

GreenDelta

sustainability consulting + software

LCA Cloud: enhancing LCA data collaboration

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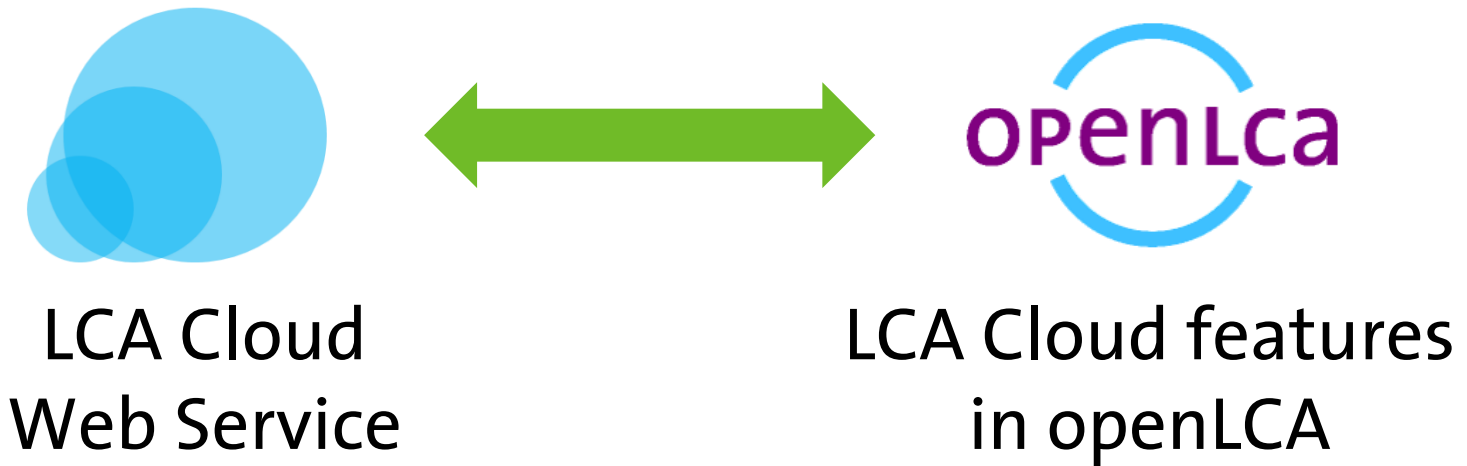
Challenges

- Simultaneous group work
- Facilitate sharing of LCA information



What is the LCA Cloud?

A platform to enable data collaboration and sharing
→ Teams of users can work on the same data sets independently and merge their changes together

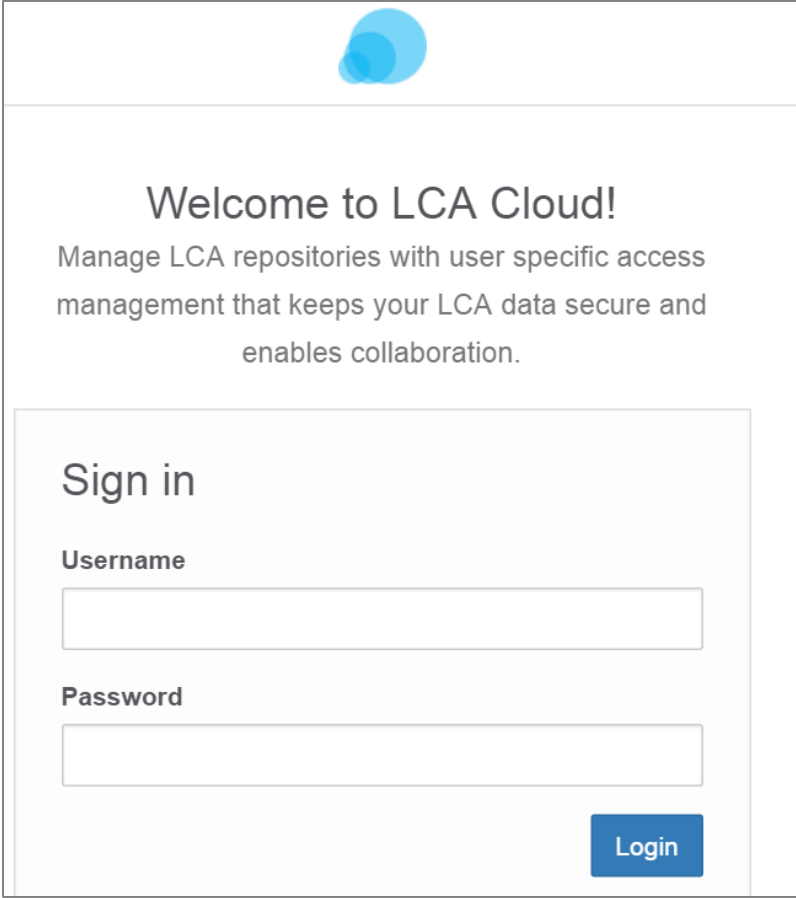


Main functionalities

- Upload, download, synchronize LCA data between a local openLCA database and a server repository
- Merging (possibly conflicting) changes in data sets
- History of changes
- User friendly web view of data in the repositories

LCA Cloud Web UI

The LCA Cloud Web UI is the central access and management tool for LCA repositories



The screenshot shows the LCA Cloud Web UI login page. At the top center, there is a logo consisting of two overlapping blue circles. Below the logo, the text reads "Welcome to LCA Cloud!" followed by a description: "Manage LCA repositories with user specific access management that keeps your LCA data secure and enables collaboration." Below this text is a "Sign in" section containing two input fields: "Username" and "Password". A blue "Login" button is positioned at the bottom right of the sign-in form.

Welcome to LCA Cloud!

Manage LCA repositories with user specific access management that keeps your LCA data secure and enables collaboration.

Sign in

Username

Password

Login

Technical details

- RESTful web service for storing and providing LCA data in a uniform way
- Developed as a standalone web application
- It can be hosted independently and can be deployed on any web server implementing the Java Servlet specification (e.g. Tomcat)
- Unlimited amount of servers possible → same application, different data

Data format

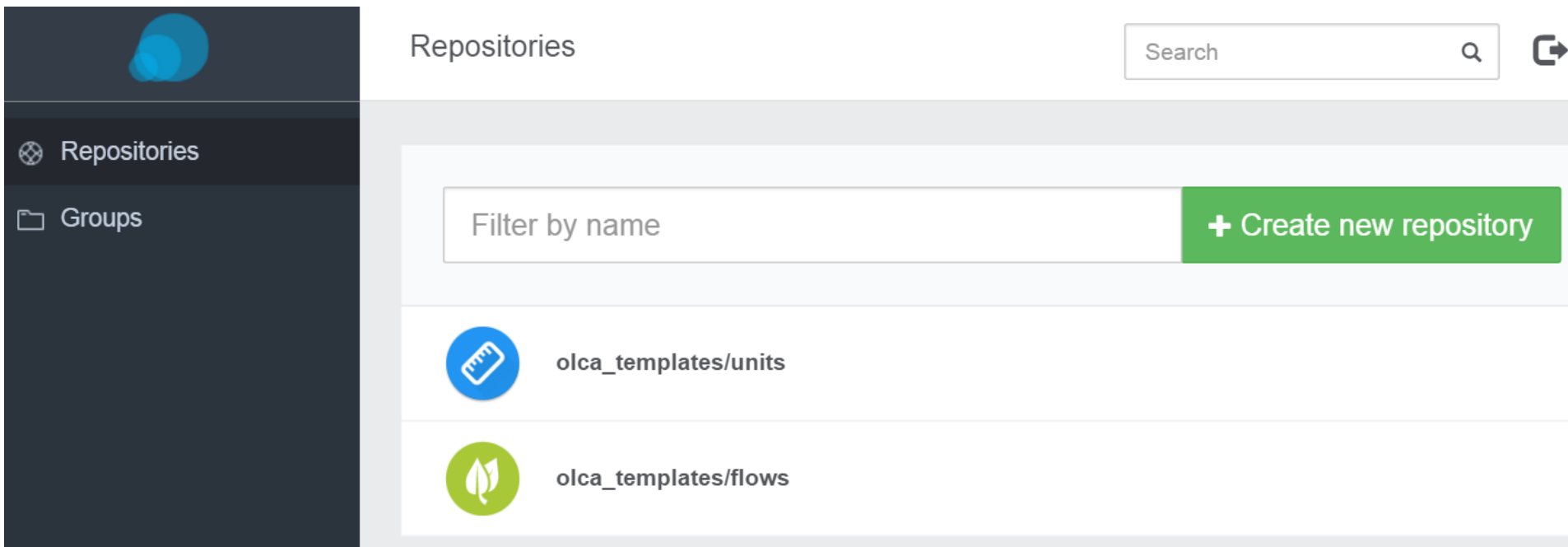
- Server runs the web application with a Derby database
- The JSON Id format is used for the exchange of data
 - Format recommended by W3C for linked data
 - It can directly be parsed as RDF triples and, therefore, be directly linked to ontologies

Integration into LCA software

- Third party applications are able to integrate the services via HTTP calls:
 - Right now LCA Cloud features only integrated in openLCA, but
 - The URLs that can be called will be publicly documented + Java API calling these webservices is part of the openLCA code and will therefore be open source
 - other LCA software could connect to it too

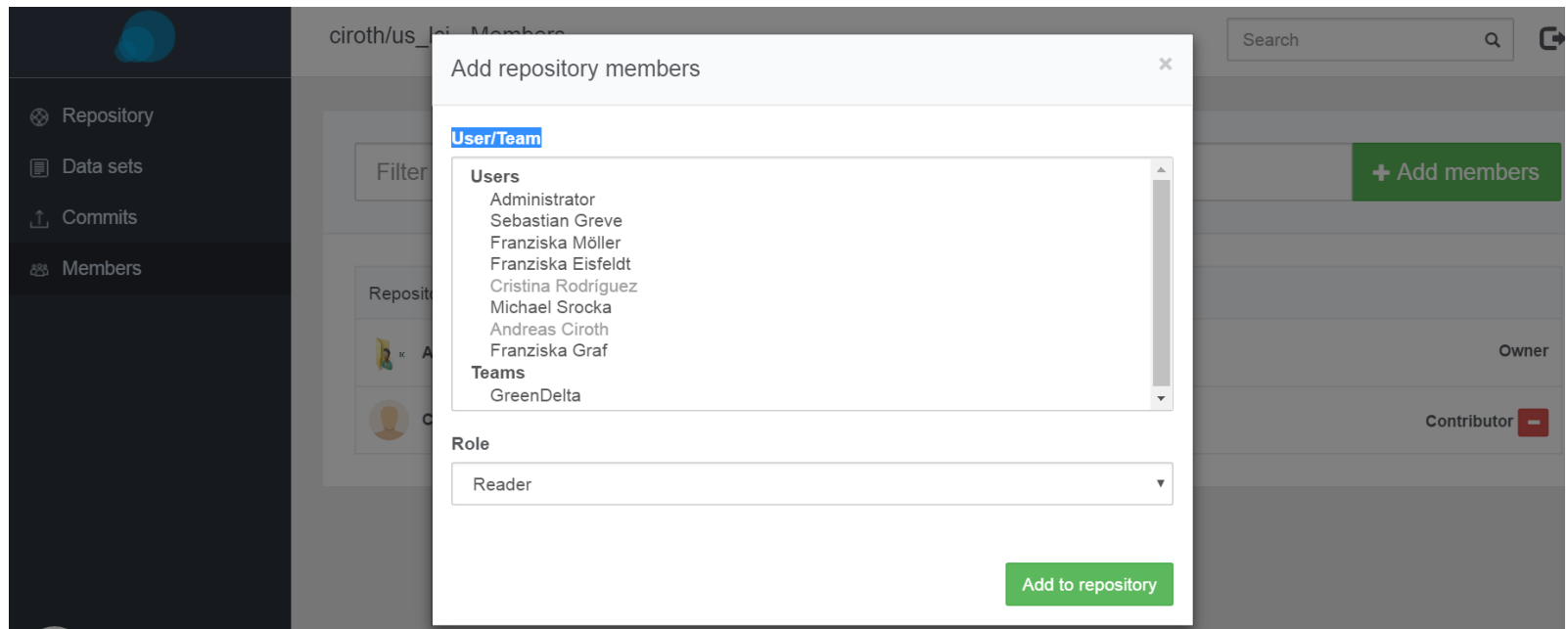
Features: Repository management

- Create/delete repositories
- Create/delete groups of repositories
- Clone repositories in a specific state (i.e. commit)



Features: User management

- Create/delete users and teams of users
- Roles: Owner, Contributor, Reader
- Set permissions per repository/group of repositories
- User profile



Features: Commit history

- View all changes per commit and navigate to the correspondent data sets

The screenshot shows a web interface for viewing commit history. On the left is a dark sidebar with navigation options: 'Back to group', 'Repository', 'Data sets', 'Commits', and 'Members'. The main content area is titled 'olca_templates/flows - Commits' and includes a search bar. The commit history is displayed as a list of entries, each with a date, commit count, title, author, and commit hash. Each entry also has a 'Details »' link.

Date	Commit Count	Commit Title	Author	Commit Hash	Action
04/25/2016	1 commit	test to see the new icons, plus parameter bug solved in this process	Andreas Ciroth on 04/25/2016	5d58f61c-6d97-4c8b-90ca-40b6ec4f738c	Details »
04/23/2016	2 commits	second product added	Andreas Ciroth on 04/23/2016	46a51944-55dd-46d2-bead-5a40d32c4942	Details »
		infrastructure added	Andreas Ciroth on 04/23/2016	555fa661-2414-40f7-832b-65d7b286f5ec	Details »
04/21/2016	3 commits	now also the flows committed for the boku processes	Andreas Ciroth on 04/21/2016	5122308d-2c19-4a81-8cf7-55cca8f53038	Details »
		1st commit test, artificial processes from boku	Andreas Ciroth on 04/21/2016	ccd26a7d-8a71-4f85-ad85-b2c0e382d132	Details »
		Initial check-in	Sebastian Greve on 04/21/2016	5357af20-1737-4b78-8203-5bde92e3e0c3	Details »

Features: Data sets browser

- Browse through the current state of the repository data sets (Filters by type and name)

Repository

Data sets

Commits

Members

ciroth/us_lci - Data sets

Search

Filter by name


Processes /

Name	Last change	Commit
..		
Air Transportation	30 minutes ago	Initial check-in
biomass	30 minutes ago	Initial check-in
Chemical Manufacturing	30 minutes ago	Initial check-in

Features: Data sets browser

- Download selected data sets as JSON format


Version Latest Download




 Cristina Rodriguez on 05/21/2016 11:26:39

Transport, aircraft, freight P

1. Important note: although most of the data in the US LCI database has undergone some sort of review, the database as a whole has not yet undergone a formal validation process. 2. Please email comments to lcj@nrel.gov.

Inputs/Outputs Documentation Allocation

Flow	Category	Amount	Costs	Uncertainty	Provider
 F_e Kerosene, at refinery		0.419919720019579 L		No distribution	


Flow	Category	Amount	Costs	Uncertainty	Avoided product
 F_e Transport, aircraft, freight		1 t*km		No distribution	
 F_e Carbon dioxide, fossil		1.05284715923147 kg		No distribution	
 F_e Carbon monoxide, fossil		0.00441023010226202 kg		No distribution	

Version
00.00.000

Last change
04/06/2011 12:23:00

UUID
c5de39e3-4187-34be-9c19-67e9544c1458

Quantitative reference
[F_e Transport, aircraft, freight](#)

Location
 [RNA](#)

Valid from
01/01/2003 12:00:00

Valid until
01/01/2010 12:00:00

Time description
-

Geography description
United States

Technology description

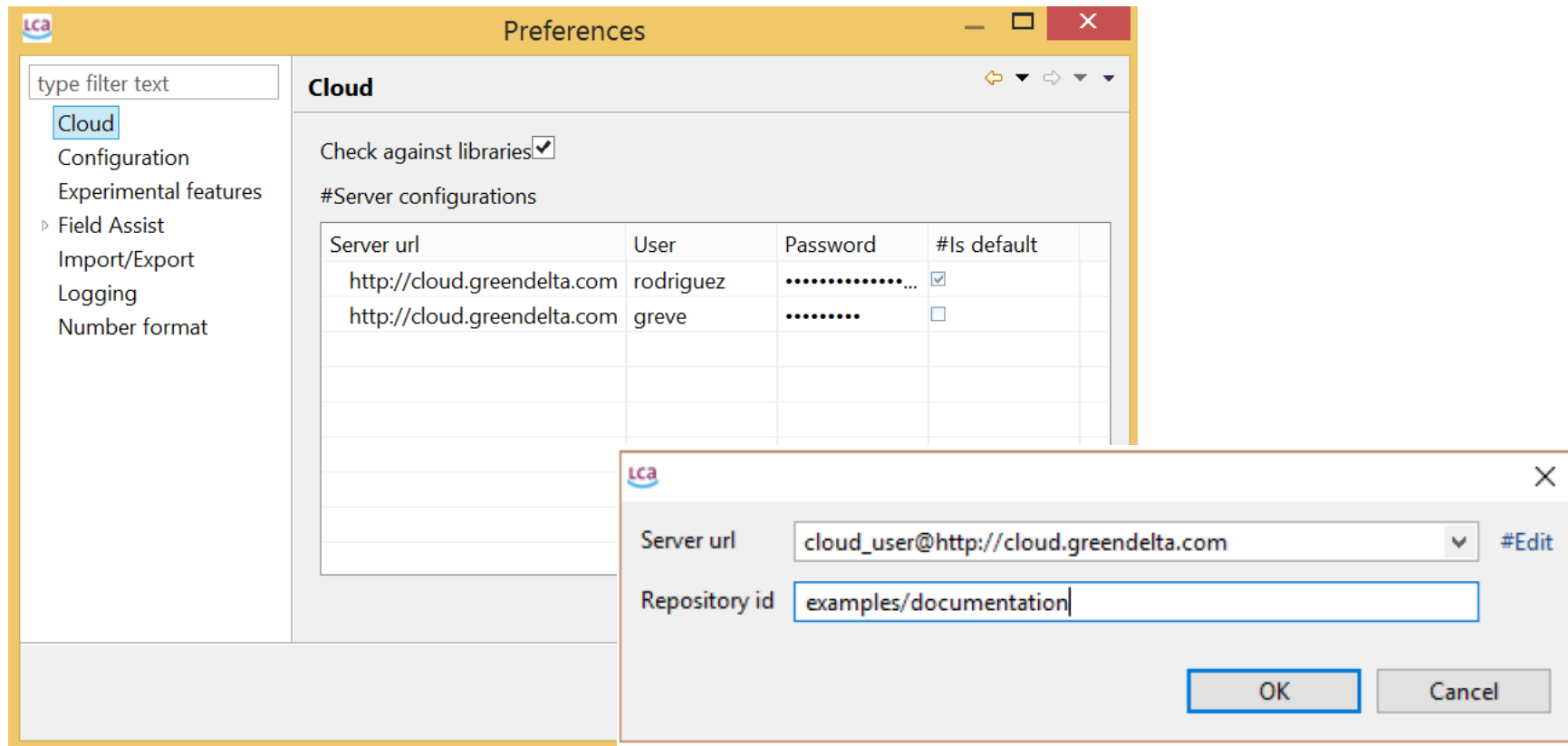
LCA Cloud integration in openLCA

openLCA integrates the usage of the LCA Cloud features:

- enabling users to share their data through LCA repositories
- adding additional tools to make the workflow more user friendly

Features: Connection to a repository

- Configure remote server accounts
- Connect a local database to a remote repository



Features: Display of changes

- The data in the local database and in the repository is compared after the connection:

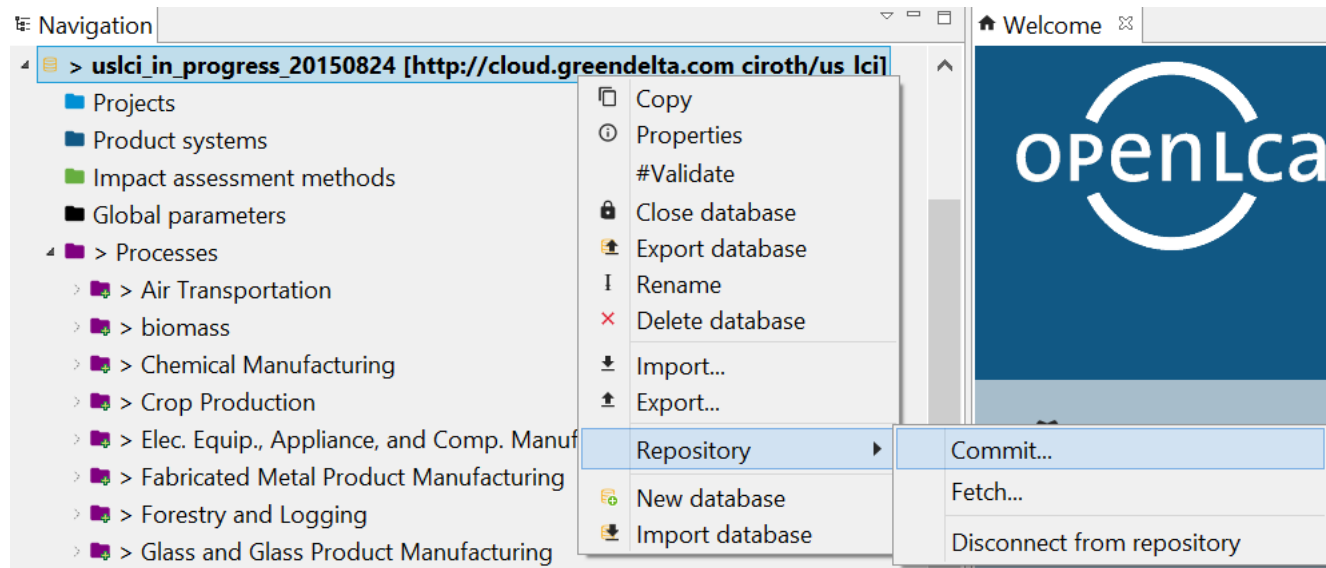
- > Indicates if a data set was changed

- + Indicates that there is new data in the local database



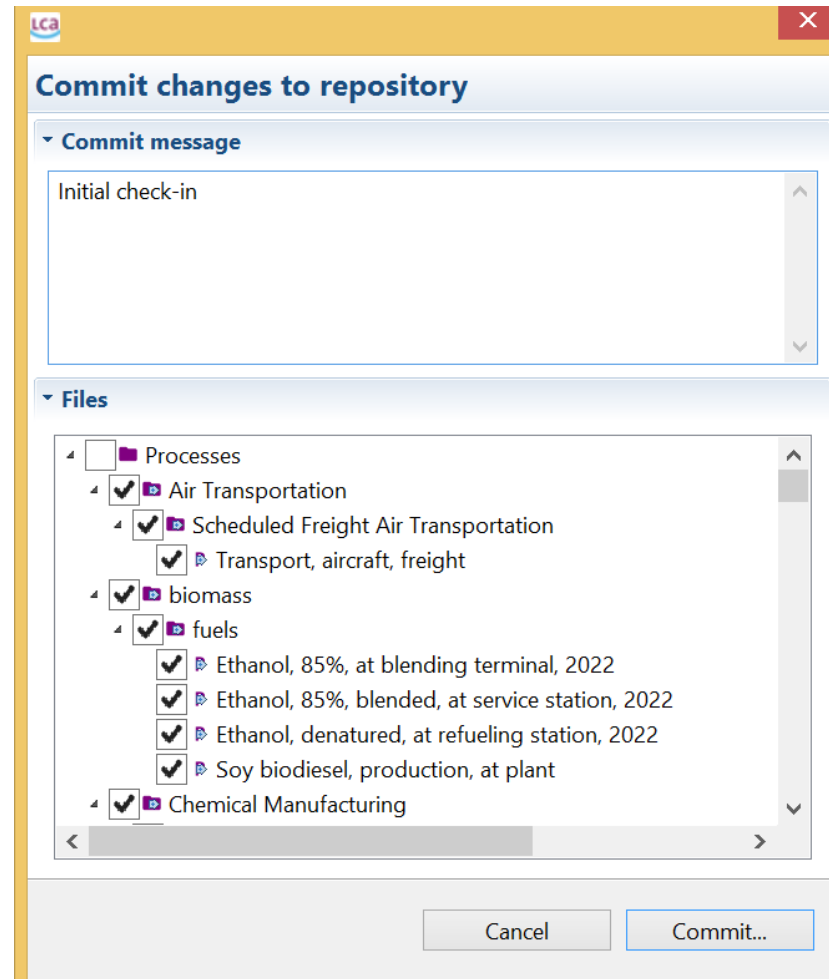
Features: Commit data

- Synchronize local changes with the repository (Commit)



Features: Commit data

- A subset of the changes can be selected

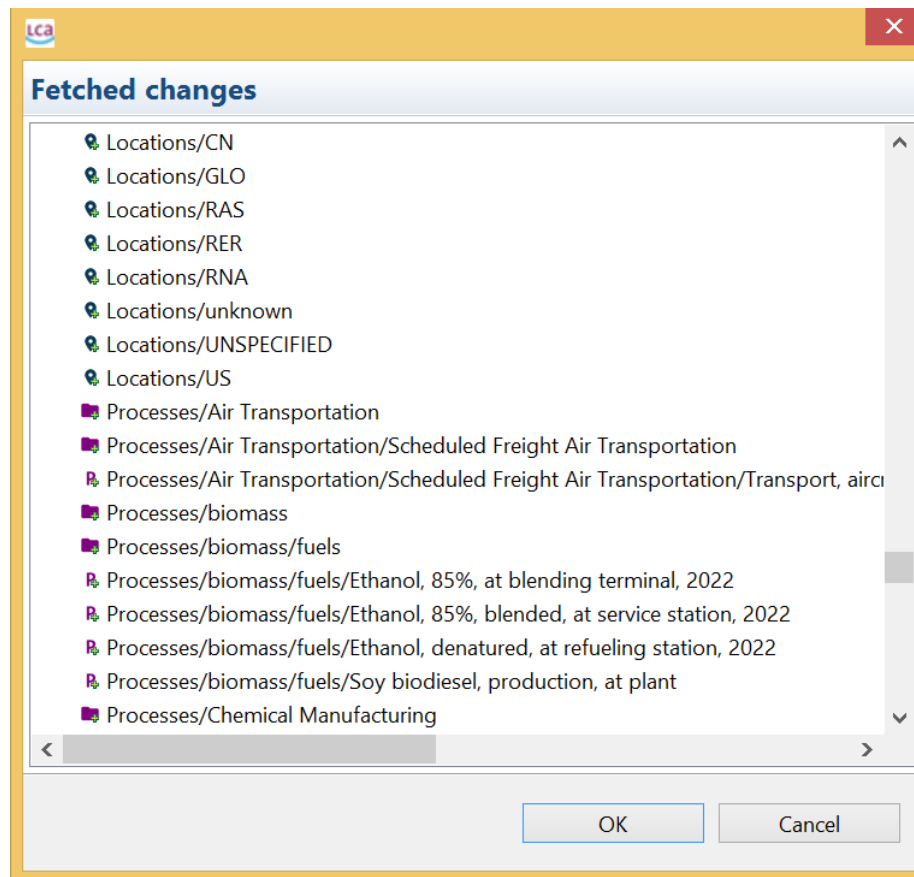


Features: Data integrity check

- Data validity checks
 - Avoid deletion of linked data
 - Avoid upload of incomplete data
- Protection of library data
 - Warning is shown when trying to commit changes

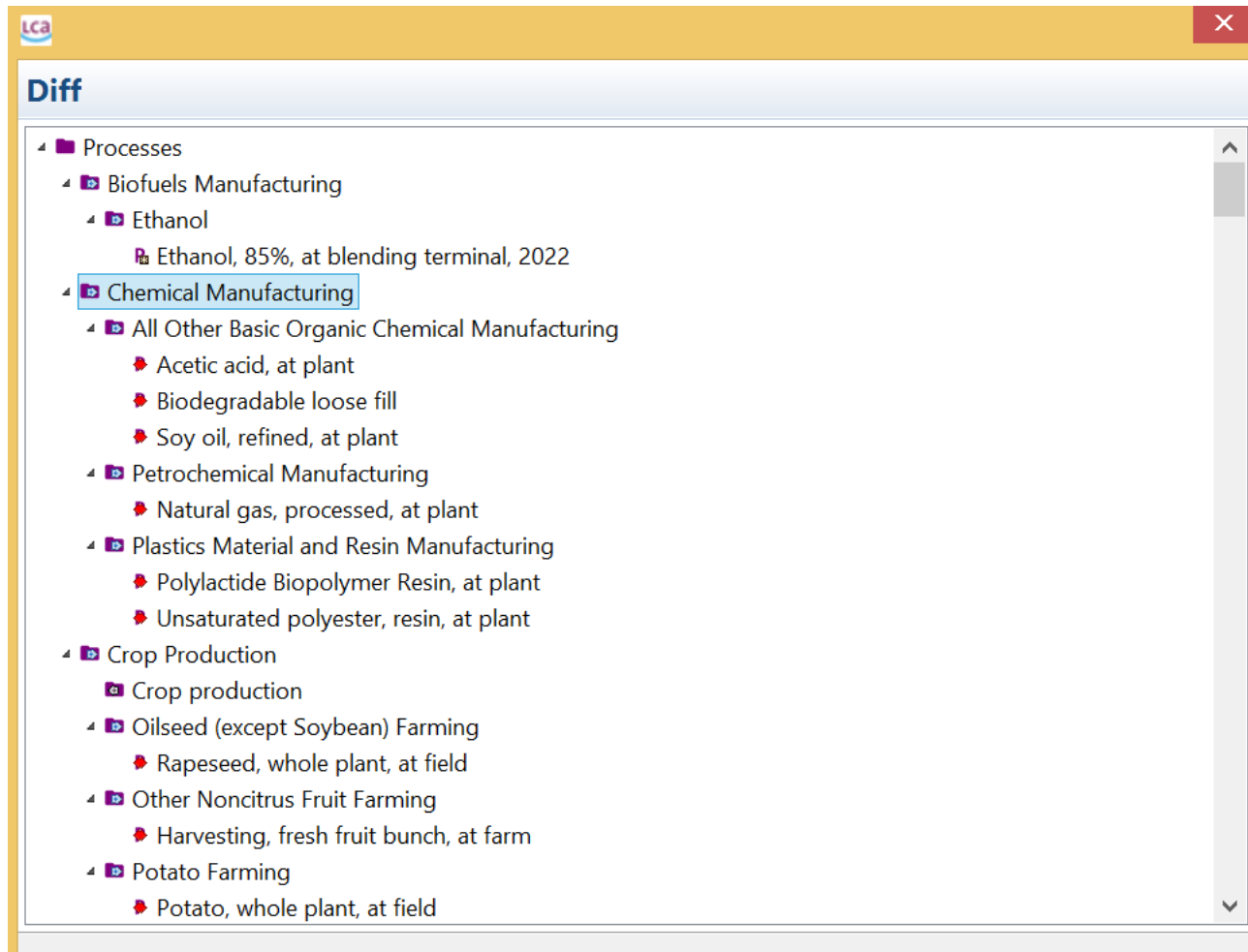
Features: Fetch data

- Synchronize changes on the remote repository with your local database (Fetch)



Features: Fetch data (Diff tool)

- Merge conflicting changes (Diff tool)



Features: Fetch data (Diff tool)

The screenshot displays the Lca Diff tool interface. The window title is "Diff: biomass/fuels/Ethanol, 85%, at blending terminal, 2022". The interface is split into two panels: "Local model" on the left and "Remote model" on the right. Both panels show the same process details, but with differences in the "Category" and "Inputs" sections highlighted in yellow.

Local model details:

- Name: Ethanol, 85%, at blending terminal, 2022
- Description: transport of gasoline is accounted by using the ecoinver
- Category: Ethanol
- Process type: Unit process
- Location: RNA
- Infrastructure process: No
- Process documentation
- Inputs:
 - 1: Energy, output, from gasoline
 - 2: Ethanol, denatured, at refueling station, 2022
 - 3: CUTOFF Liquid storage tank, chemicals, organics
 - 4: Electricity, at grid, US, 2008
 - 5: Gasoline, at refinery
 - 6:
- Outputs


Remote model details:

- Name: Ethanol, 85%, at blending terminal, 2022
- Description: transport of gasoline is accounted by using the ecoinver
- Category: fuels
- Process type: Unit process
- Location: RNA
- Infrastructure process: No
- Process documentation
- Inputs:
 - 1: Energy, output, from gasoline
 - 2: Ethanol, denatured, at refueling station, 2022
 - 3: Dummy_liquid storage tank, chemicals, organics
 - 4: Electricity, at grid, US, 2008
 - 5:
 - 6: Gasoline, at refinery
- Outputs

A "Mark as merged" button is located at the bottom right of the interface.

Features: Commit history

- View commit history
- Check out at specific commit states

Commit history 

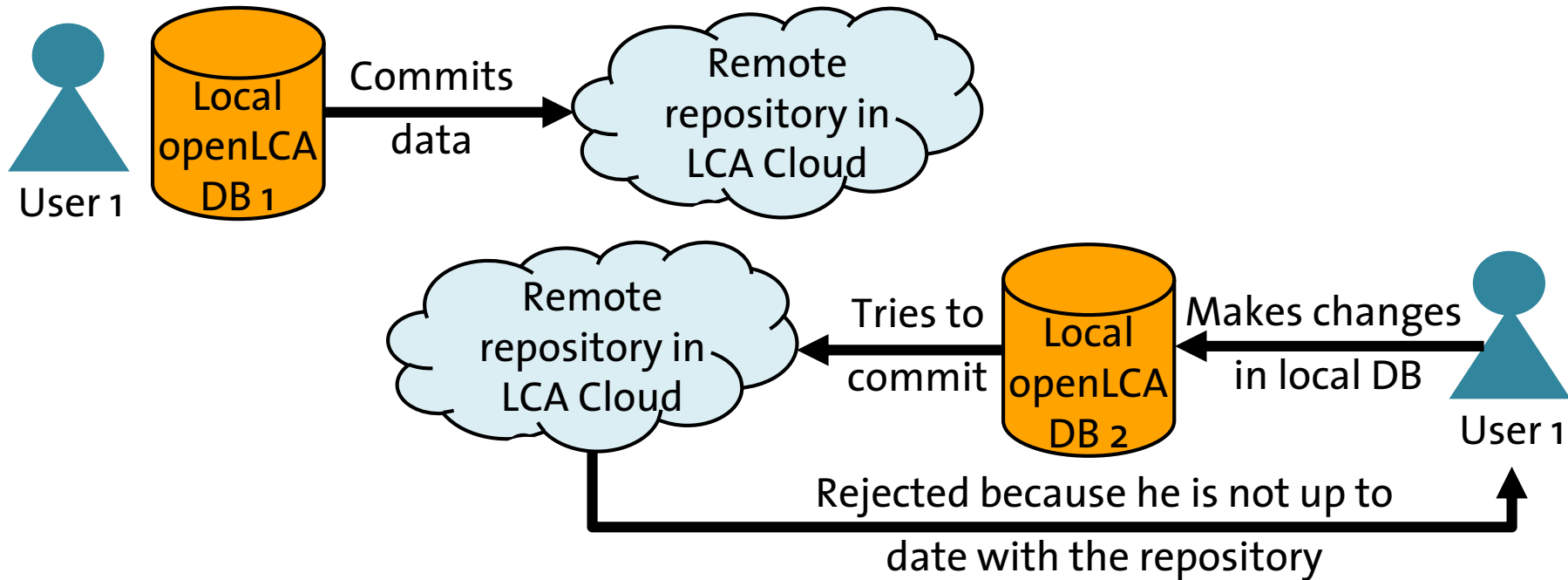
#Id	#Message	#Committer	#Committed date
5d58f61c-6...	test to see the new icons, plus parameter bug solved in this process	ciroth	3 weeks ago
46a51944-...	second product added	ciroth	4 weeks ago
555fa661-2...	infrastructrure added	ciroth	4 weeks ago
5122308d-...	now also the flows committed for the beta process	ciroth	4 weeks ago
ccd26a7d-...	1st commit test, artificial processes from boku	ciroth	4 weeks ago
5357af20-1...	Initial check-in	greve	1 month ago

#Checkout...
Copy

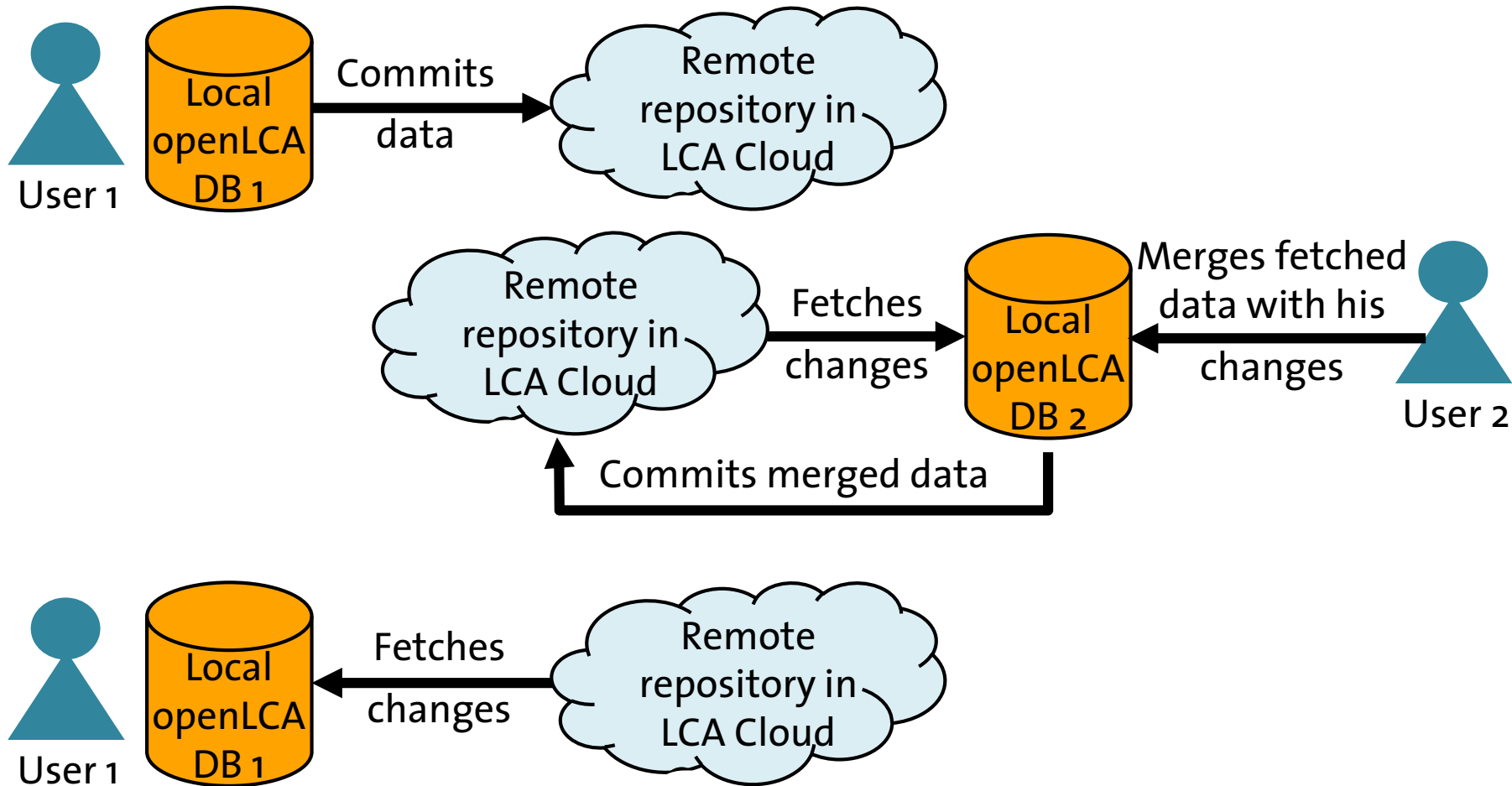
Name: test series no 5
P Process: test series no 5
F Product: test series no 5
Flow property: Mass
Unit: kg
Target amount: 0.2
P Processes
P 1: test series no 2
P 2: test series no 3
P 3: test series no 4

test series no 5
test series no 3
test series no 1
P test series no 1

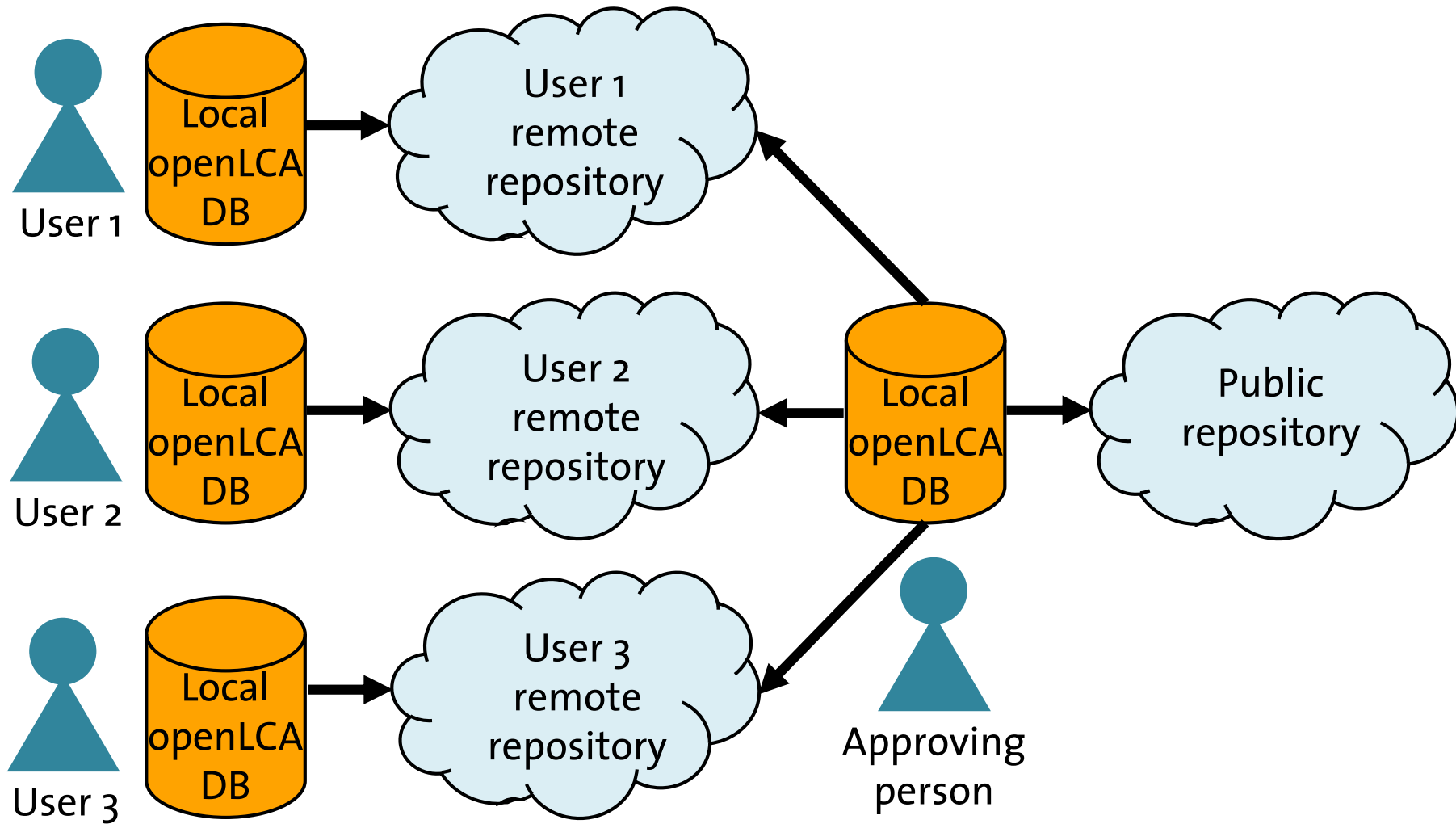
Use case scenario I: Data collaboration



Use case scenario I: Data collaboration

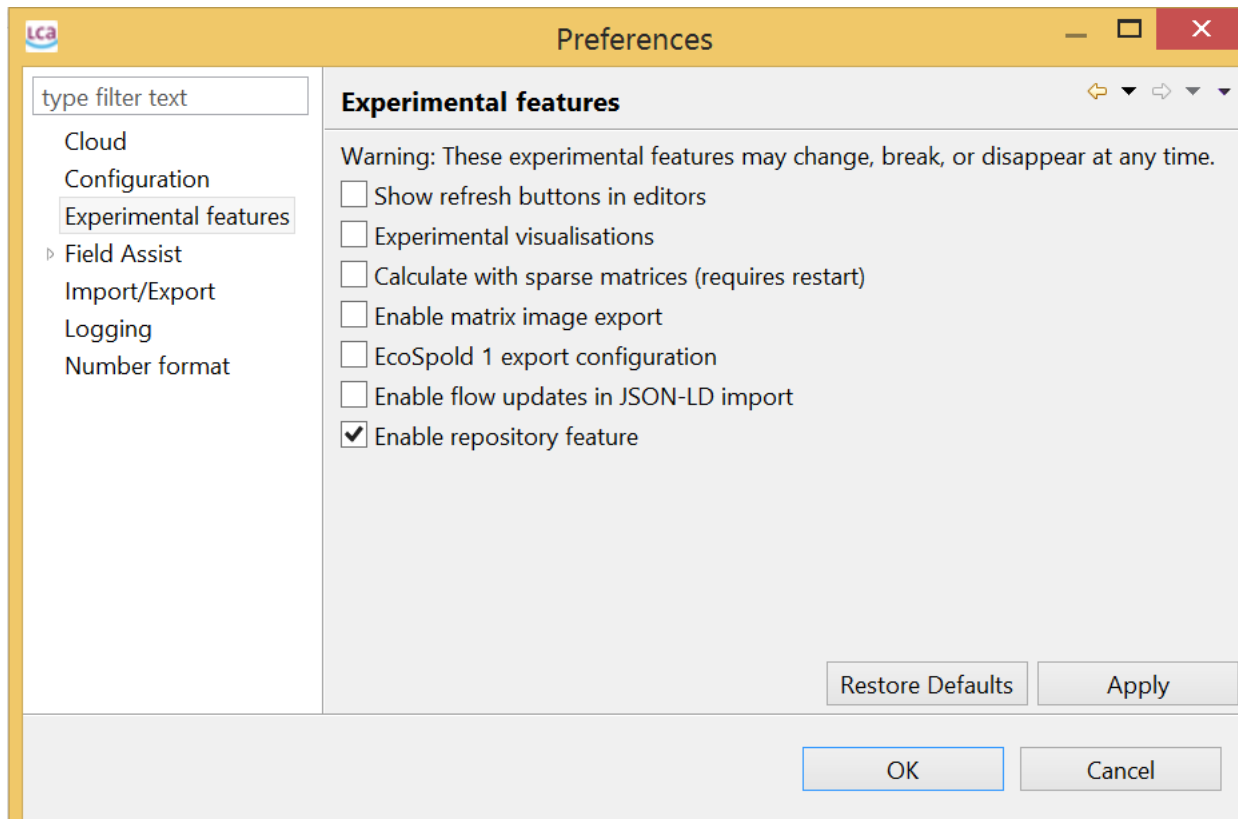


Use case scenario II: Editorial



Status of LCA Cloud

- Basic functionalities are included in openLCA 1.5.0 beta 1 as “Experimental feature” since January 2016



Outlook

- Extended and usability features will be included in next version of openLCA

→ A beta version with a fully featured web-application is currently being tested by openLCA partners

Conclusions

- Very powerful and complete tool for group work and data sharing:
 - Independent repositories and group of repositories
 - User/Team roles per repository/group
 - Data validity: linear workflow, validity checks
 - Web-view of repositories and download of data sets
- Very flexible:
 - Selection of data to commit
 - Merging of conflicting changes
 - URLs that can be called + Java API to connect to the web-services and all other features in openLCA open source

Acknowledgments

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United States Department of Agriculture
National Agricultural Library

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Merci!

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