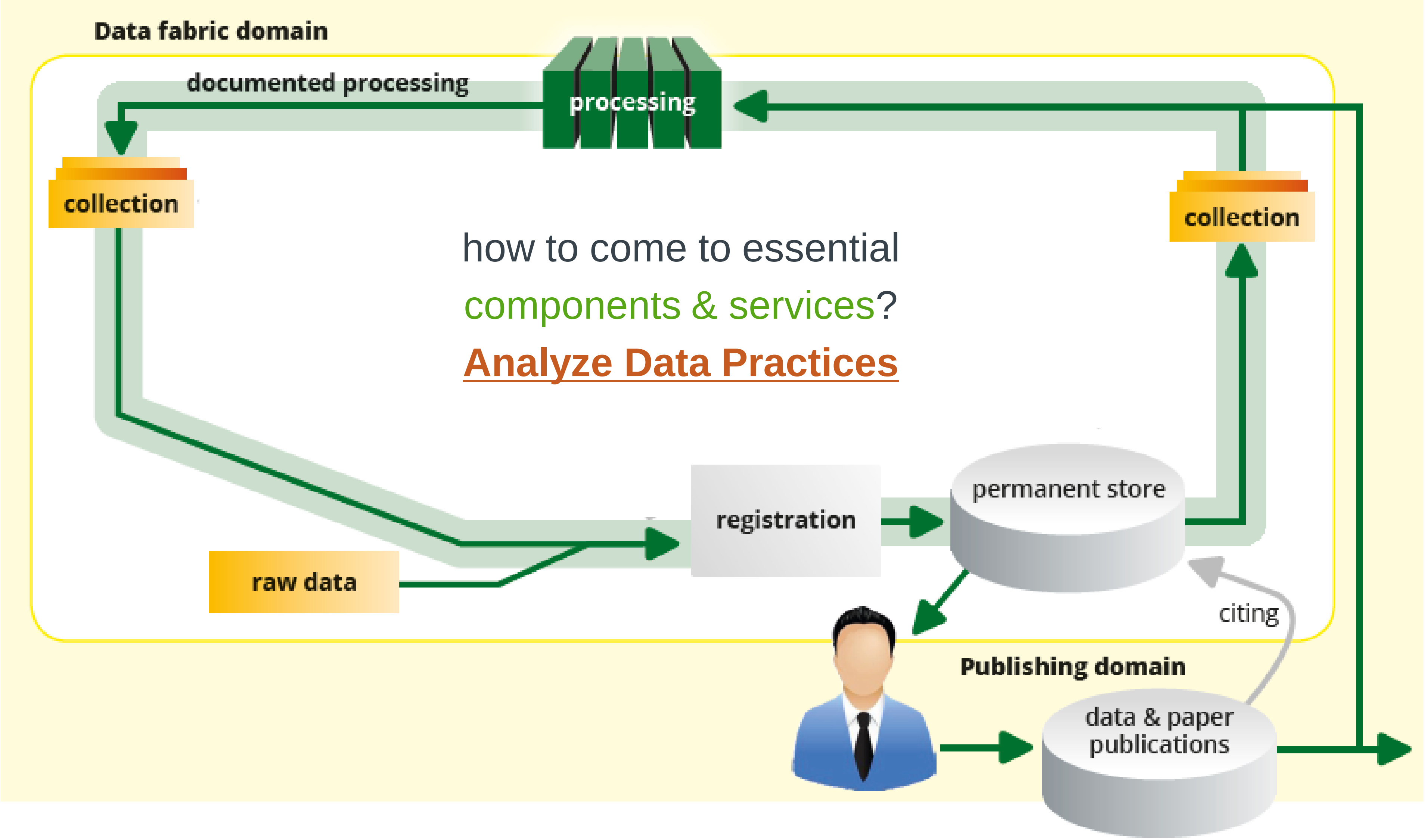
Data Fabric first analysis

- goals
  - understand components/services infrastructures are using
  - extract common components/services and their characteristics

- two strands of input for analysis
  - current data practices
  - Use cases

  - now also analysis of Large Scale Data Infrastructures

Data Fabric first analysis

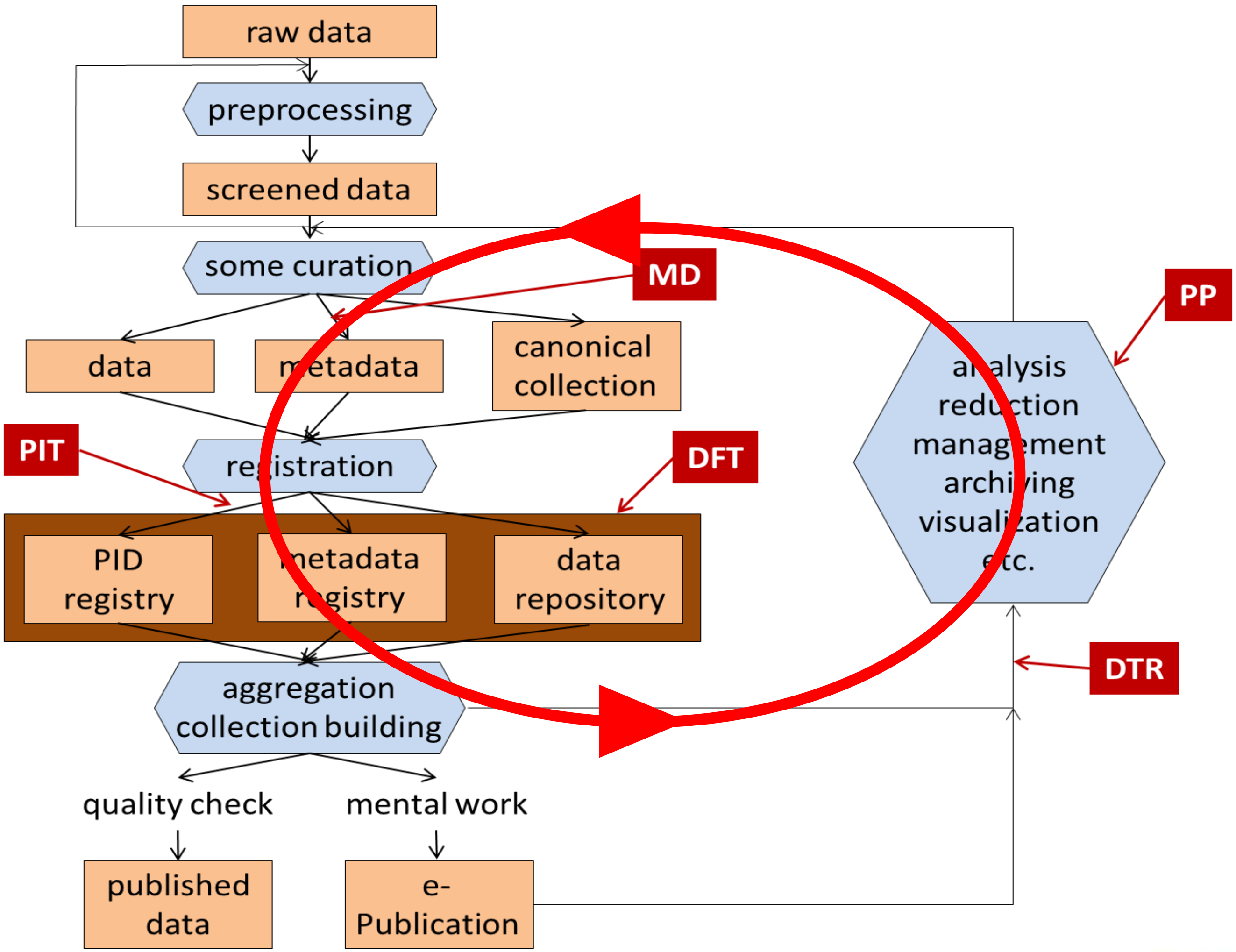


how to come to essential

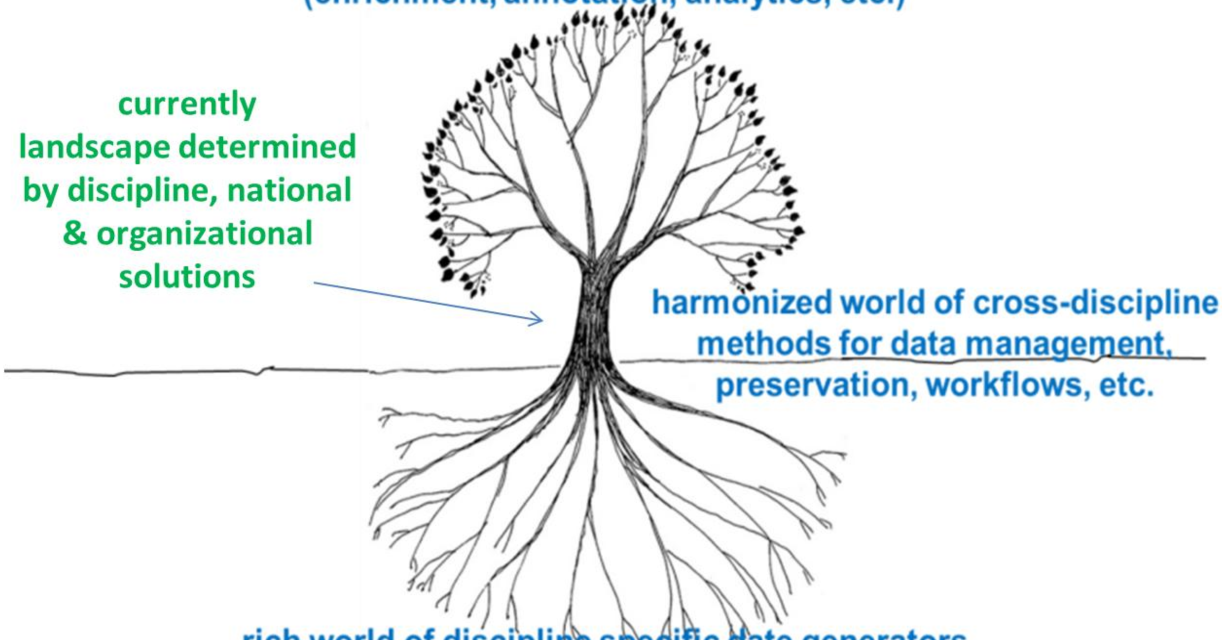
components & services?

Analyze Data Practices

Data Practices (120 interviews etc.)



Data Management Conclusion



rich world of discipline specific date analytics (enrichment, annotation, analytics, etc.)

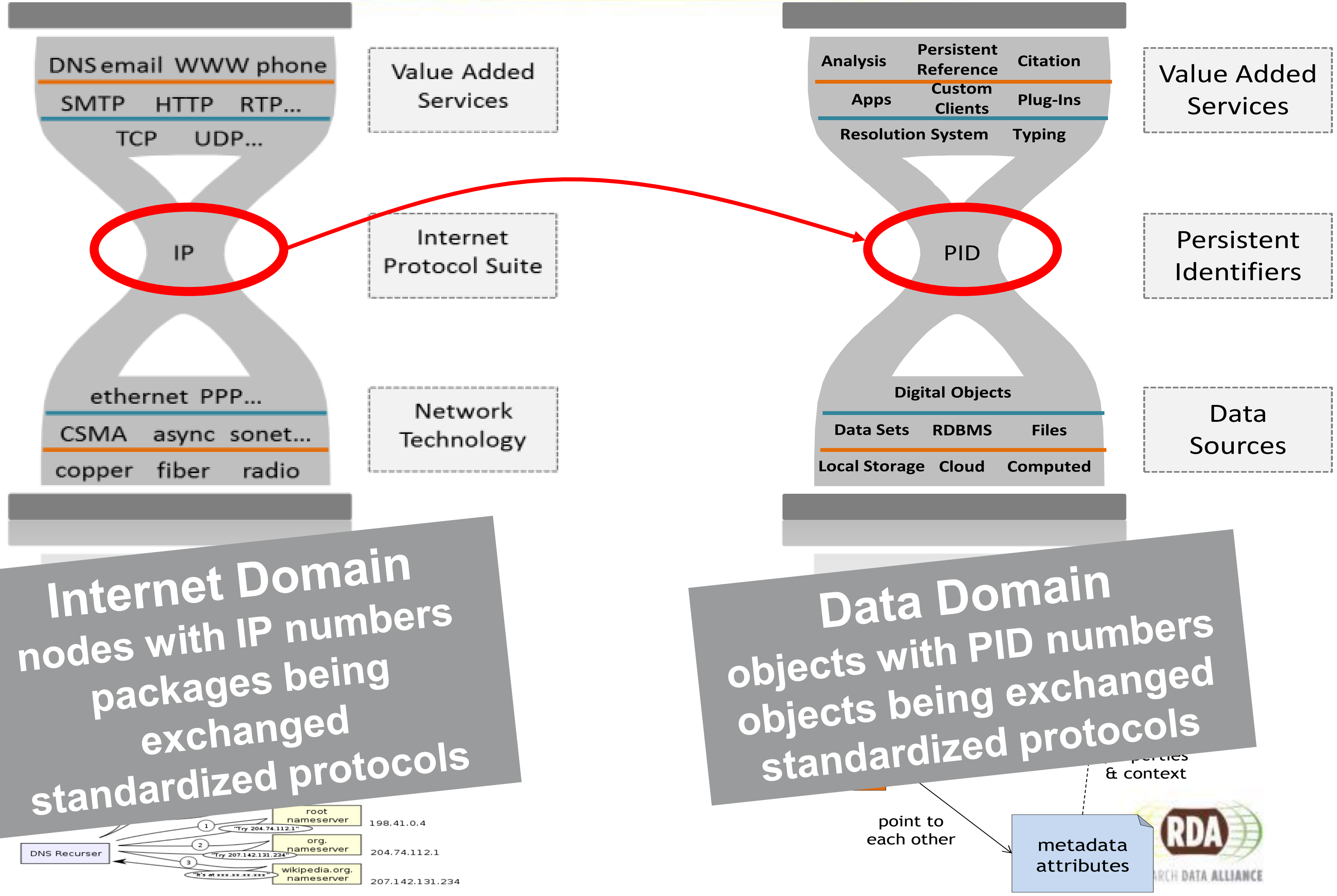
currently landscape determined by discipline, national & organizational solutions

harmonized world of cross-discipline methods for data management, preservation, workflows, etc.

rich world of discipline specific date generators (sensors, simulation, massive crowd sourcing, etc.)

management of data objects is widely type and discipline independent

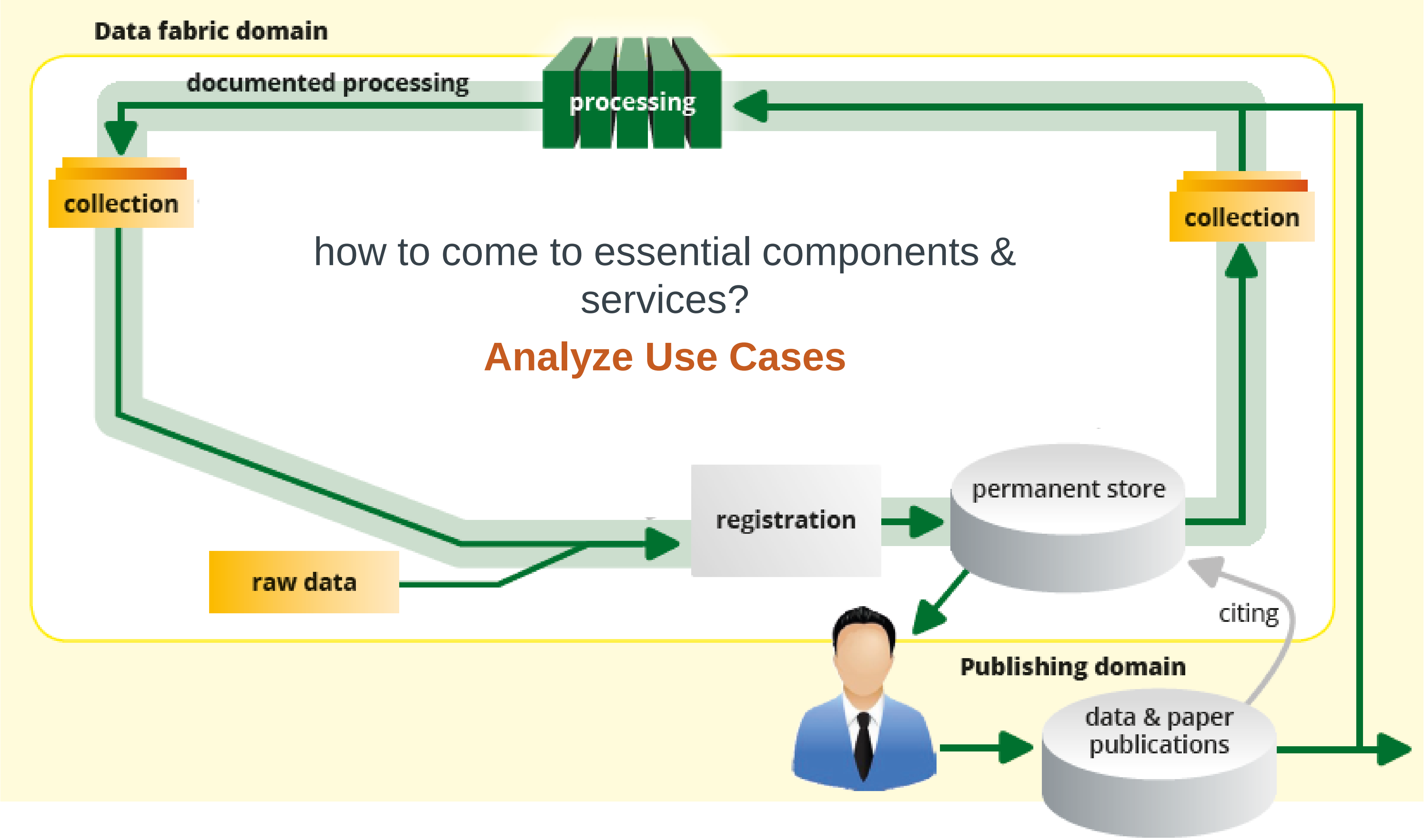
PID system is core



Internet Domain
nodes with IP numbers
packages being exchanged
standardized protocols

Data Domain
objects with PID numbers
objects being exchanged
standardized protocols

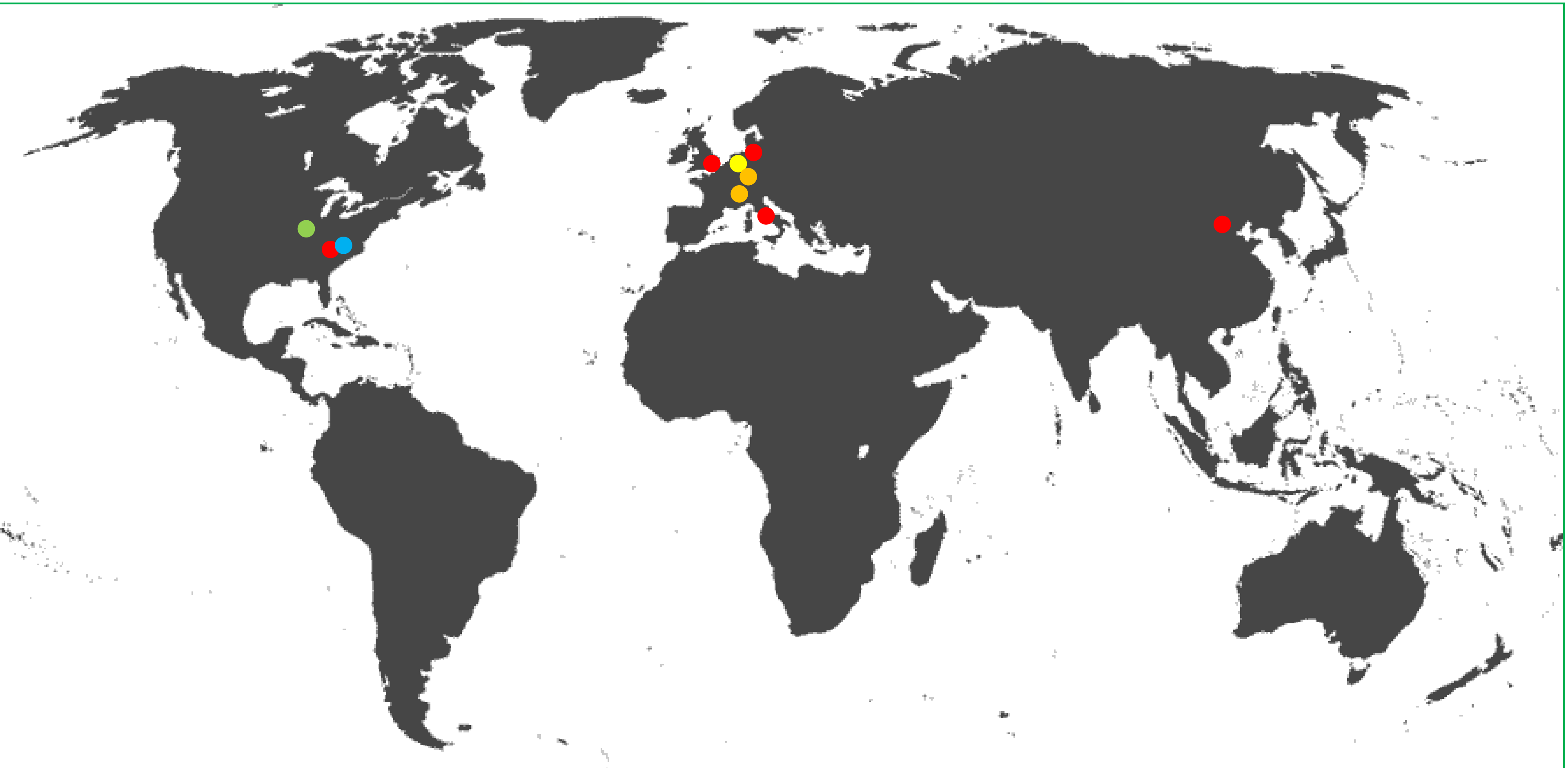
Data Fabric first analysis



how to come to essential components & services?

Analyze Use Cases

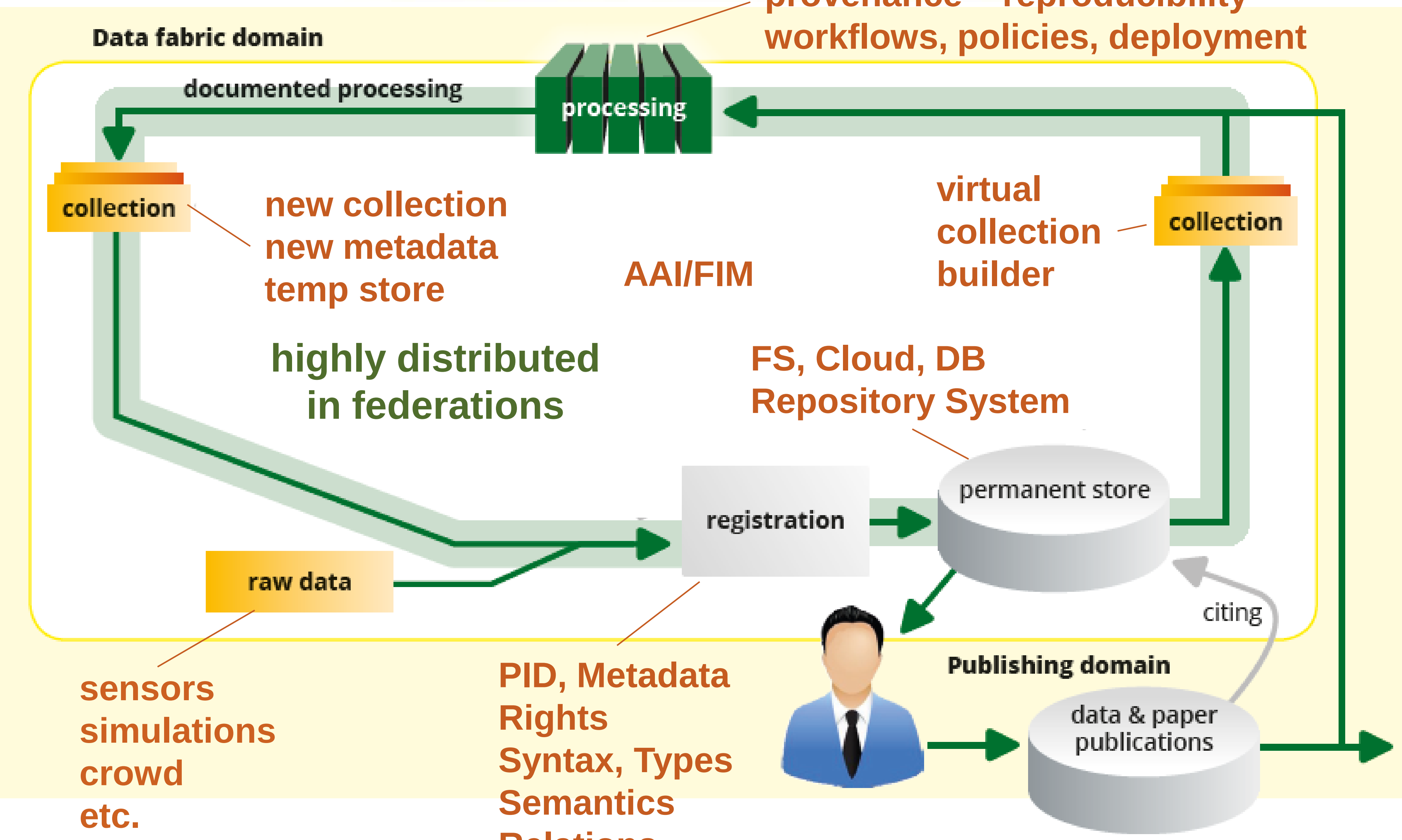
10 (+5) Use Cases so far (2 in development, others mature)



🔴 environmental science 🟢 natural science 🟠 life science 🟡 humanities, soc. sciences 🔵 IT, various

all indicated nodes are centers of national, regional and even worldwide federations

Issues of Relevance



management, analytics, conversion
provenance – reproducibility
workflows, policies, deployment

new collection
new metadata
temp store

AAI/FIM

virtual
collection
builder

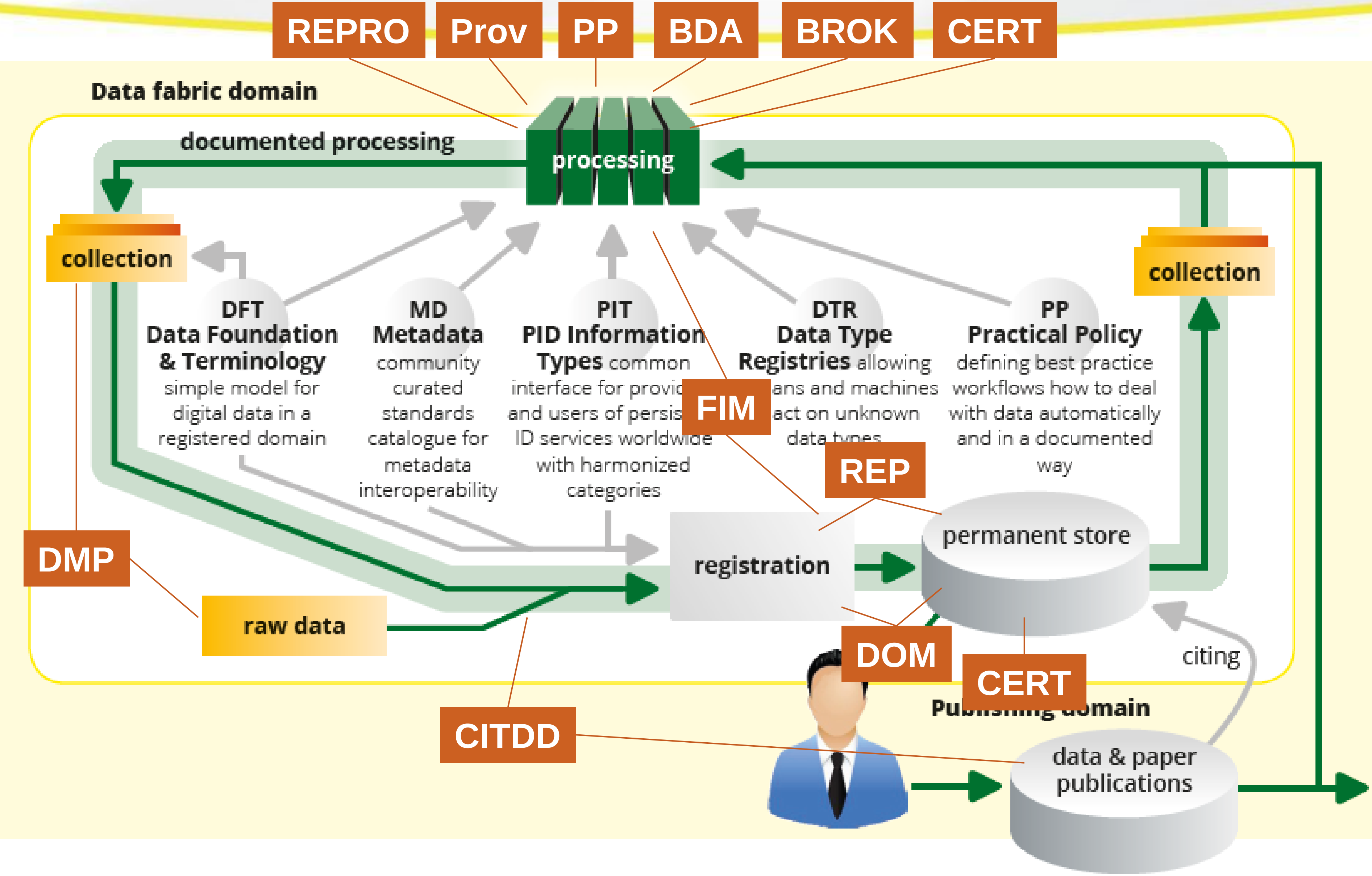
highly distributed
in federations

FS, Cloud, DB
Repository System

sensors
simulations
crowd
etc.

PID, Metadata
Rights
Syntax, Types
Semantics
Relations

How do WGs/IGs fit?



REPRO Prov PP BDA BROK CERT

Data fabric domain

documented processing

processing

collection

collection

DFT
Data Foundation & Terminology
simple model for digital data in a registered domain

MD
Metadata
community curated standards catalogue for metadata interoperability

PIT
PID Information Types common interface for provi and users of persis ID services worldwide with harmonized categories

DTR
Data Type Registries allowing ans and machines act on unknown data types

PP
Practical Policy
defining best practice workflows how to deal with data automatically and in a documented way

FIM

REP

DMP

raw data

registration

permanent store

DOM

CERT

citing

CITDD

Publishing domain

data & paper publications

Components I

- domain of registered digital objects (DO) incl. basic organization principles (data, code, knowledge) -> worldwide PID system (Handles/DOI)
- domain of registered actors -> worldwide ID system (ORCID)
- domain of trusted repositories for DOs -> worldwide Rep Registry
  - proper DFT/DSA/WDS compliant repository systems
- accepted policy commons (proper organization support, self-documenting, tested/certified, etc.) -> policy component registry
- policy/services -> service registry
- authentication system -> various in place (ORCID just number)
- authorization system -> authorization registry

Components II

- MD components/schemas -> metadata schema registry
- data types /schemas/formats -> data type registry
- semantic categories

much already out there but ...

... why does it cost months

- to federate and integrate data
- to make data interoperable

... need to harmonize, raise trust & value

... make it ready for machines

Use cases template I

In order to compare different use cases and extract common characteristics of components and services of use cases, DFIG made a use case description template.

1. Scientific Motivation and Outcomes
2. Functional Description
3. Describe essential Components and their Services
4. Describe optional/discipline specific Components and their Services
5. Describe essentials of the underlying Data Organization
6. Indicate the type of APIs being used
7. Achieved Results

Use cases template II

1. Scientific Motivation and Outcomes *(max. 0.5 pages)*
   Provide a short summary of the scientific or technical motivation for the use case. What would be the best possible outcome and why?
2. Functional Description *(max. 1 page)*
   Give at least one diagram that indicates the overall structure/architecture of the data creation and consumption machinery that is being used in the lab/infrastructure. Describe in simple words the functioning of the machinery.
3. Describe essential Components and their Services *(max. 1 page)*
   Describe the most essential infrastructural components of the machinery and the kind of services they offer. These descriptions don't have to be comprehensive.

Use cases template III

4. Describe optional/discipline specific Components and their Services *(max. 1 page)*

   Describe the optional/discipline specific infrastructural components of the machinery and the kind of services they offer. These descriptions don't have to be comprehensive.

5. Describe essentials of the underlying Data Organization *(max. 1 page)*

   Describe the most important aspects of the underlying data organization and compare it with the model outlined by DFT.

6. Indicate the type of APIs being used*(max. 1 page)*

   Describe the most relevant APIs and whether they are open for being used.

7. Achieved Results *(max. 0.5 pages)*

   Describe the results (if applicable) that have been achieved compared to the original motivation.

Summary

- DFIG as a platform for WG/IG chair interaction about all kinds of components/services that are essential to make data work more efficient, cost-effective and reproducible
- The idea is to do Use Case studies to identify such components/services based on what people are doing
- The method is thus learning from examples and from there to do abstractions to common components

Please provide your Use Cases and join discussions on their essentials

Thanks for your attention.

some answers !?

- lack of broad conviction in science – missing guidance, thus too risky to invest (thus no broad uptake and lack of quality)
- lack of widely trusted, stable and accessible services
- lack of explicitness of structures and semantics
- lack of agreed common interfaces
- brokering versus harmonization