Persistent Identifiers in Earth science data management environments

PIDs for ESGF

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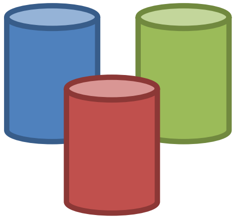
PID usage is driven by two needs.

1. Users want to precisely reference data
2. Management of different versions and replicas by node managers



User needs in ESGF

- Refer to a specific subset of data
  - slices across one or several simulations
- There is typically no single hierarchy.

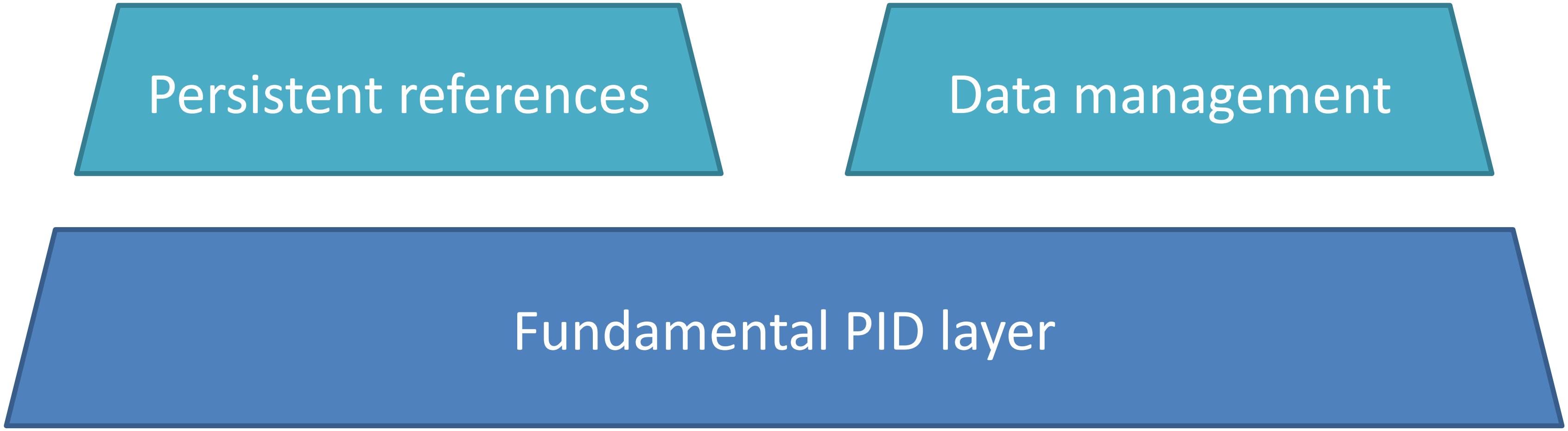
- Not to be confused with citation via a DOI.
  - prior to late QA stages and formal publication

Needs of node maintainers

- Competing and incoherent identification mechanisms in use

- Improved communication
- Improved version control
- Support in case of replication failures
- ...

Motivations differ, yet there is a common layer.



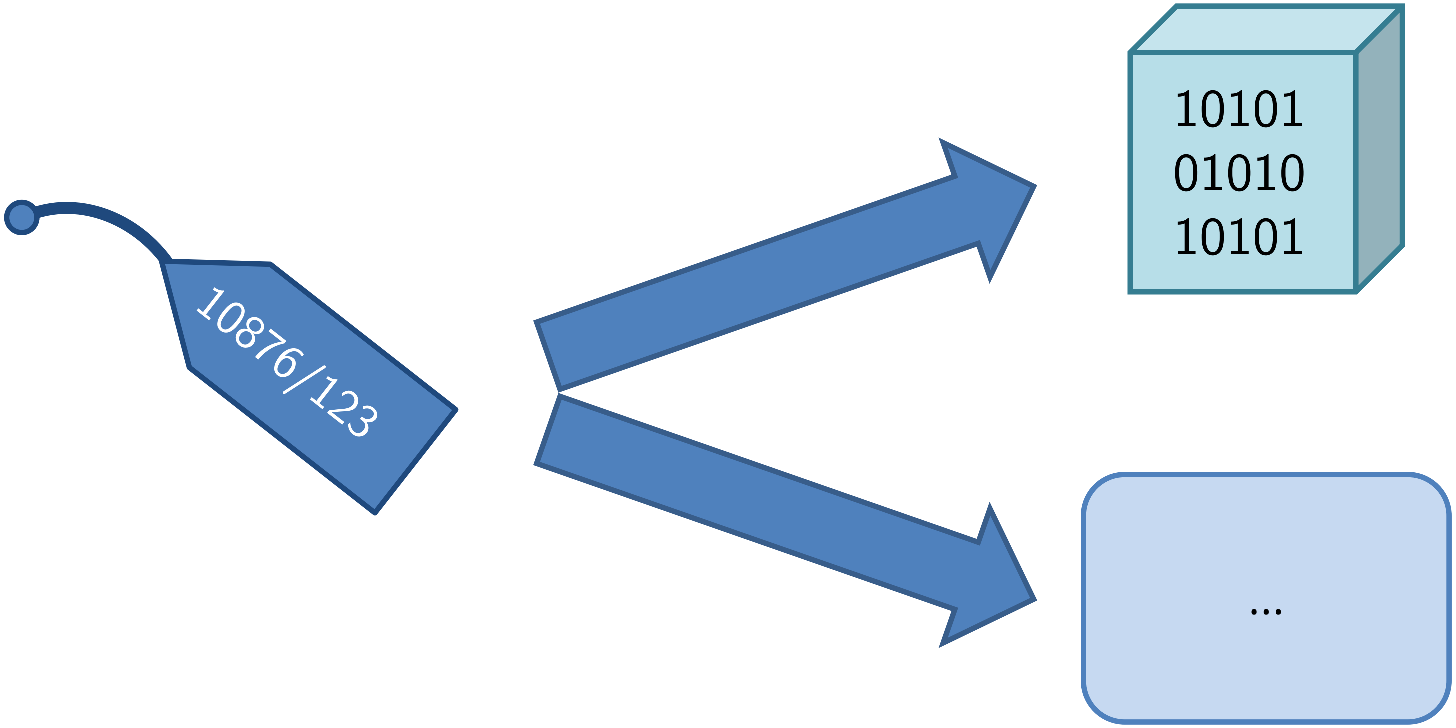
Persistent references

Data management

Fundamental PID layer

Persistency of identification

- A persistent identifier can be resolved to meaningful state information for at least as long as the resource exists.



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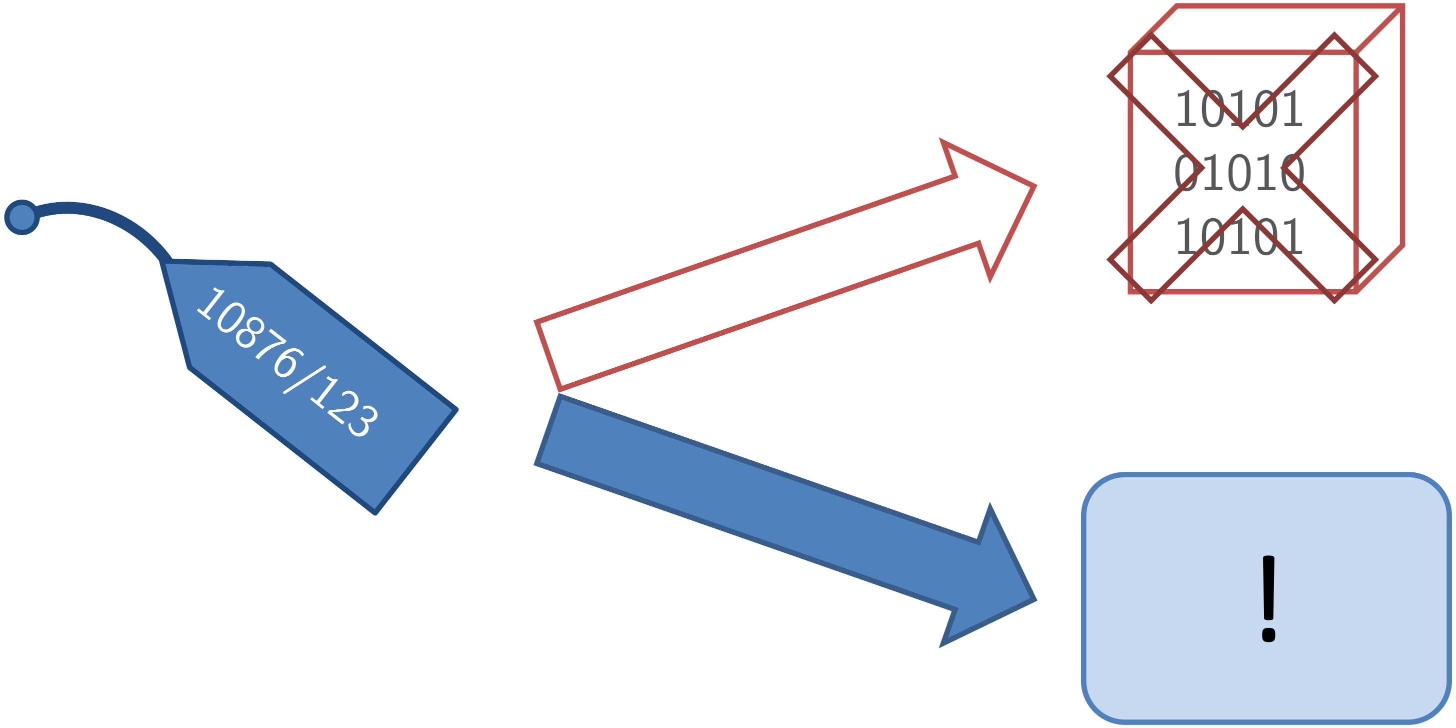


PID Information Types

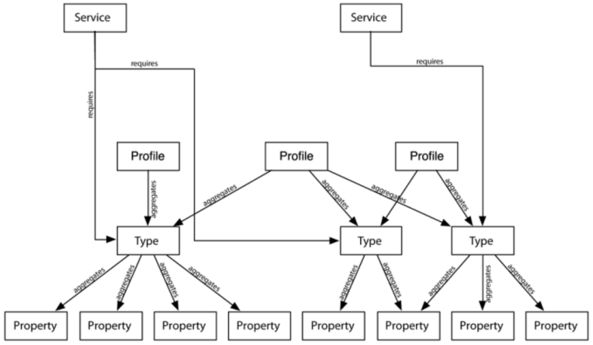
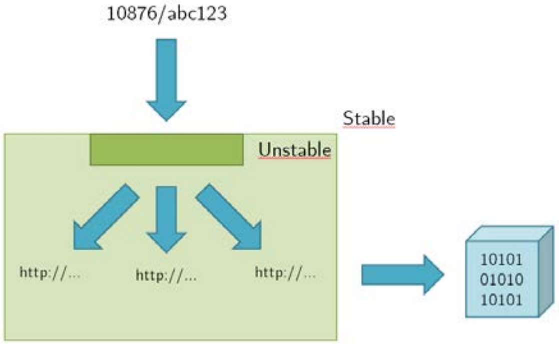
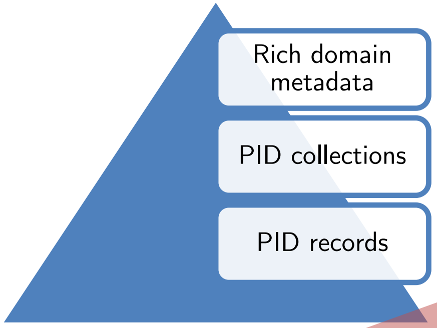


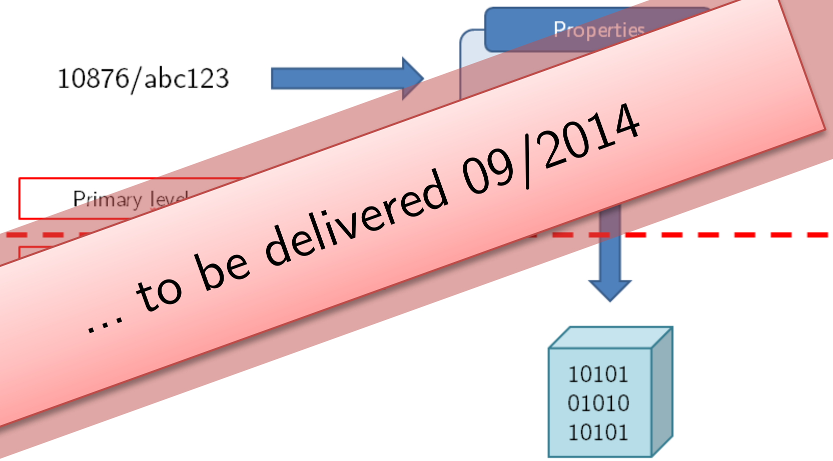
diagram courtesy of Timothy DiLauro (JHU)

http://bit.ly/1fSL78t

```
getProperties()
getAllProperties(PID)
getPropertiesOfType(PID, typeID)
getPropertyValue(PID, propertyName)
describeType(typeID)
doesPIDconformToType?(PID, typeID)
writeFullPIDrecord(PID, dict)
registerType(properties, ...)
createPIDaccordingToType(typeID,
PID, ...)
...
```







... to be delivered 09/2014

What does this mean to ESGF?

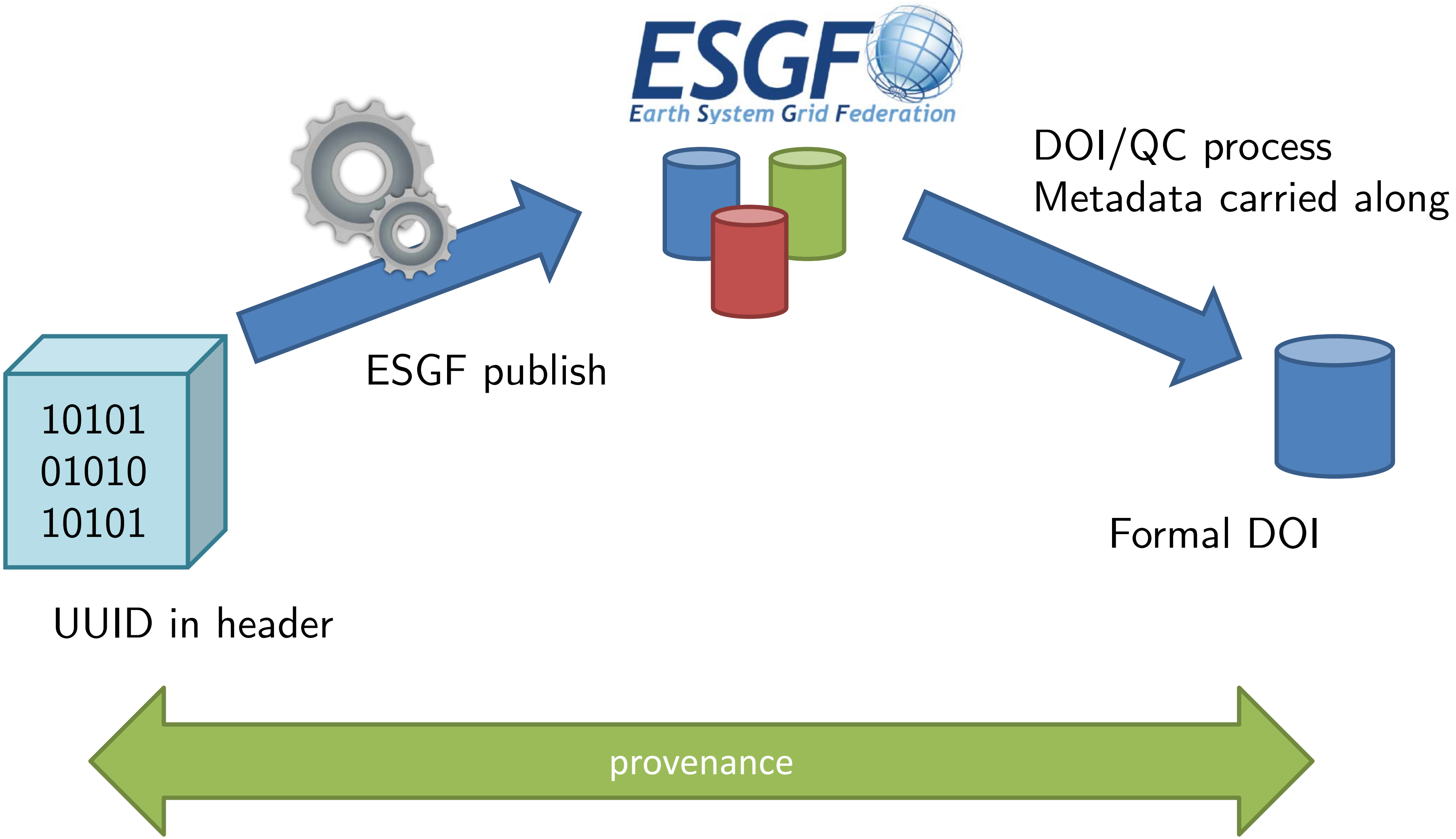
We have some prior experience.

- Existing experience from EUDAT services
- PID federation lessons learned from running distributed Handle Server nodes (EPIC)
- Some first experiments with PIDs and collections for CORDEX

How can we assign PIDs at an early stage?

- Nodes are not allowed to modify data.
- Write UUID in netcdf header during CMOR process
  - establish structure to minimize UUID collisions
- On ESGF publish: mass-register PIDs with name based on UUID

Possible PID assignment process in ESGF



UUID in header

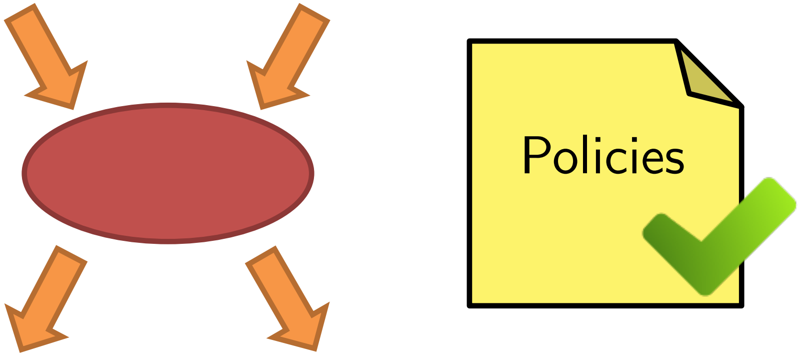
ESGF publish

DOI/QC process
Metadata carried along

Formal DOI

Next steps

- Continuing implementation and prototyping
  - particularly for CORDEX
- Agree on solid mechanisms to ensure proper identifier usage



- Detailed concepts open for discussion at next GO-ESSP meeting

Conclusions

- PIDs can address identification issues within ESGF
- There are many potential downstream use cases
- Range of previous work from concepts to practical experience
- Some costs involved in terms of QA
- Detailed concepts to be developed closely with ESGF developer community

- Thank you for your attention.

DKRZ DEUTSCHES KLIMARECHENZENTRUM

ESGF Earth System Grid Federation

RDA RESEARCH DATA ALLIANCE

UHH Universität Hamburg DER FORSCHUNG | DER LEHRE | DER BILDUNG

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