



Can LCA be FAIR?

Assessing the status quo and opportunities for data sharing

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ALIGNED
CONSTRUCTION - PULP AND PAPER - WOODWORKING - TEXTILE - BIO-CHEMICALS



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Today

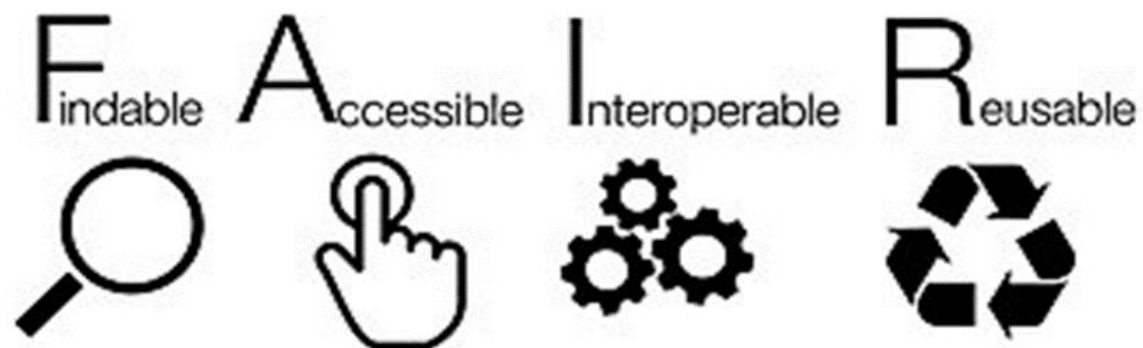
- What is FAIR data and data ecosystem
- LCA infrastructure for data sharing
 - Guidelines
 - Repositories
 - Nomenclature and data formats
 - Challenges and opportunities
- ALIGNED FAIR Data sharing workflow

Read more here: Ghose, Agneta. 2024. “Can LCA Be FAIR? Assessing the Status Quo and Opportunities for FAIR Data Sharing.” *The International Journal of Life Cycle Assessment* 29(4):733–44. doi: [10.1007/s11367-024-02280-3](https://doi.org/10.1007/s11367-024-02280-3).



Background

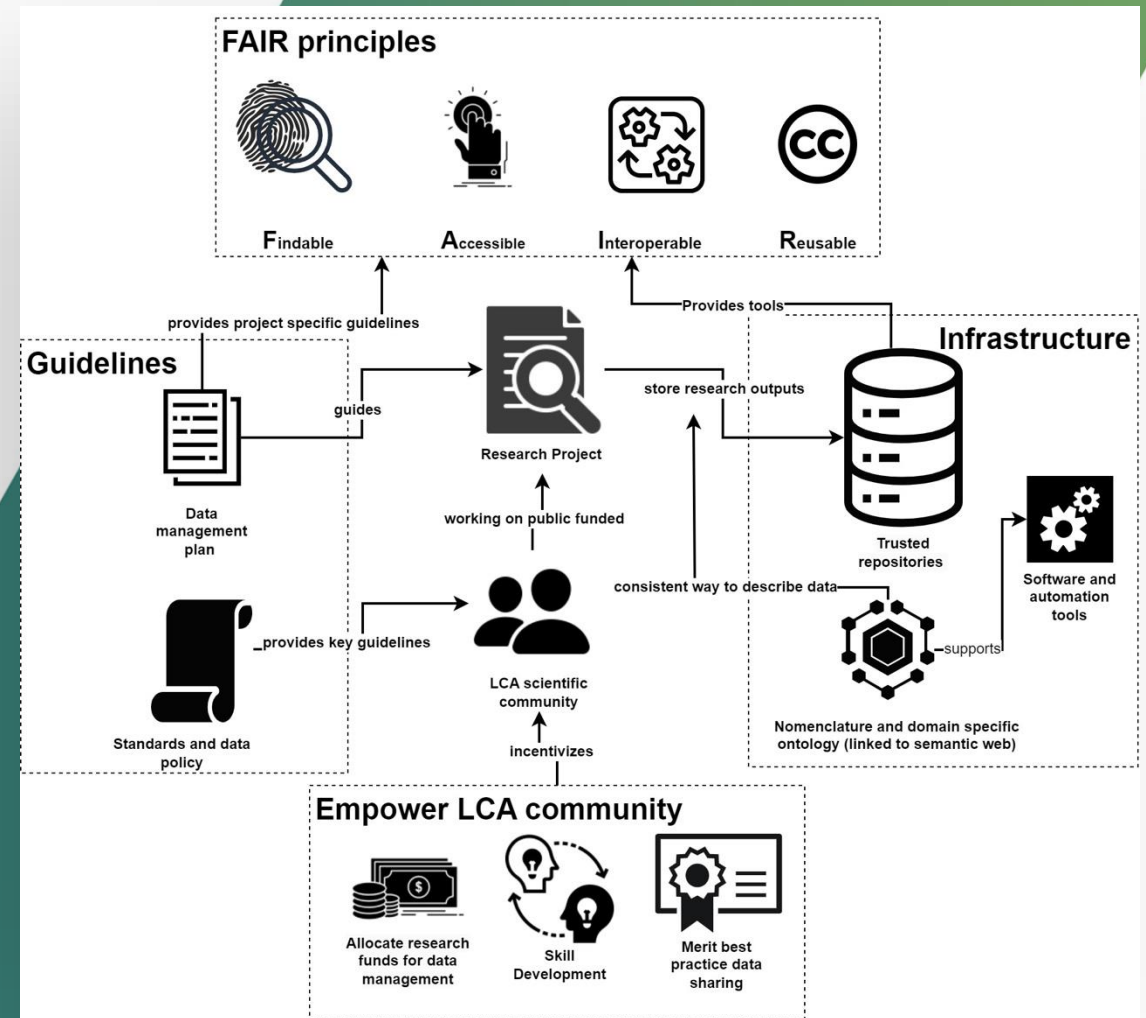
- Growing need for better data
- Core FAIR principles (2016) emerge as a golden standard
- FAIR implementation promoted across scientific disciplines and geographic boundaries
 - European open science cloud (EOSC) and the European commission
 - NIH Data Commons (US)
 - the Australian Research Data Commons
 - African open science platform



Source: [Wikimedia](#)

A FAIR data ecosystem

- Ensuring FAIR data sharing is beyond the sole responsibility of individual researchers
- Requires the **support of several components** such as:
 - Domain specific data nomenclature (e.g., ontologies)
 - Policies or standards
 - Data repositories
 - (Meta)data templates and formats



Source: Can LCA be FAIR ([Ghose, A. 2024](#))

Guidelines for LCA data sharing

ISO standard 14048 provides technical specification to facilitate reporting of LCI data

- Elaborate data documentation format. Adopted in common LCA data formats (Ecospold, ILCD)
- Database providers implement ISO specifications in different, inconsistent ways → **low interoperability** for LCA data exchange.
- Standard from 2002 → Future versions should implement FAIR principles (currently lacking).

Data Management Plans (DMP) from recent Horizon Europe projects that perform LCAs

- Most DMPs refer to the FAIR guidelines
- Implementation of the guidelines is **still vague or non-existent on LCI data**.
- Strategically planned DMP can play an integral role to support data sharing.

Data repositories for LCA data sharing

Several country and industry-specific LCA repositories exist

- EC **Life Cycle Data Network** (LCDN): free nodes for data sharing accessible to data providers if data ILCD compliant
- Limited use of LCA specific data repositories on EU's LCDN (**very few datasets**).

Global LCA Data Access (GLAD) network

- International directory (not repository) of LCA databases.
- Increasingly supports **mandatory metadata** definitions and conversion tools for interoperability
- Can enhance LCA data findability and reusability (strict storage, identifier, metadata, and license requirements).



Nomenclature and data formats for LCA data sharing

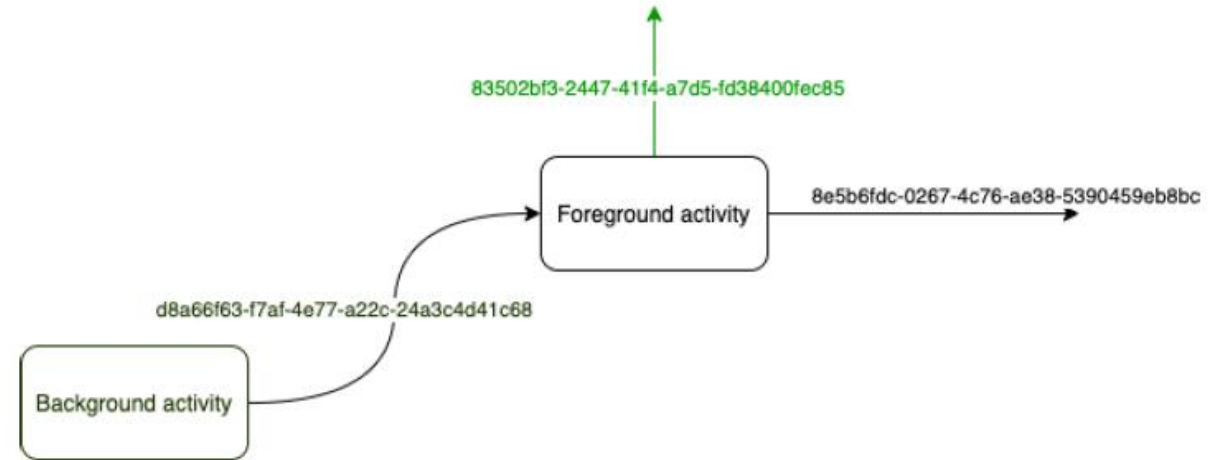
- ❌ Inconsistencies in the nomenclature → loss of data
 - Example: exchanges (products, emissions) and activities classified differently or inconsistently → data from different sources can not be combined
 - ✅ Data can be correctly reused if well described and classified.
- Strong need for common nomenclature in LCA community, preferably semantically linked* → will achieve high interoperability.

Common data formats (EcoSpold2 and ILCD - ISO compliant)

- ✅ Acceptable level of documentation, review, and quality
- ❌ Sharing is resource-intensive: complex LCI data compilation and reporting
- Need data templates with essential information and formats for easier parsing (e.g. .csv, JSON) → higher interoperability.

ALIGNED – Data sharing workflow

1. Retrieve data. Understand how activities are linked with each other (flow diagram).
2. Create unique identifiers (UUID) for foreground exchanges. For background exchanges use predefined UUIDs
3. Compile inventory in tabular format.
4. Compile Metadata with GLAD template
5. Create a datapackage
6. Upload the data in an openly accessible repository and publish



Activity database	Activity code	Activity name	Activity unit	Activity type	Exchange database	Exchange input	Exchange amount	Exchange unit	Exchange type
foreground-db-name	8e5b6fdc-0267-4c76-ae38-5390459eb8bc	Foreground activity	some-unit	process	foreground-db-name	8e5b6fdc-0267-4c76-ae38-5390459eb8bc	1	some-unit	production
foreground-db-name	8e5b6fdc-0267-4c76-ae38-5390459eb8bc	Foreground activity	some-unit	process	background-db-name	d8a66f63-f7af-4e77-a22c-24a3c4d41c68	1	some-unit	technosphere
foreground-db-name	8e5b6fdc-0267-4c76-ae38-5390459eb8bc	Foreground activity	some-unit	process	background-db-name	83502bf3-2447-41f4-a7d5-fd38400fec85	1	some-unit	biosphere

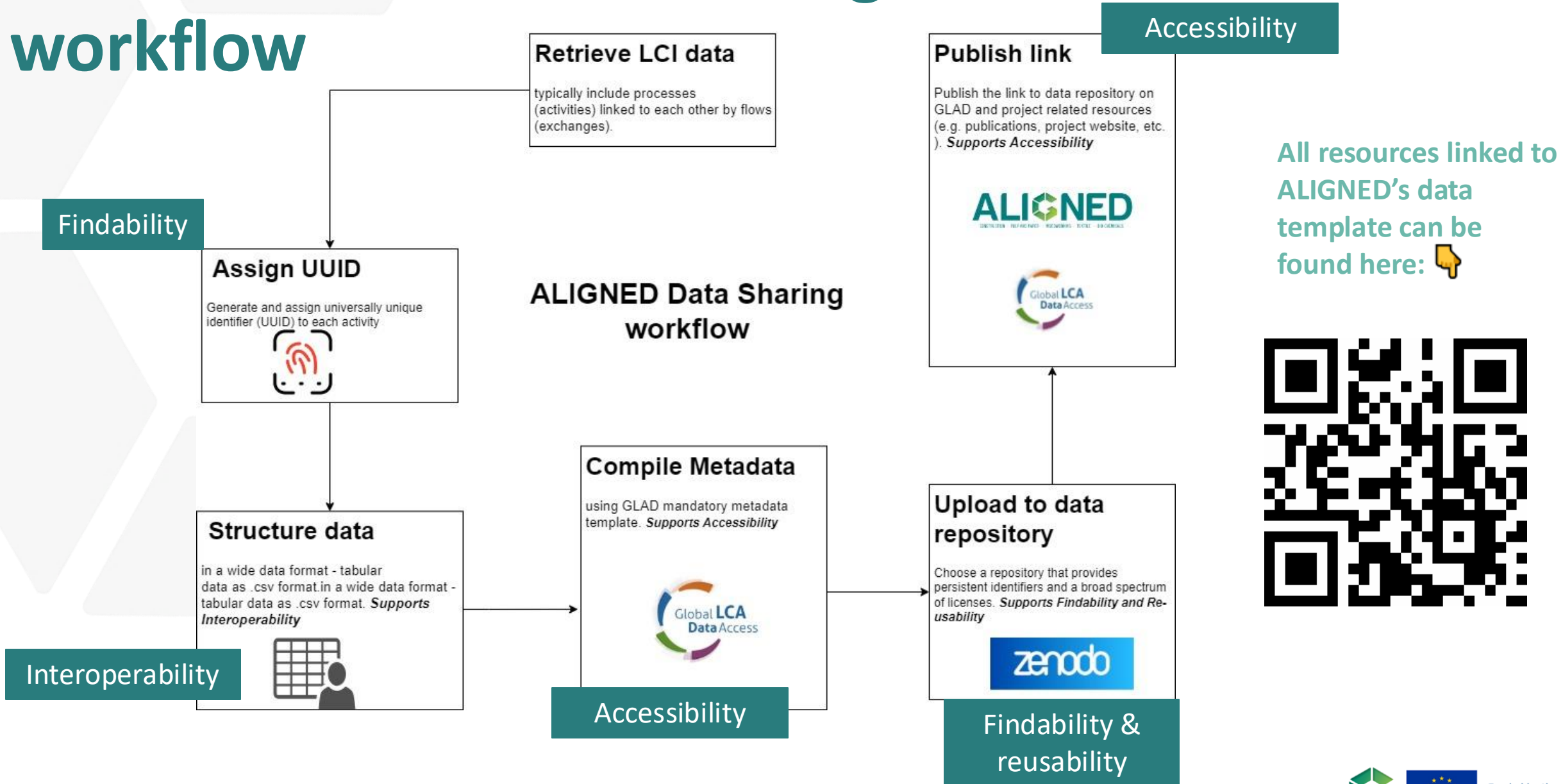
Database ID

Activity ID

Database ID

Exchange ID

ALIGNED –FAIR data sharing workflow



All resources linked to
ALIGNED's data
template can be
found here: 



THANK YOU

AND SEE YOU SOON

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