DSpace Developer Meet-Up and Q&A





Priorities for DSpace 8

DSpace 8.0 had a shortened development cycle and DSpace Steering established four priorities

Include major features which just missed the 7.x series of releases

FEATURES INCLUDE



- > COAR Notify
- > OpenAIRE Correction service
- Port "REST-based Quality Control Reports"
- Basic Duplicate Detection in Submission form

2

New features which empower users (focus on the Admin User Interface)

FEATURES INCLUDE



- Request withdrawal or reinstatement of Items
- "Processes" page reorganization
- Edit Item supports authority control lookup & lookup via external sources
- Item Submission forms can be configured for entire Community

3

Any other features which existed in 6.x but missed the 7.x series of releases

FEATURES INCLUDE



- > Advanced Search
- Search facets on Homepage / Community / Collection
- Search within Community /Collection

4

Necessary bug fixes, accessibility fixes, performance improvements & dependency upgrades

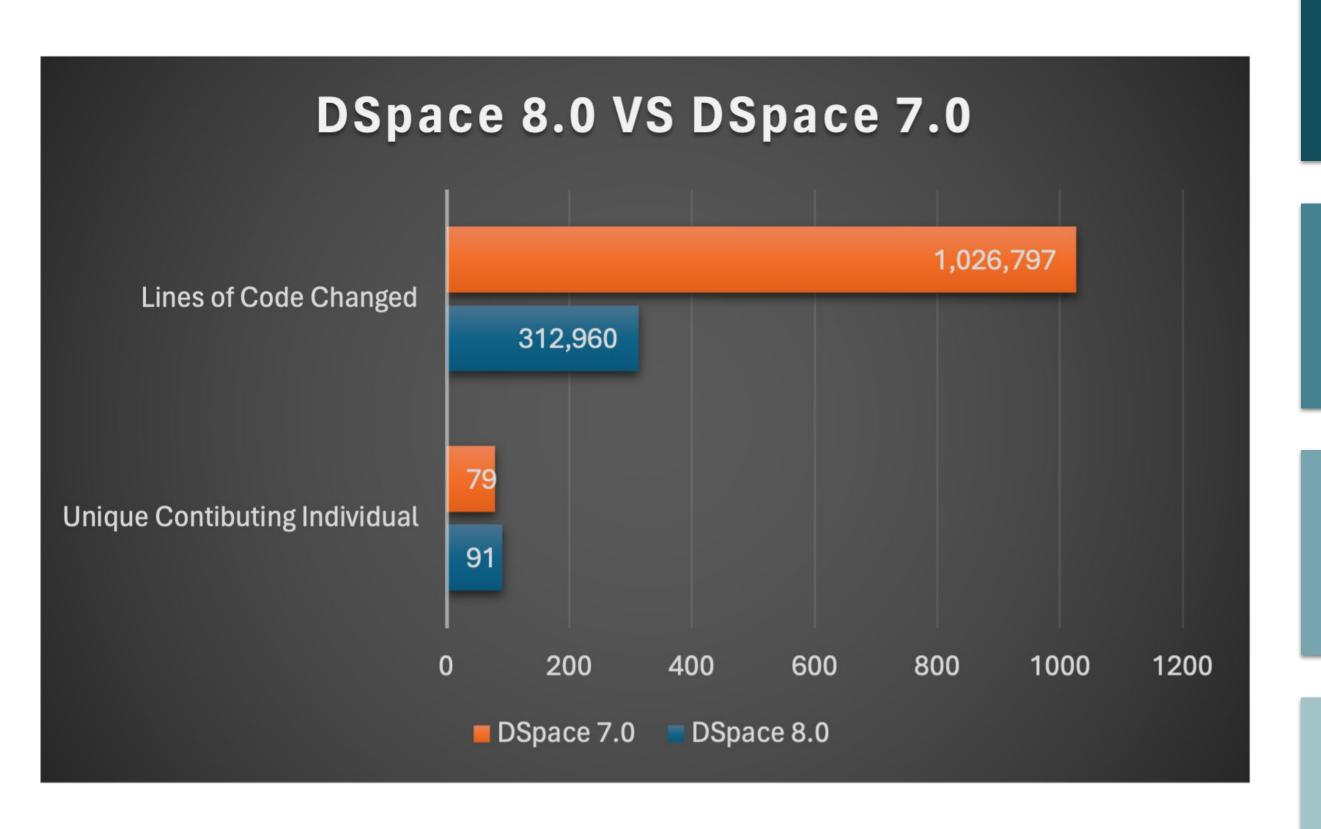
FEATURES INCLUDE



- Large number of accessibility fixes
 (header, navbar, search, admin tools,
 MyDSpace, etc.)
- Accessibility fixes backported to 7.6.2 (due in July/Aug)
- Major dependency upgrades:
 - Backend upgraded to Spring v6
 - Frontend upgraded to Angular 17



8.0 Statistics



>6,000 lines of code refactored for the dependency upgrades

Testathon revealed a number of bugs which were the result of these upgrades.

Community developers are still resolving them.

DSpace 8.0 release: Approx. June 17-24



DSpace 8.0 Feature Preview (Part 1)

OpenAIRE Data Correction & Publication Claim, COAR Notify, and more...



DSpace 8 Features - Publication Claim

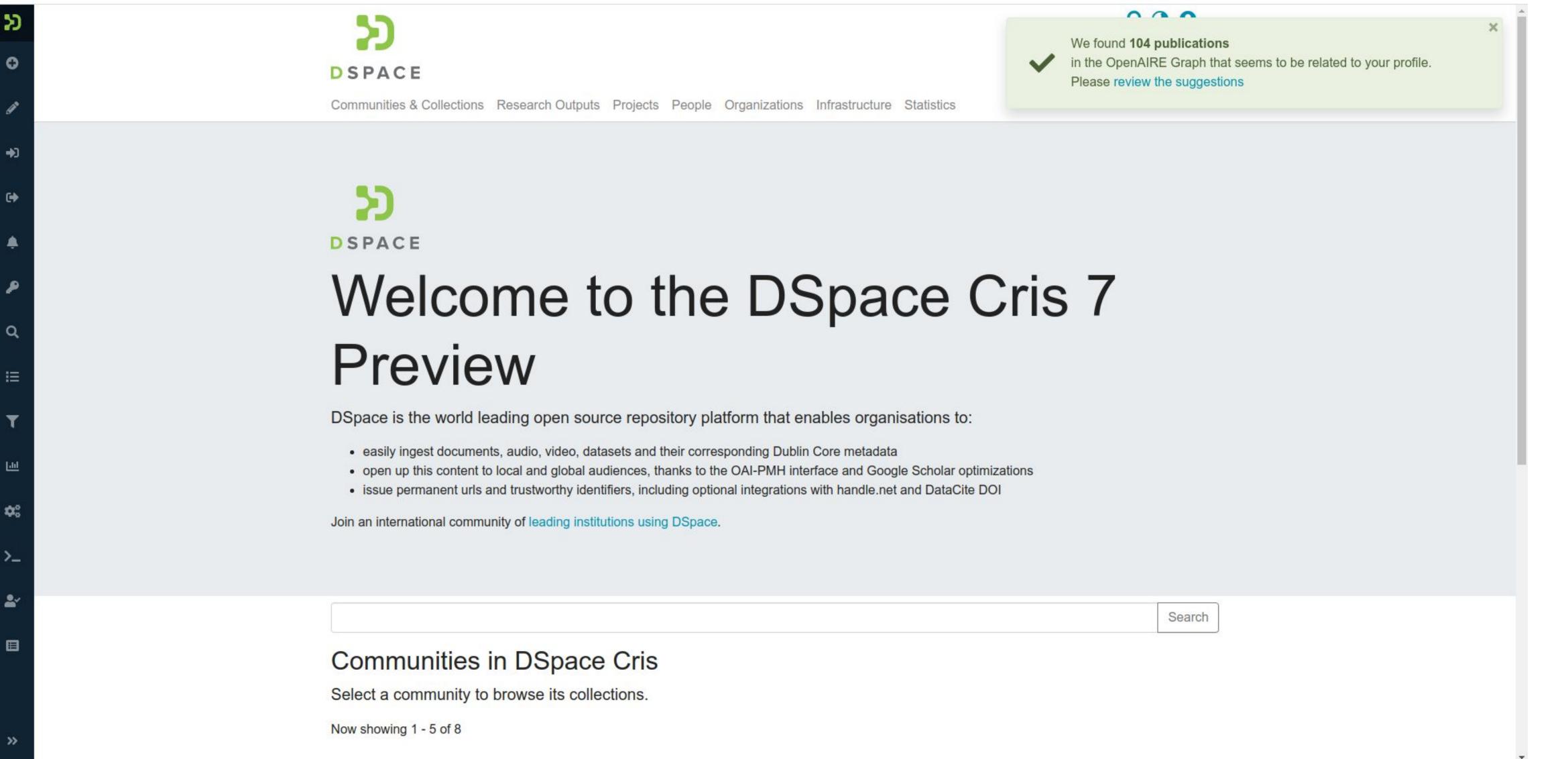
- Content exists elsewhere: assure that your repository showcases all the production of your community
- It is the result of the OpenAIRE ELD project awarded by 4Science back in 2020 and first implemented in DSpace-CRIS in 2021 now finally available in DSpace 8

A new researcher joins the institution and logins for the first time in the repository.

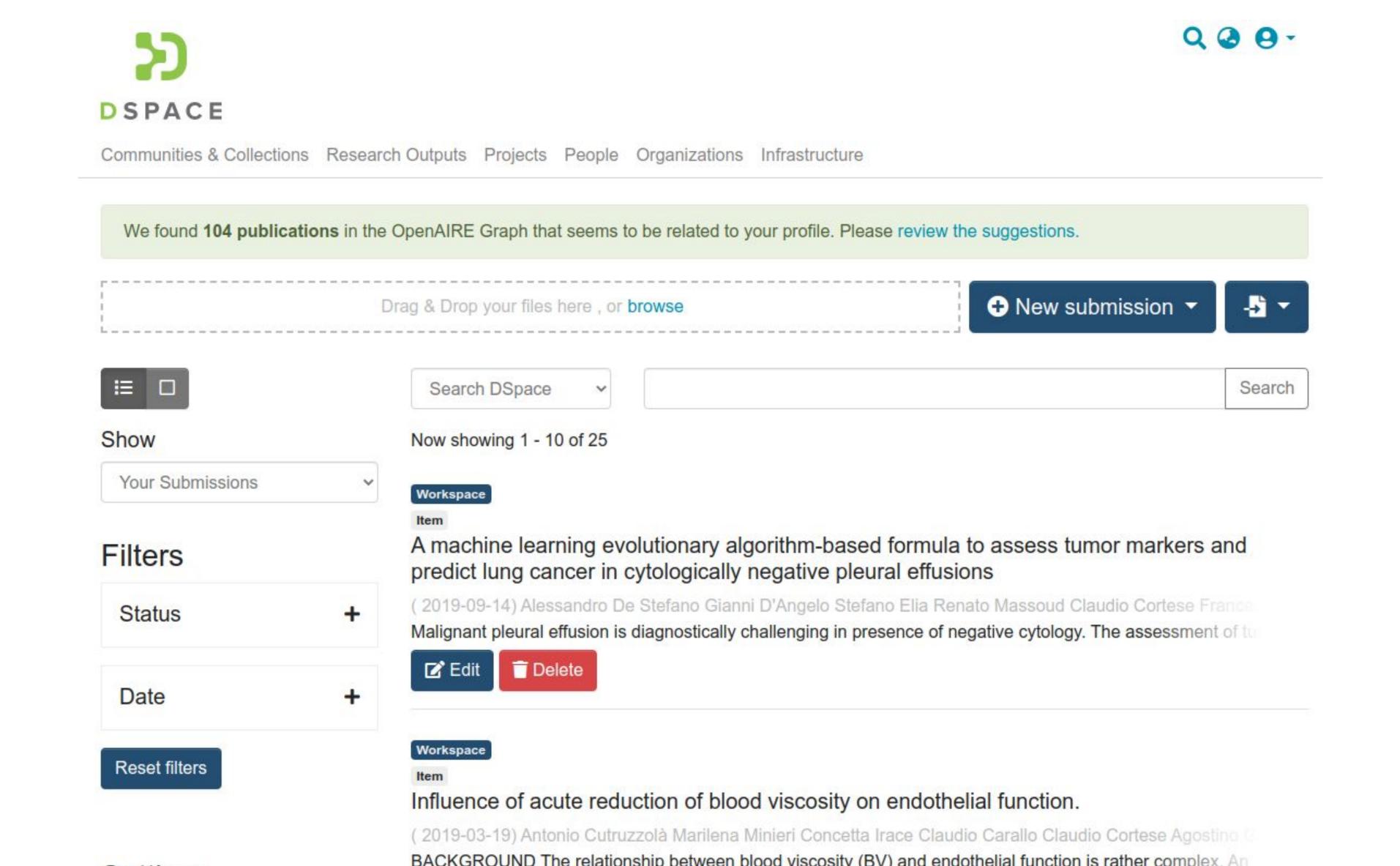
The publication claim service found most of their publications and prompts for import.

The researcher reviews the list, confirms the authorship and imports the publication saving a significant amount of time....











Suggestion for Claudio Cortese from the OpenAIRE Graph ✓ Approve & import Selected ▼ Select / Deselect All (10) Not mine Selected Now showing 1 - 10 of 110 * Processi di trasformazione nel suburbio di Mediolanum tra tarda età repubblicana e media età imperiale. Il caso dell'area dell'Università Cattolica CORTESE, CLAUDIO **Total Score** Nell'area oggi occupata dall'Università Cattolica del Sacro Cuore di Milano a partire dal 1986 scavi di emergenza 100.00 hanno messo in luce una porzione del suburbio occidentale di Mediolanum, e in particolare una realtà insediativa suburbana di età imperiale. Un'ampia area di tale insediamento è stata oggetto della presente ricerca che See evidence ✓ Approve & import • Semantic Search and Browsing nell'ambito dei Beni Culturali Cortese, Claudio Negli ultimi anni, il mondo dei beni culturali si sta rivelando una delle aree più promettenti e stimolanti per quanto **Total Score** concerne la sperimentazione e la diffusione degli standard e delle tecnologie che rientrano nell'ambito del 100.00 ~ "Semantic Web". All'organizzazione dei dati secondo gli standard semantici si accompagna la necessità di Approve & import * Not mine See evidence MTHFR gene polymorphism, homocysteine and cardiovascular disease. (2008-06-03) Corradino Motti: Claudio Cortese AbstractHomocysteine is an emerging new risk factor for cardiovascular disease. It is a thiol compound derived Total Score from methionine and involved in two main metabolic pathways: the cycle of activated methyl groups, requiring 100.00 folate and vitamin B12 as cofactors, and the transsulfuration pathway to cystathionine and cysteine require See evidence ✓ Approve & import ¬ Not mine

Taking advantage of a side effect of isotretinoin.

(2004-03-02) Claudio Cortese; Rosamaria Corona







Communities & Collections All of DSpace ▼

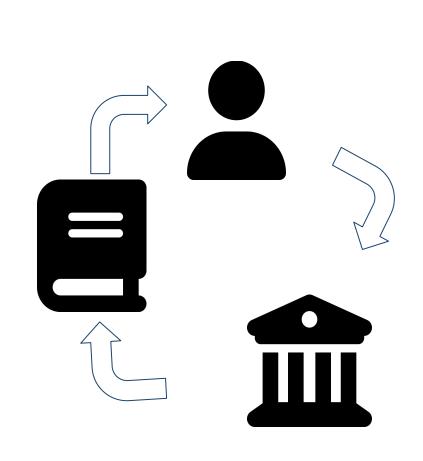


Home • Publication Claim

Publication Claim

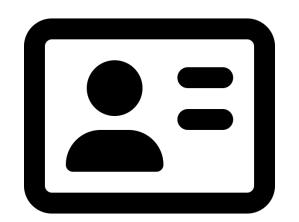
Now showing 1 - 10 of 41 **Researcher Name** Actions Bollini, Andrea Review 116 suggestion(s) 9 Cortese, Claudio Review 104 suggestion(s) 9 Fazio, Riccardo Review 16 suggestion(s) 9 Mornati, Susanna Review 4 suggestion(s) 9





Configurable entities

Requires:



Researcher Profile



- It uses the generic service **Suggestion Service** to store, retrieve and process suggestions related to content potential of interest for researchers affiliated to the repository in SOLR (new **suggestion** core)
- It is open to future extensions by mean of additional suggestion providers (i.e. **ORCID**)
- The openAIRE provider includes a framework to evaluate the quality of the suggestions (i.e. assign a score)



- Show reliable and accurate information in your repository
- It is the result of two innovative projects, the previous mentioned <u>OpenAIRE ELD project</u> and the <u>ELD ADVANCE project</u> supported by the European Open Science Cloud Digital Innovation Hub

A repository manager of a repository indexed in OpenAIRE

login in the repository and see the list of improvements and

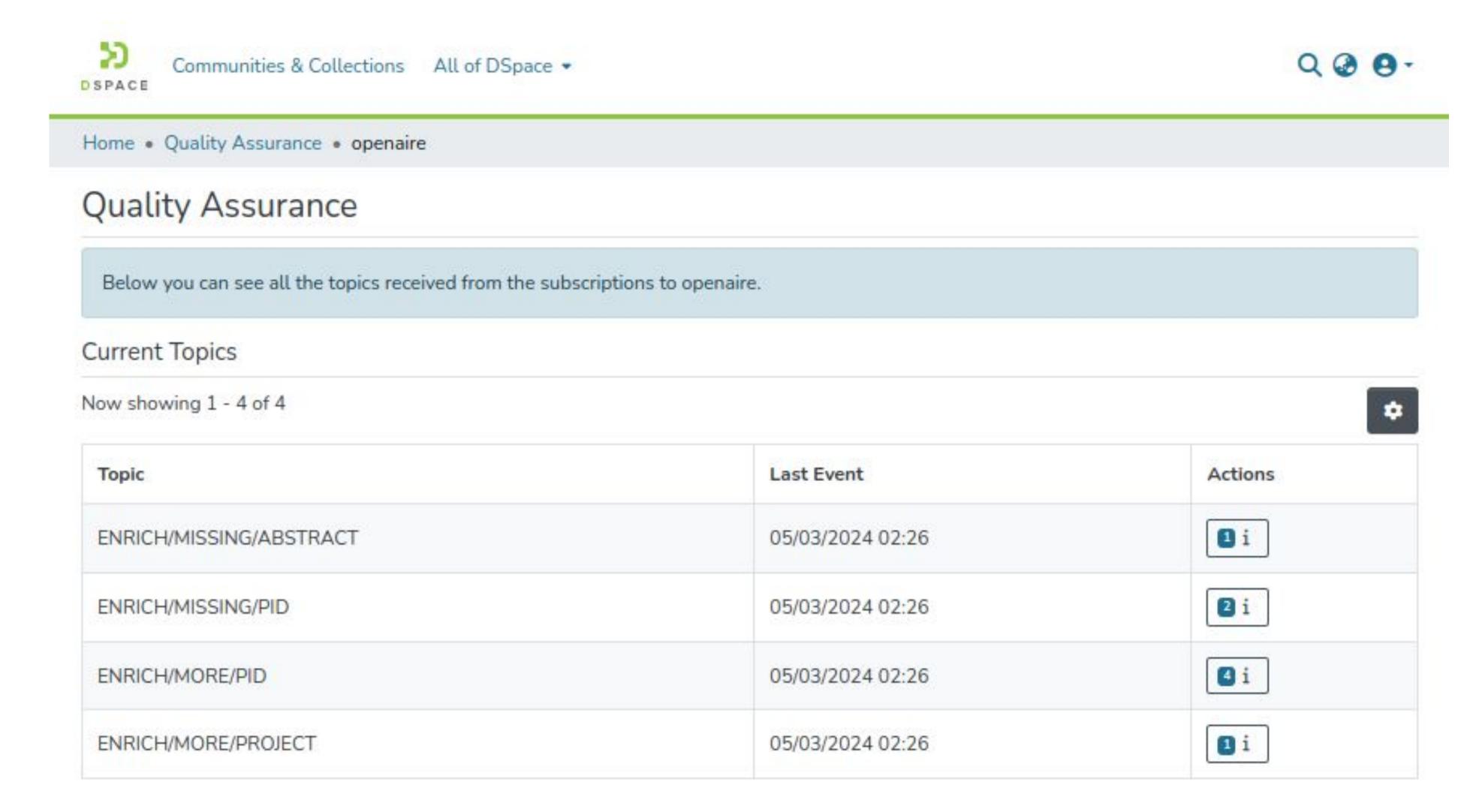
corrections identified, among others one publication that has a PMID that

was unknown to the repository and a link to a project.

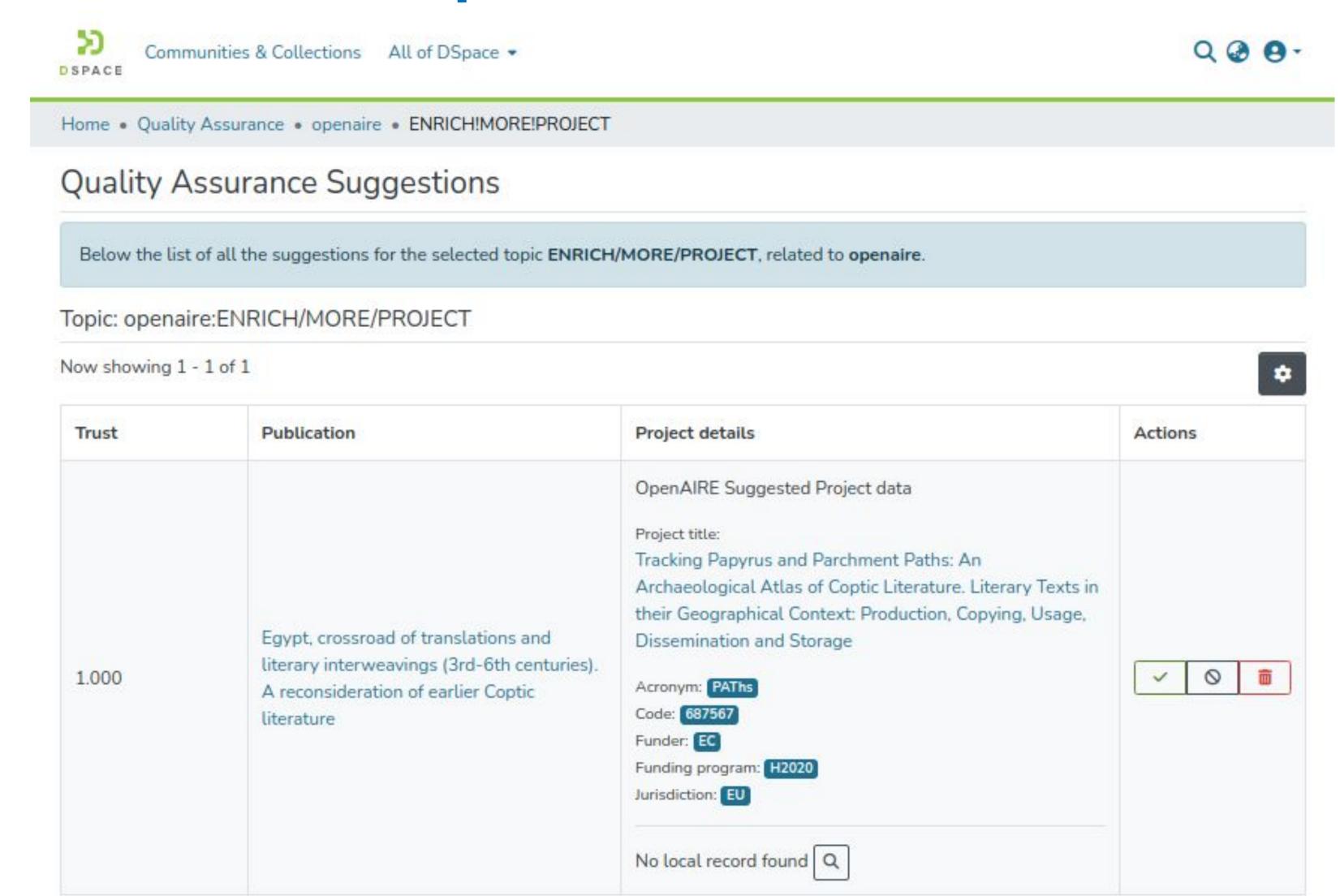
They click on the "accept the suggestion" button and the new information

is stored in the local record.

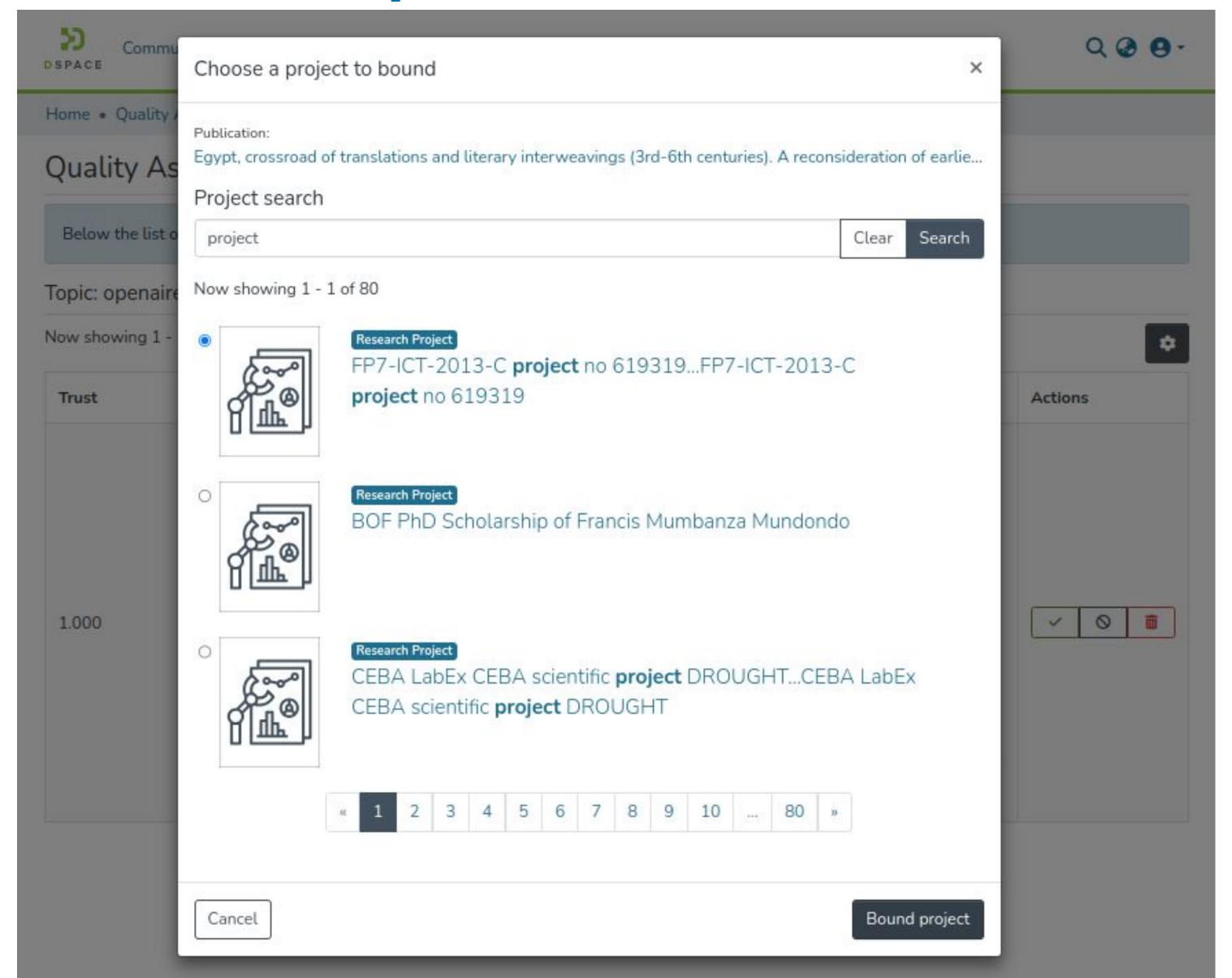








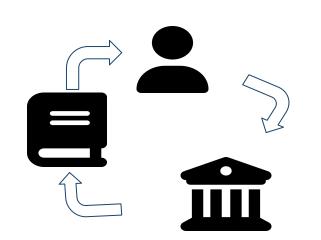








Your repository must be registered as an OpenAIRE provider

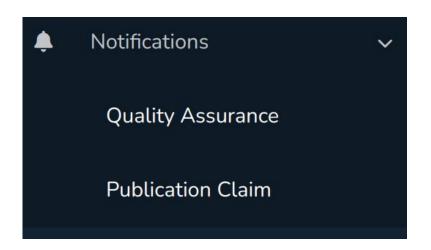


Configurable entities





Researcher Profile



Quality Assurance

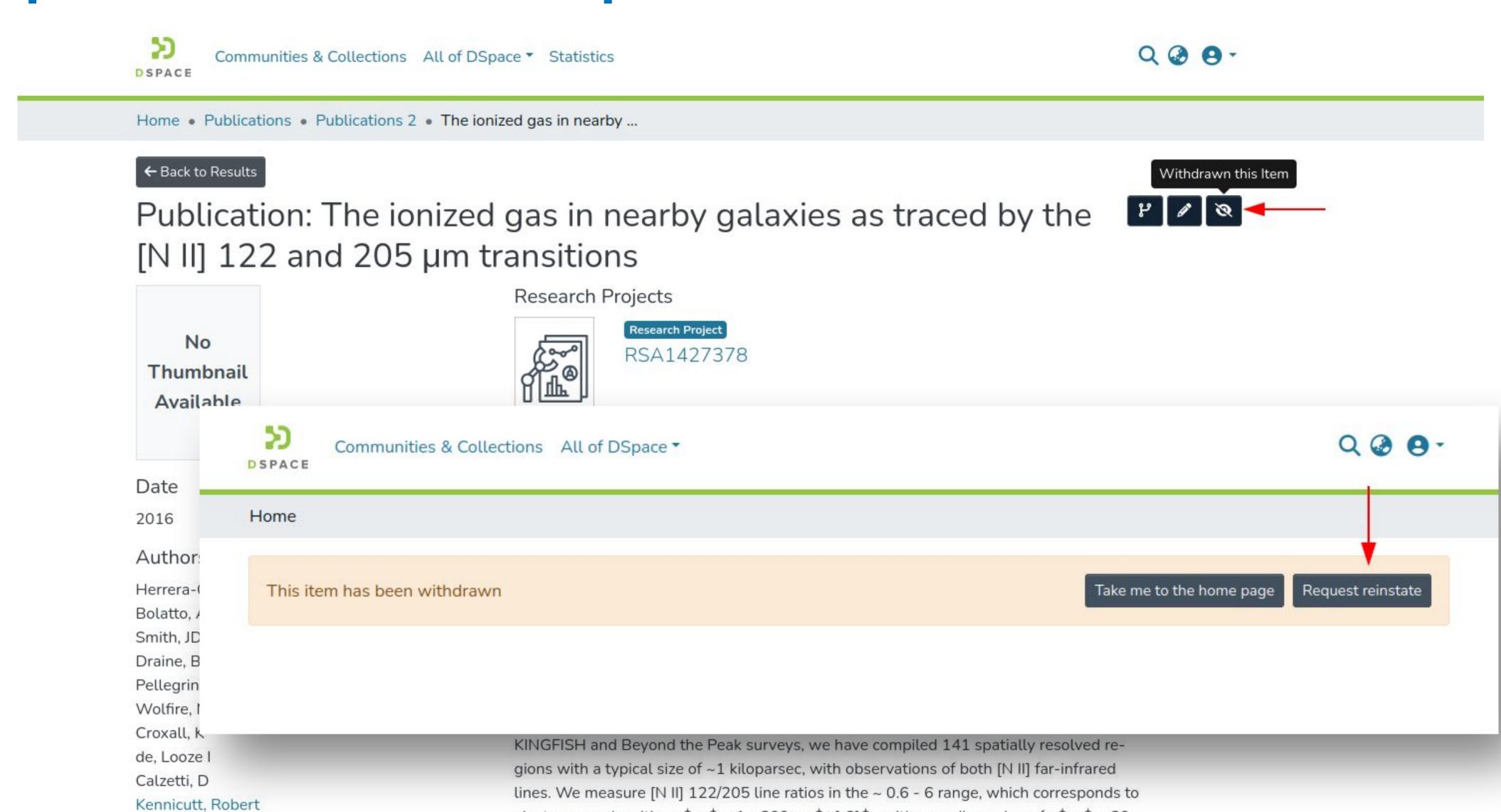


- It uses a generic service **QAEventService** to store, retrieve and process corrections related to **content already in the repository**, data are stored in SOLR (new **qaevent** core)
- It is open to future extensions by mean of additional correction providers (see next slides)
- It includes a framework to automatically process corrections according to configurable rules



DSpace 8 Features - DSpaceUsers Data Correction

Show 10 more



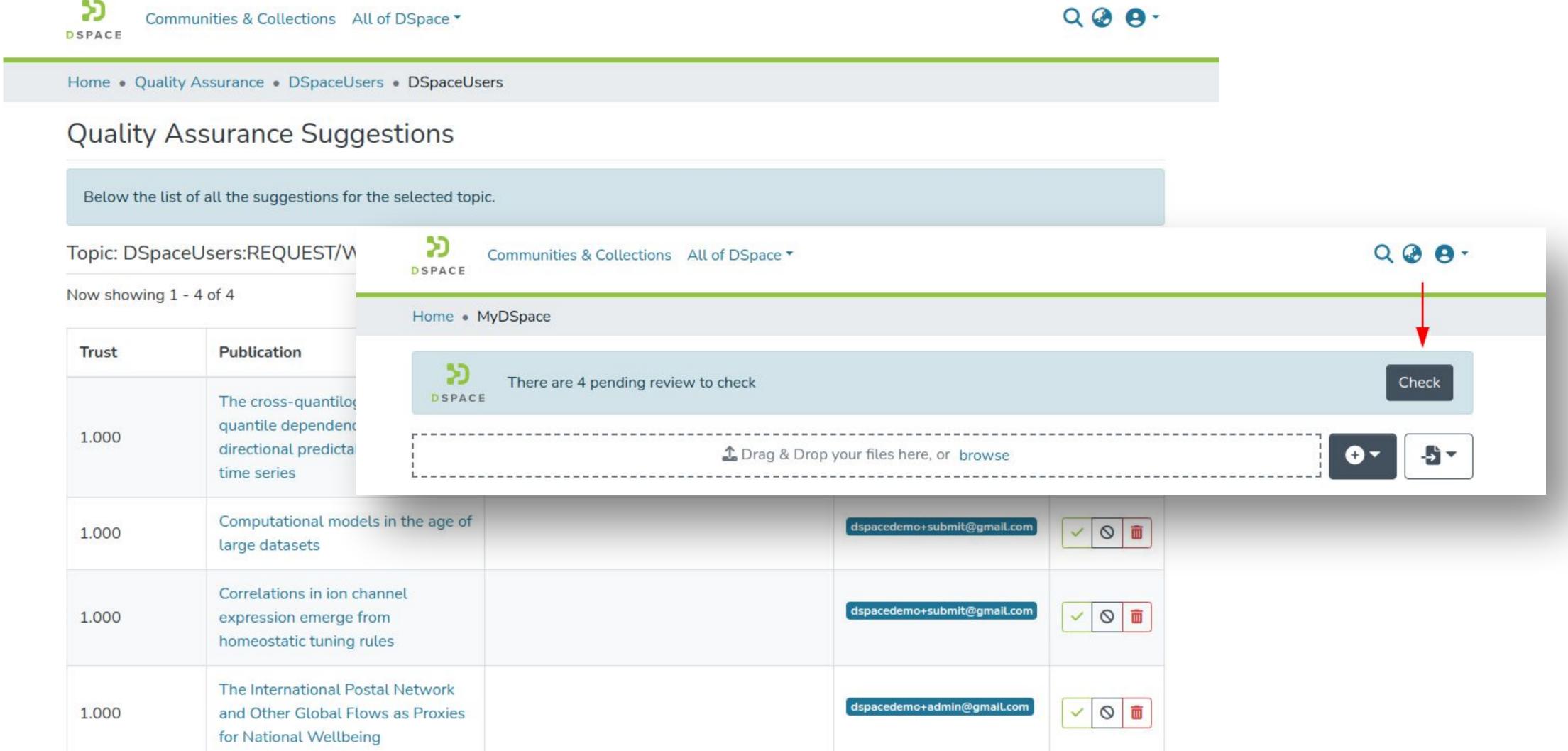
electron gas densities $n_e^* = 1 - 300 \text{ cm}^{-3}$, with a median value of $n_e^* = 30$

cm\$^{-3}\$. Variations in the electron density within individual galaxies can be as a high

as a factor of ~ 50, frequently with strong radial gradients. We find that n\$_e\$ increases



DSpace 8 Features - DSpaceUsers Data Correction





DSpace 8 Features - DSpaceUsers Data Correction

- It is another provider of the Data Correction functionality just presented, it generates **QAEvent**
- It collects correction proposals by the DSpace Users (DSpaceUsers source), currently the following CorrectionType(s) are provided:
 - request to withdrawal
 - request to reinstate
- Thanks to the previous mentioned processing framework it allows automatic approval of request according to flexible rules (based on the ItemFilter framework)





I have a publication that uses your dataset



DSPACE

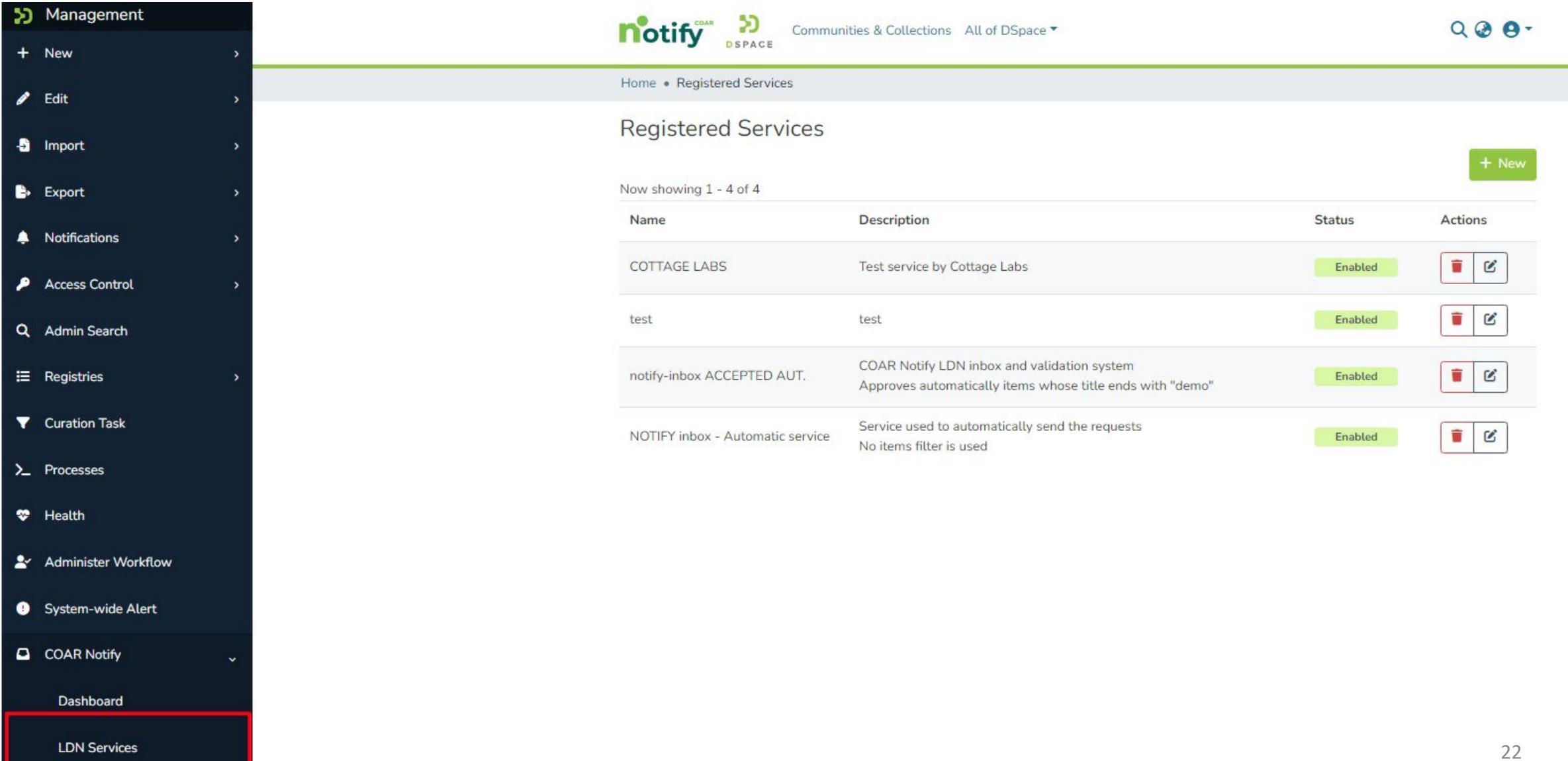
Link to a dataset is in the metadata

check if automatic notification should be triggered

LDNMessageConsumer

Link the dataset back to DSpace

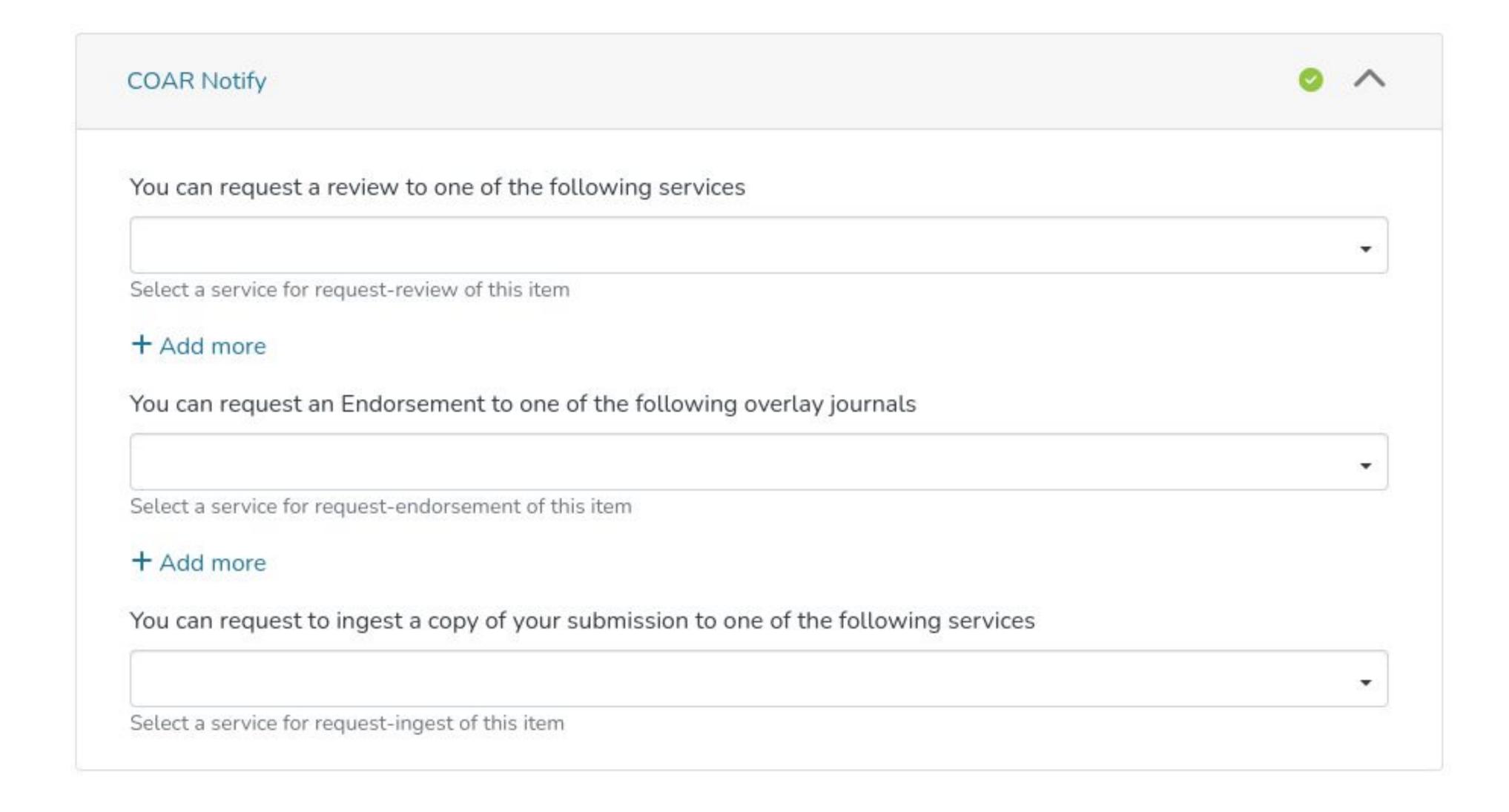




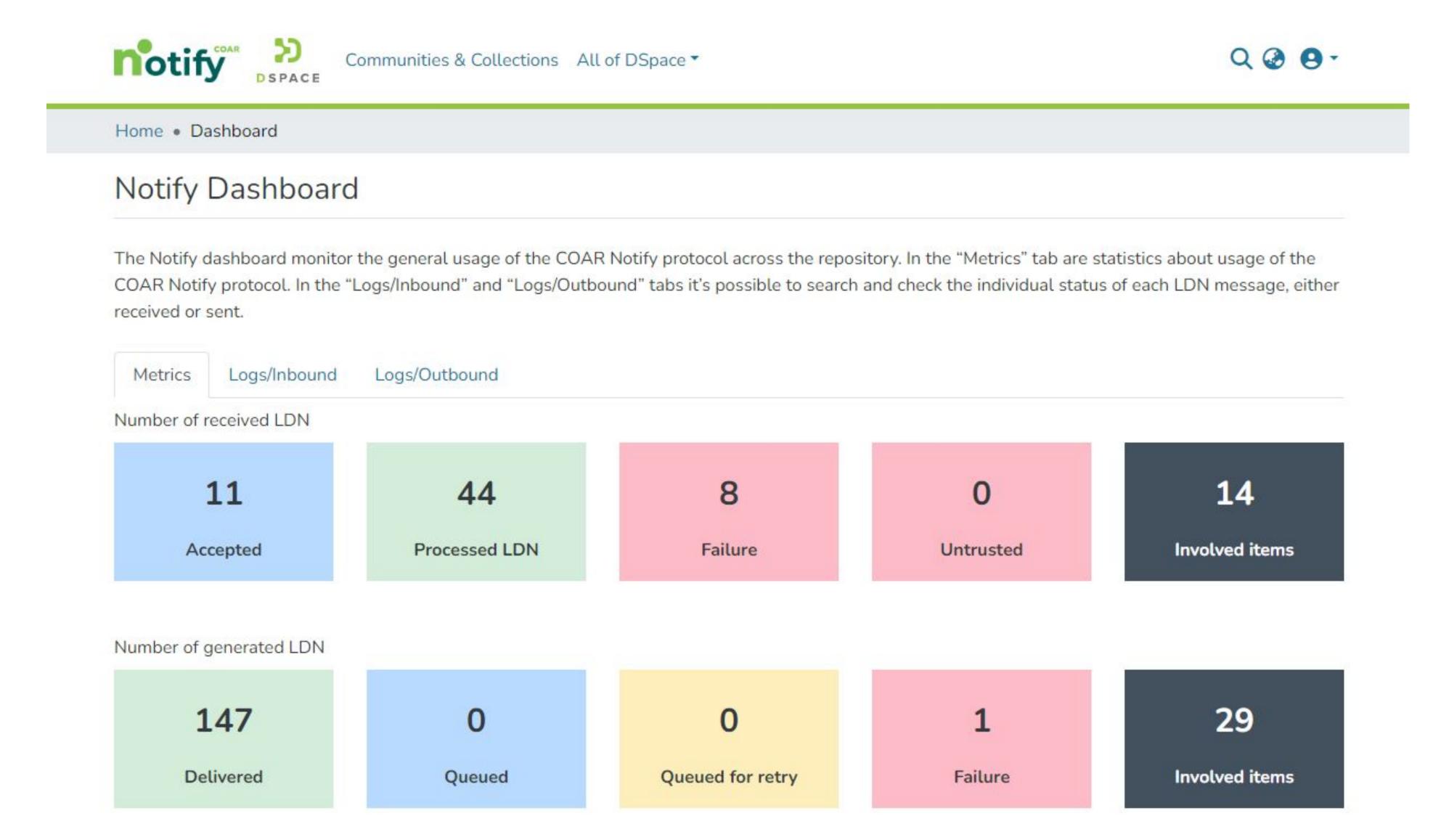


Home • Registered Services • New Service				
Create service				
Please provide service name				
Description				
Please provide a description regarding your ser	vice			
Service URL		Level of trust		
Please input the URL for users to check out more information about the service		Please enter a value between 0 and 1. Use the "." as decimal separator		
Service IP range				
Pv4 range lower bound		IPv4 range upper bound		
Please enter a valid IpV4 in both range bounds (note: fo	r single IP, please enter the sar	me value in both fields)		
LDN Inbox URL				
Please specify the URL of the LDN Inbox				
Inbound Pattern	Item Filter		Automatic	
Acknowledge and Accept		F. * 2		
+ Add more				
CONTROL CONTROL OF THE CONTROL OF TH				

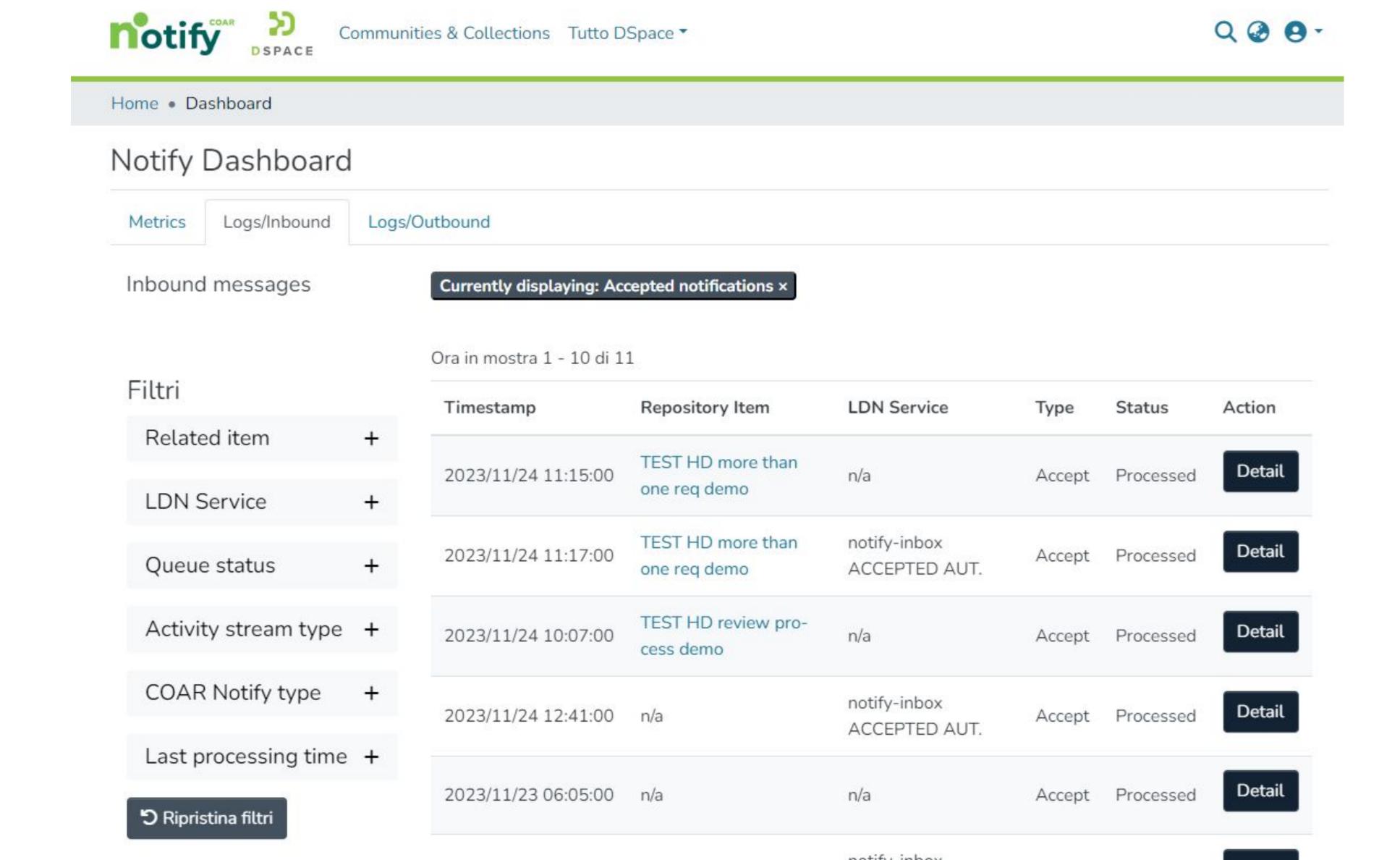




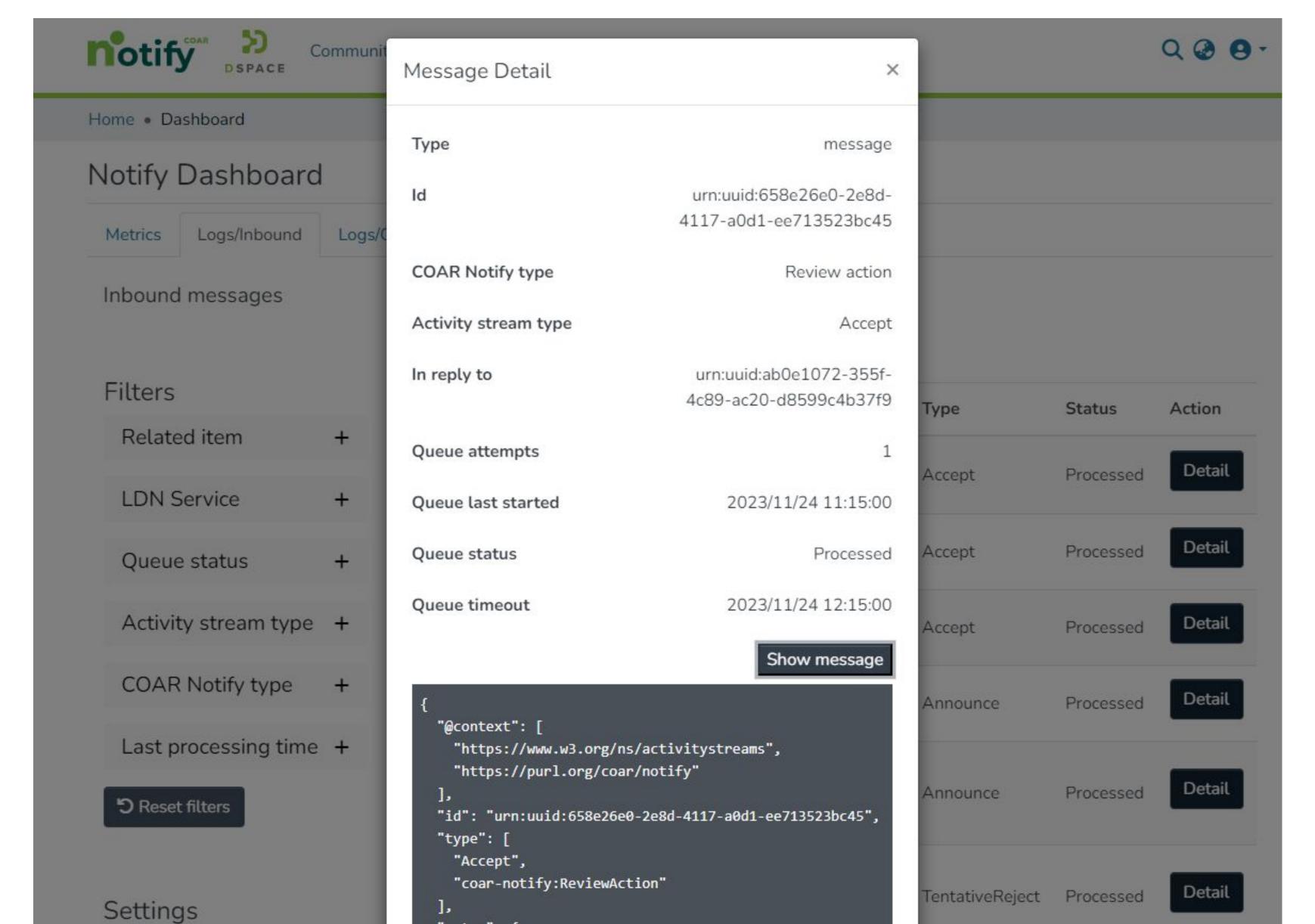




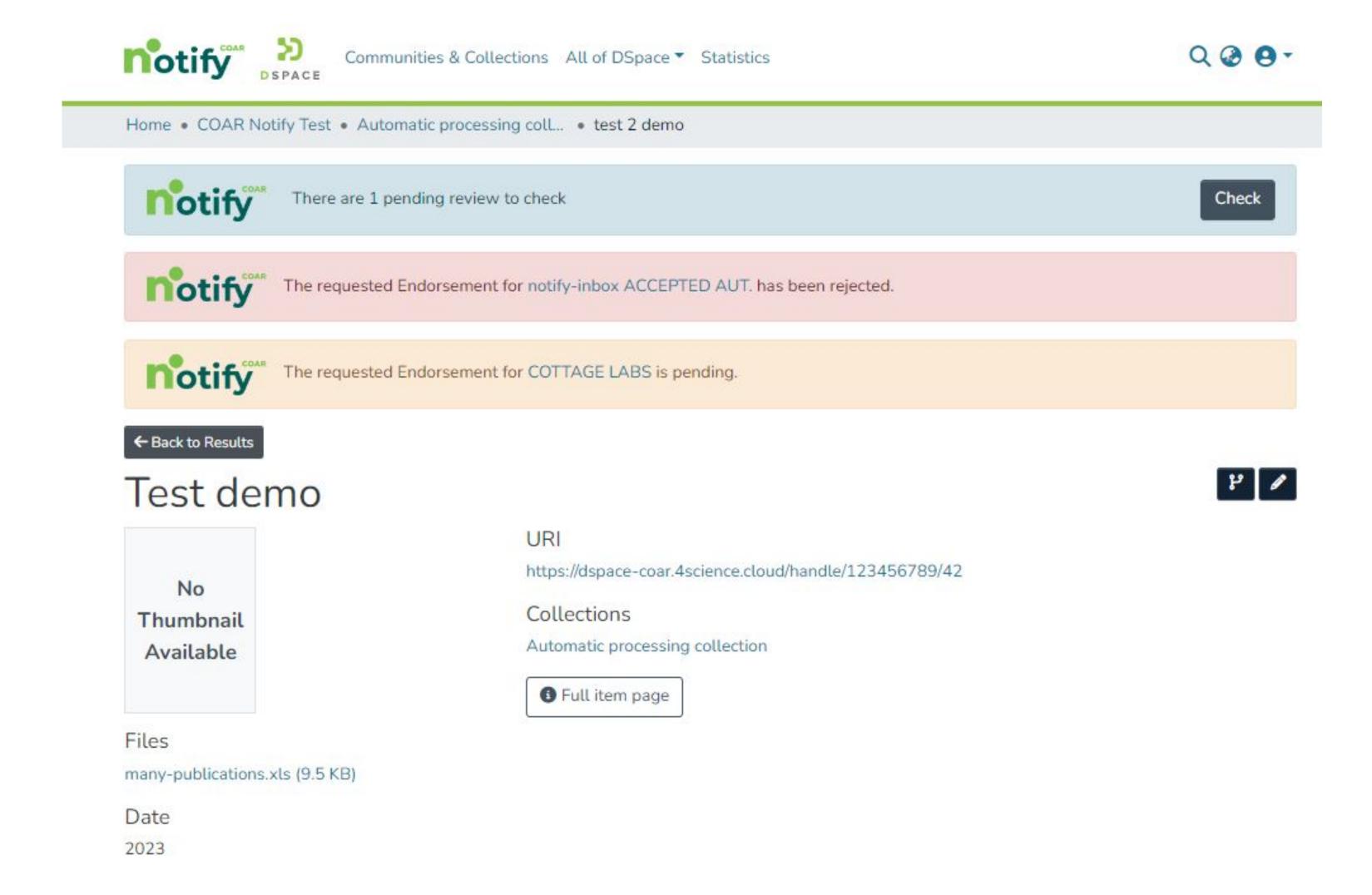






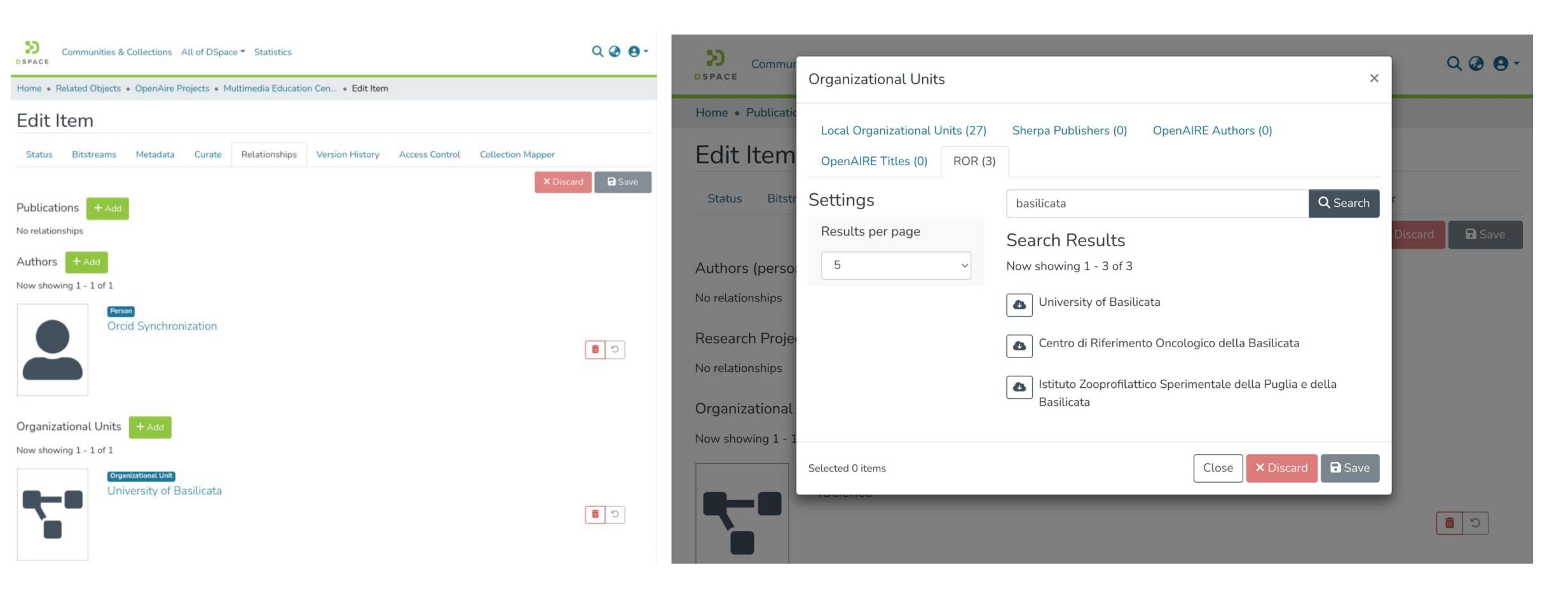






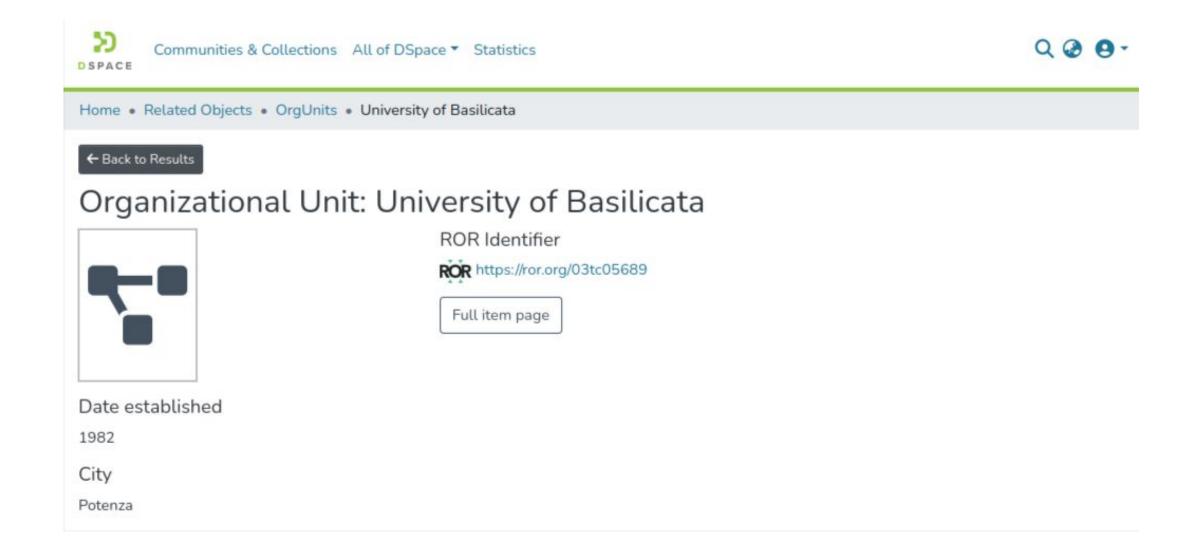


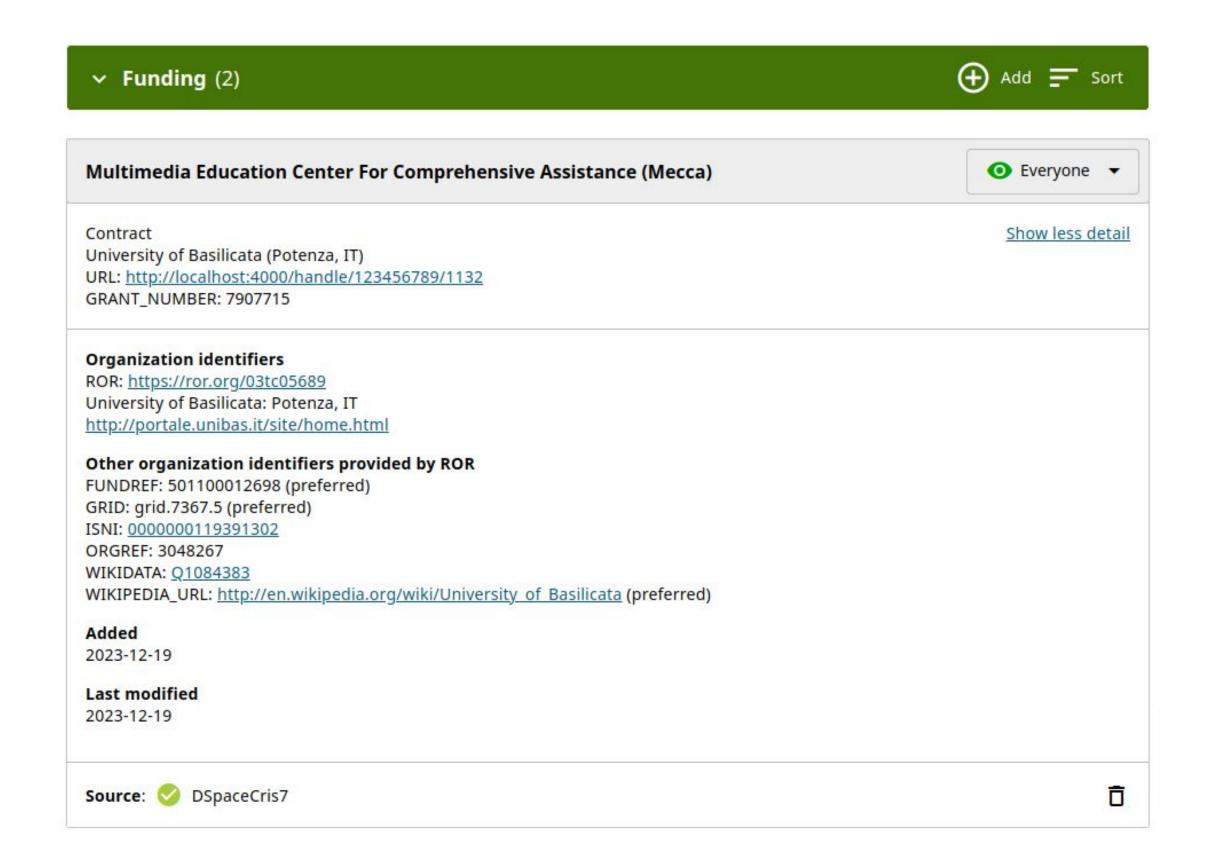
DSpace 8 Features - ROR Integration





DSpace 8 Features - ROR Integration







DSpace 8.0 Feature Preview (Part 2)

Improvements to Processes, embedded Search, Duplicate Detection, Administrative Reports, and more...



Processes Overview + New Now showing 1 - 20 of 47 Start time (UTC) Finish time (UTC) Actions **Process ID Status** User Name 58 metadata-import Express Admin 2024-03-07 20:51:21 COMPLETED 2024-03-07 20:51:20 57 metadata-import Express Admin 2024-03-07 20:50:40 COMPLETED 2024-03-07 20:50:40 56 metadata-export-search COMPLETED Express Admin 2024-03-07 20:48:13 2024-03-07 20:48:13 54 COMPLETED metadata-export-search Express Admin 2024-03-07 20:42:31 2024-03-07 20:42:31 46 metadata-export-search Atmire Client 2024-03-04 19:04:33 2024-03-04 19:04:34 COMPLETED 45 metadata-export-search Express Admin COMPLETED 2023-12-19 21:36:50 2023-12-19 21:36:50 44 metadata-export-search COMPLETED Express Admin 2023-10-25 13:26:12 2023-10-25 13:26:12 43 metadata-export-search Atmire Client 2023-06-26 22:21:19 2023-06-26 22:21:20 COMPLETED



Processes Overview

Running processes (11) >

Scheduled processes (13) >

Succeeded processes (3336) >

Failed processes (91) >



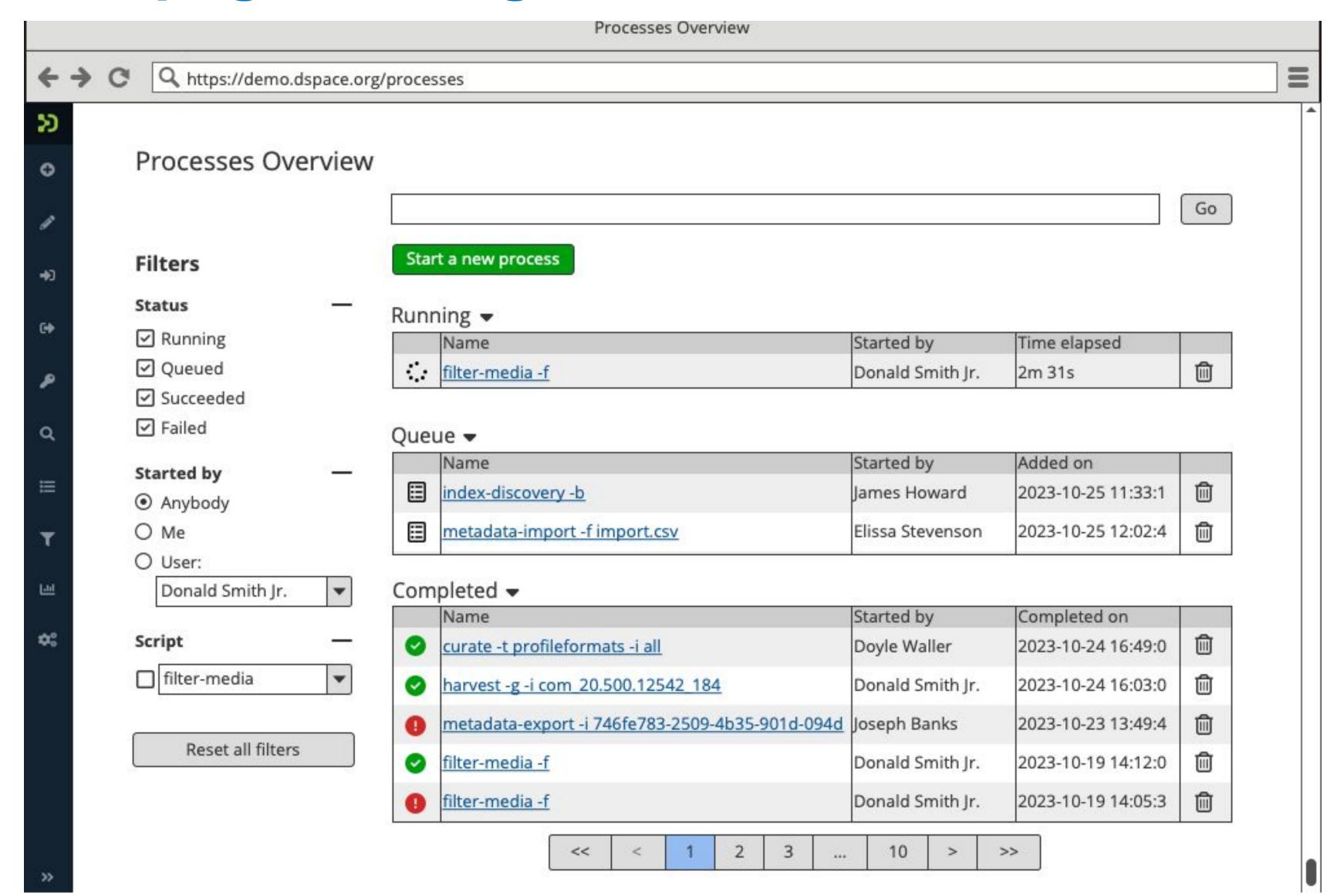


Succeeded processes 3336 v

Now showing 1 - 5 of 3336

Process ID	Name		User	Completed on	Actions
3471	metadata-export		Administrator	2024-04-11 09:28:42	
3470	metadata-import		Administrator	2024-04-09 15:06:20	
3469	metadata-import		Administrator	2024-04-09 15:05:29	
3468	harvest		Administrator	2024-04-09 15:04:21	
3467	harvest		Administrator	2024-04-09 15:04:07	
		« 1 2 3 4 5	5 668 »		







Basic Duplicate detection

Basic detection mechanism to prevent duplicate items in the repository.

- Compares item titles in SOLR with the submitted item's title
- Configurable degree of variation (uses levenshtein distance)

Duplicates can be found:

- By submitters or editors via a submission step to warn submitters or editors of potential duplicates
- By Workflow reviewers or editors through a warning for claimed and pooled tasks indicating the total number of potential duplicates.
- Through a new /duplicates REST item link which will search and retrieve a paged list of potential duplicates for any item



Basic Duplicate detection

Potential duplicates

Potential duplicates were detected. Please review the list below.

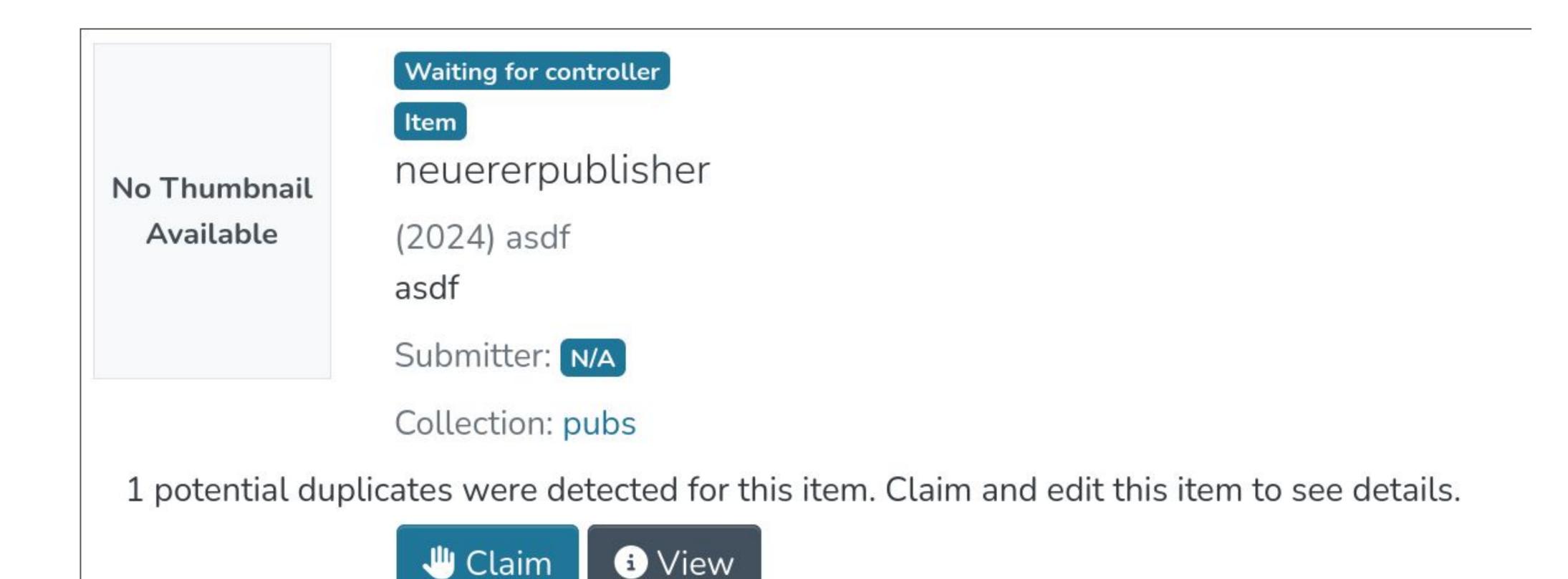
Neuerer Publisher

Title: Neuerer Publisher

Entity Type: Publisher



Basic Duplicate detection

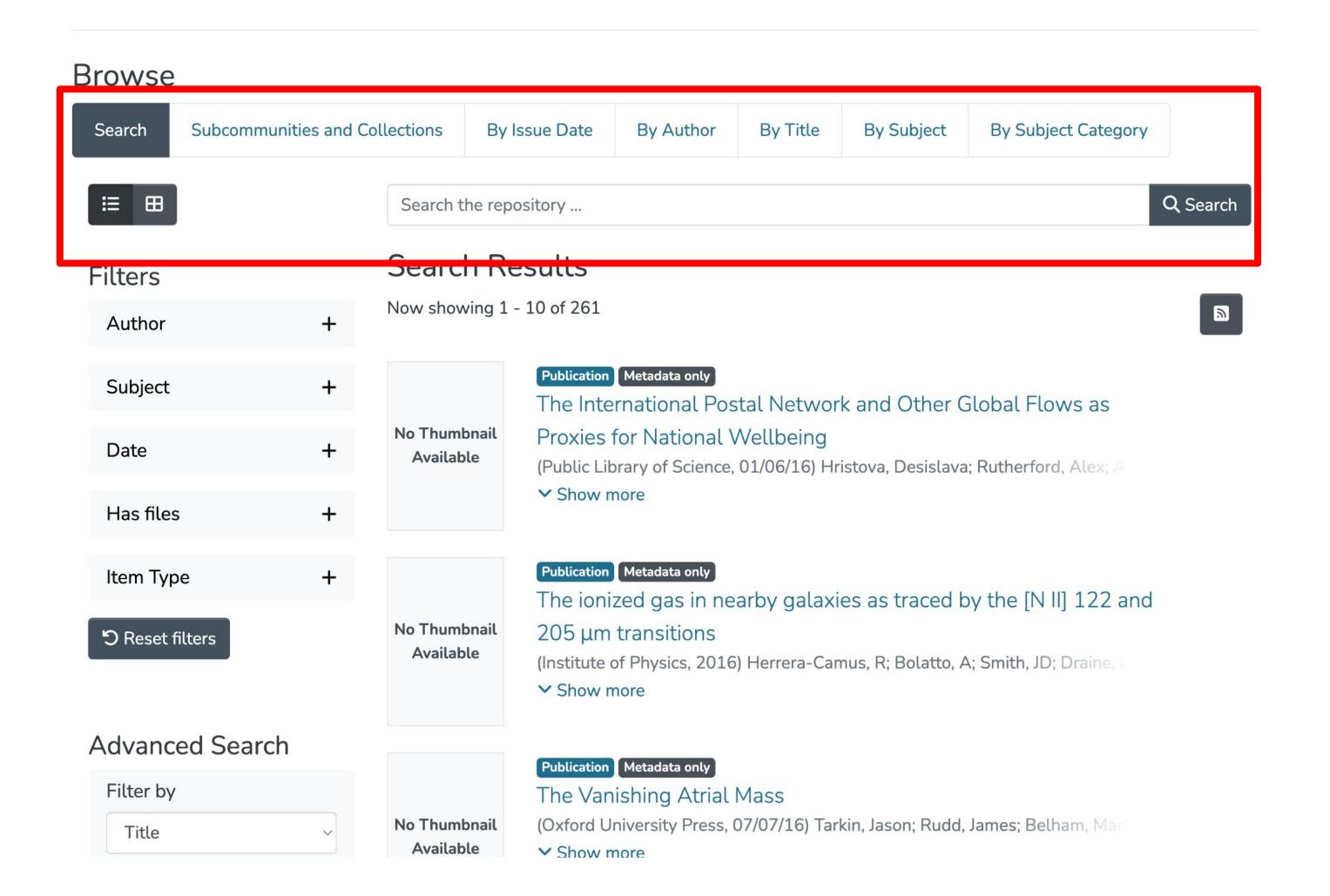




Search tab on Community/Collection pages

Publications

Permanent URI for this community https://demo7.dspace.org/handle/123456789/1

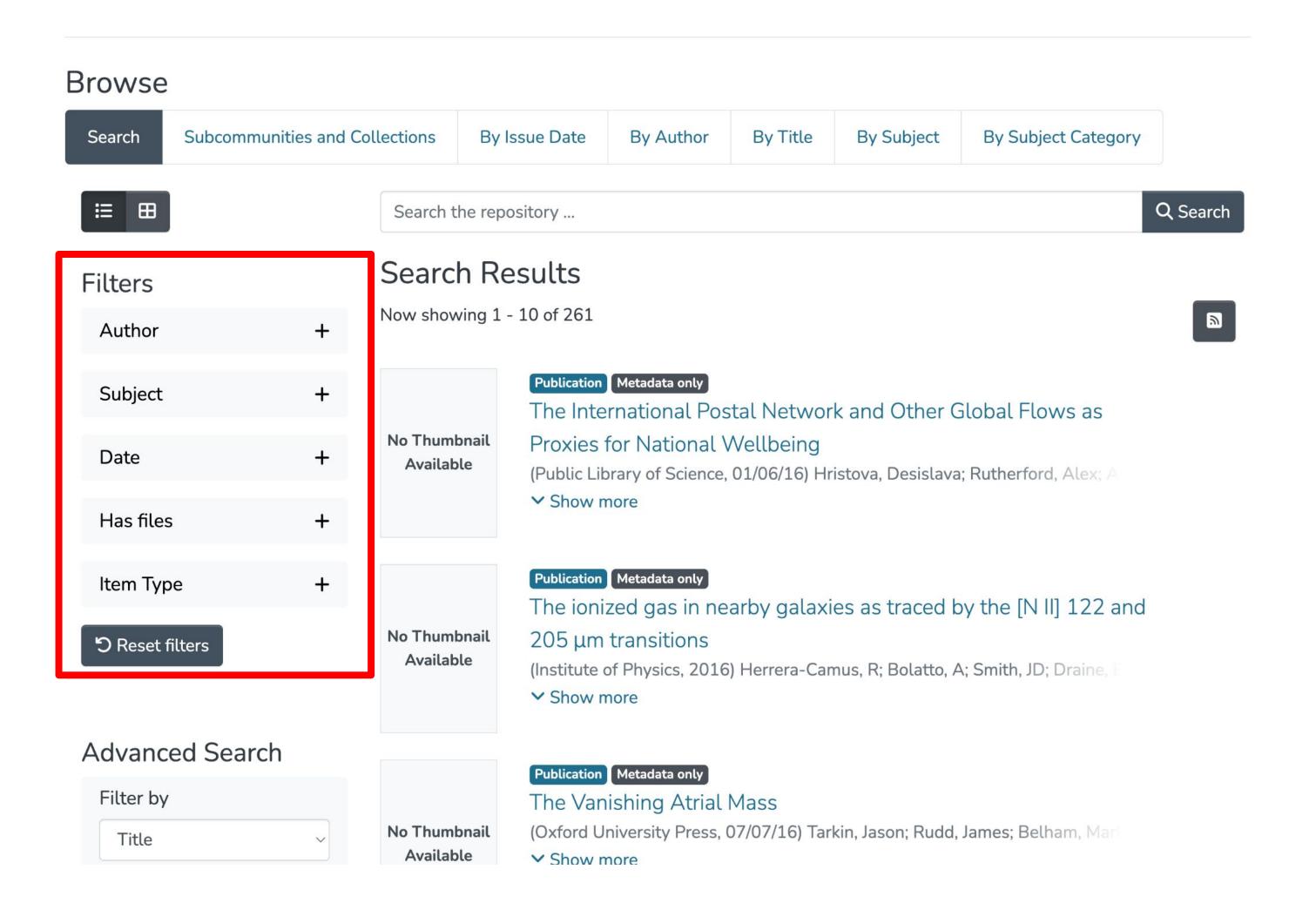




Search tab on Community/Collection pages

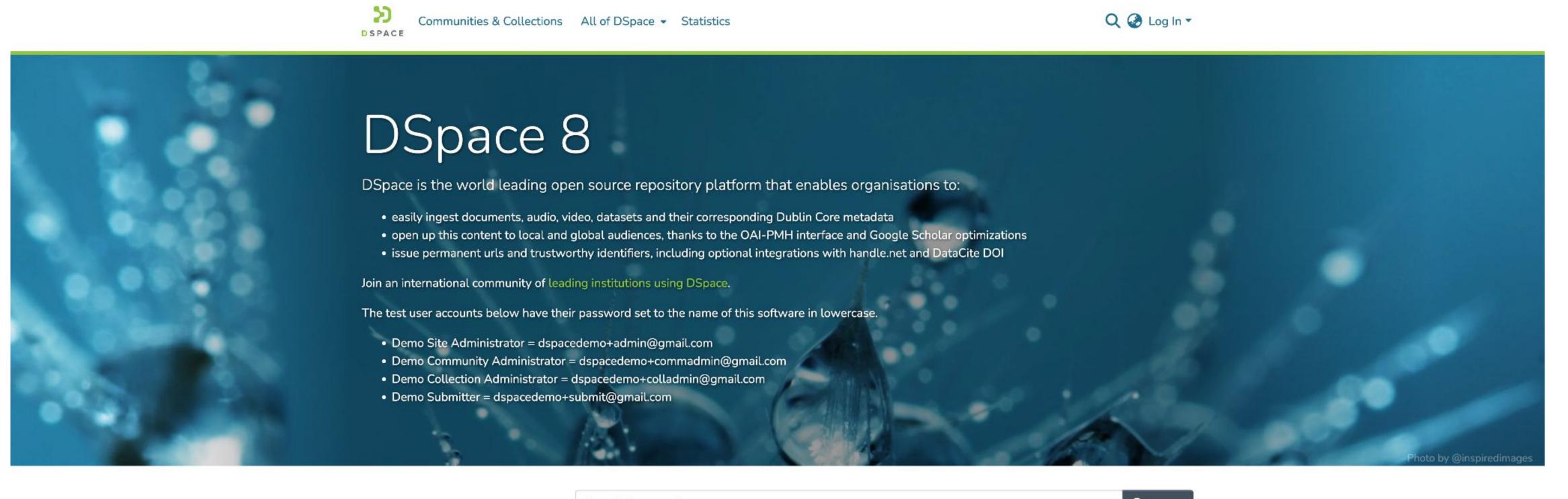
Publications

Permanent URI for this community https://demo7.dspace.org/handle/123456789/1





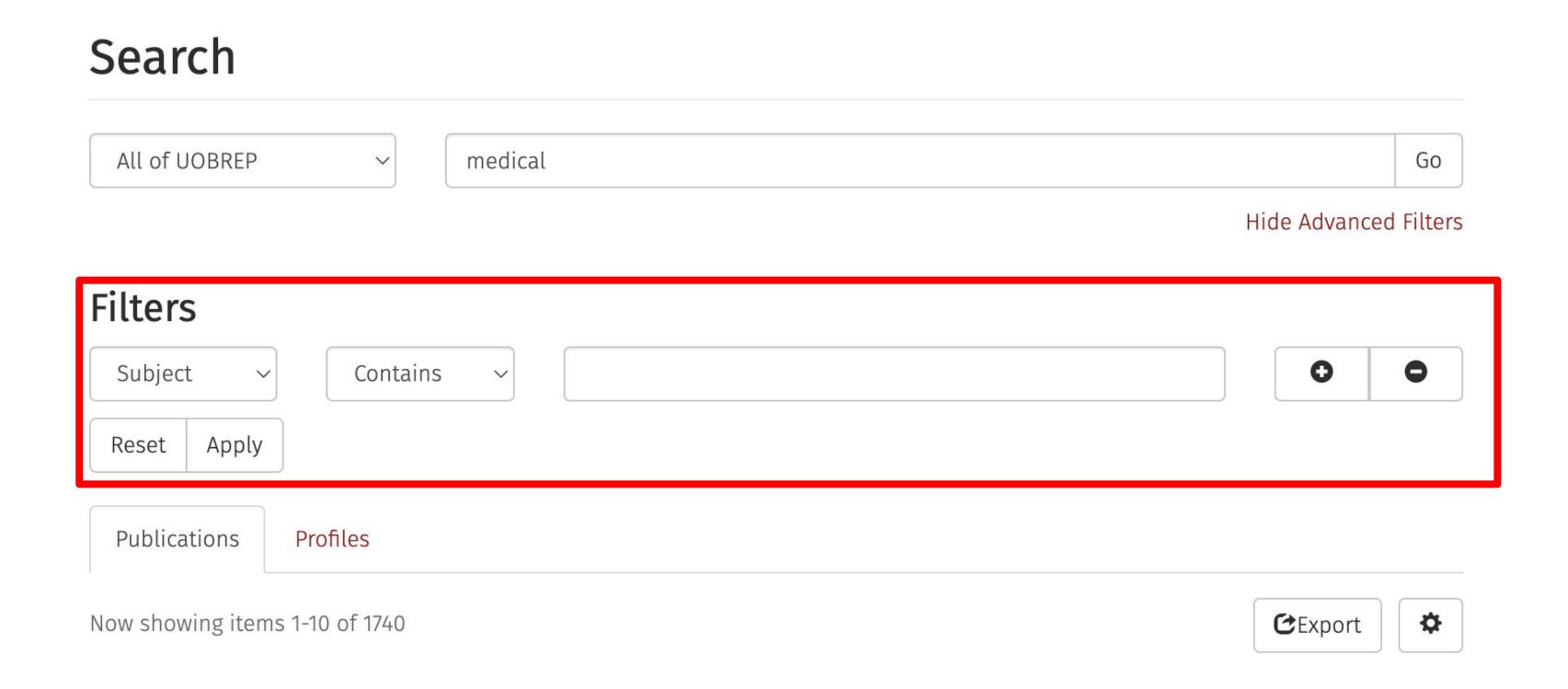
Search Facets on Homepage





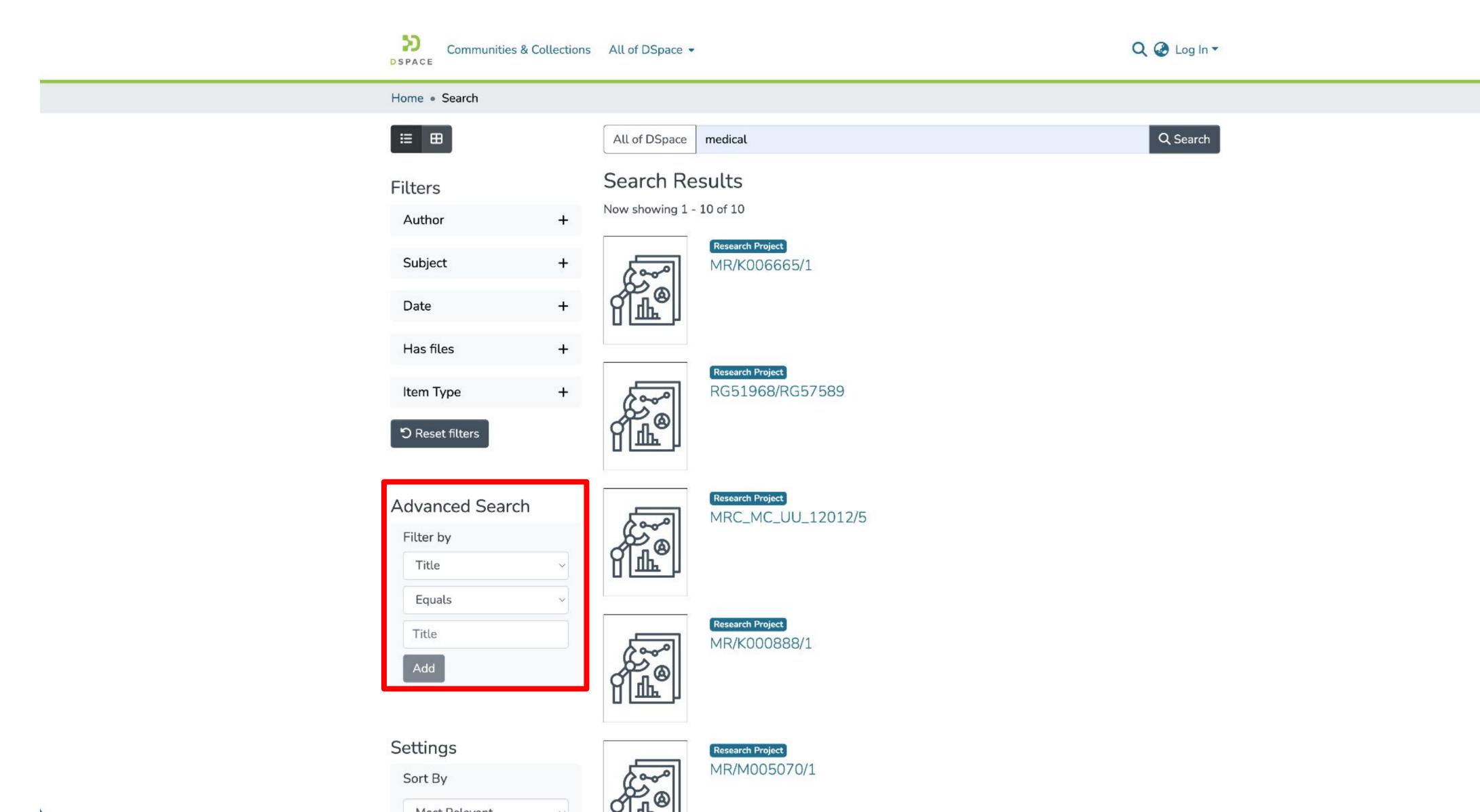


Advanced Search filters



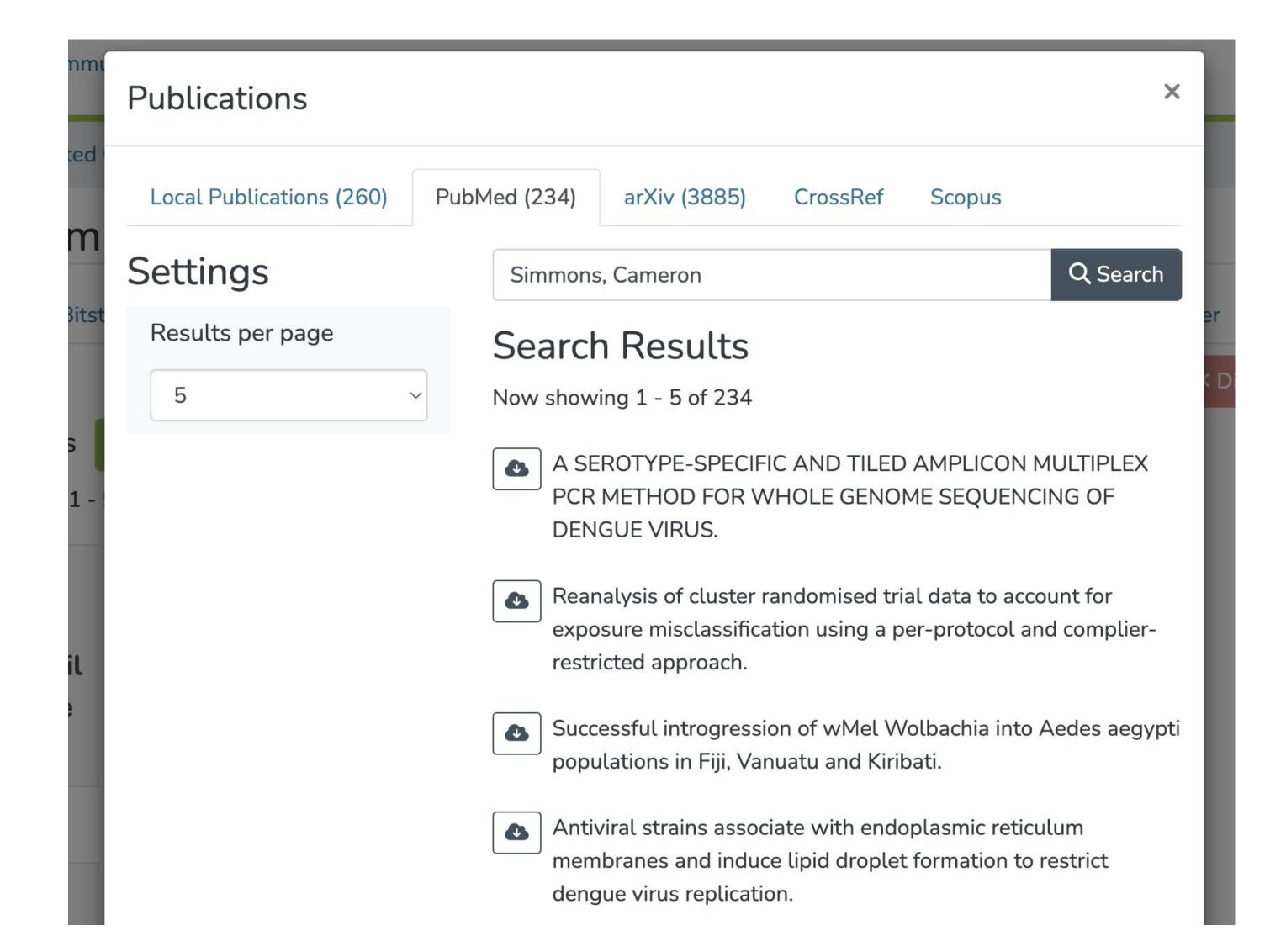


Advanced Search filters





Add relationships via external sources





Administrator Reports (beta)

DSpace 8 will introduce basic administrator reports. There are two reports available:

- Filtered Collection reports: these reports count the numbers of item per community/collection. Administrators will also have access to a number of filters they can apply to narrow down the result.
- Metadata Query reports: These will provide item counts based on metadata queries to specify what should be counted and what not (and some other available filters).



Administrator Reports (beta)

Collection Filter Report

Filters			
	Show C	Collection	
	Select all filters		Deselect all filters
ltem	Property Filters		
	Is Item - always true		Withdrawn Items
	Available Items - Not Withdrawn		Discoverable Items - Not Private
	Not Discoverable - Private Item		
Basic	Bitstream Filters		
	Item has Multiple Original Bitstreams		Item has No Original Bitstreams
	Item has One Original Bitstream		
Bitsti	ream Filters by MIME Type		
	Item has a Doc Original Bitstream (PDF, Office, Text, HTML, XML, etc)		Item has an Image Original Bitstream
	Has Other Bitstream Types (not Doc or Image)		Item has multiple types of Original Bitstreams (Doc, Image, Other)



Bug fixes

https://github.com/orgs/DSpace/projects/27/views/2?filterQuery=done+label%3Abug

~	O V Done 337			
1	OSpace 7 doesn't support Tomcat 10 or have Jakarta EE Support #8713	⊕ tdonohue	☑ Done	-
2	Backend (Hal Browser) doesn't work properly in Tomcat 10 #8173	1 tdonohue	☑ Done	~
3	Fix for submission describe warning contribution bug #2905	LotteHofstede	☑ Done	~
4	Remove unnecessary "exit" statements which stop running Postgres container #9492	(a) tdonohue	☑ Done	~
5	Fix Runnable JAR issues & use it in all Docker images #9505	• tdonohue	☑ Done	~
6	Created abstract component loader class #2339	alexandrevryghem	☑ Done	¥
7	Search query is not set by default when opening an external sources tab #2376	alexandrevryghem	☑ Done	~
8	Fixed MathJax code being displayed twice by dsMarkdown pipe #2397	alexandrevryghem -	☑ Done	v
9	Fix setStaleByHrefSubstring not emitting true when all requests are stale #2349	alexandrevryghem -	☑ Done	¥
10	Fix minor collection form bugs #2350	alexandrevryghem -	☑ Done	~



Overview of Upgrade process from v7 to v8

overview of backend major changes



Upgrading underlying DSpace 8 dependencies

- Java 17 (OpenJDK or Oracle)
- Apache Maven 3.8.x or above
- Tomcat is now OPTIONAL, if you want to use it you need version 10. You may instead choose to use the Runnable JAR approach to deploying the DSpace 8 backend.

```
java -jar [dspace]/webapps/server-boot.jar
```

- PostgreSQL 12.x 15.x (with pgcrypto installed)
- SOLR 8.11.1+
- in bold the version currently used by the CI and dockerfile

unchanged

- unchanged



How to update the server.xml with the embedded Tomcat?

DSpace installation requires you to configure the <code>URIEncoding="UTF-8"</code> attribute over the Connector in the <code>server.xml</code> luckily this is not required with the embedded tomcat as it is configured by default

Good default are provided also for the X-Forwared-For Header and to trust internal proxies making available out-of-box a production ready configuration.

If you need to customize other aspect of the server.xml (port, extra connector, etc.) you can do that using env properties and/or modifying the spring boot application.properties file

Spring boot reference documentation



Update your code base

- For upgrade from version prior of DSpace 7 there are some extra steps required (older is your version more extra steps are needed) be sure to look closely to the documentation
 - if you are coming from a version prior of DSpace 7 consider to start with a fresh codebase and manually port (reconsider) your changes
 - if you are already on DSpace 7 you can merge or rebase your change on top of DSpace 8 (there is a <u>GitHub issue</u> to improve the merge experience)
- include in the new local.cfg your changes or merge the change in the configuration files with your, for example

```
db.dialect = org.dspace.util.DSpacePostgreSQLDialect
```



Major changes in the backend code

- JAVA 11 → 17:
 - most javax.* dependencies migrated to jakarta.*
- Hibernate $5 \rightarrow 6$:
 - HibernateProxyHelper is now in the org.dspace.core package
 - Query created via HQL/JPQL have been updated to use
 CriteriaBuilder
- Spring boot $2 \rightarrow 3$
- Spring framework $5 \rightarrow 6$

```
✓ ♣ 34 ■■■■ dspace-api/src/main/java/org/dspace/content/MetadataValue.java 「□
              package org.dspace.content;

    import javax.persistence.CascadeType;

    import javax.persistence.Column;

    import javax.persistence.Entity;

            import javax.persistence.FetchType;

    import javax.persistence.GeneratedValue;

    import javax.persistence.GenerationType;

    import javax.persistence.Id;

17

    import javax.persistence.JoinColumn;

18
          +- import javax.persistence.Lob;
            import javax.persistence.ManyToOne;

    import javax.persistence.SequenceGenerator;

            import javax.persistence.Table;
            - import javax.persistence.Transient;
23
        10 + import jakarta.persistence.CascadeType;
              import jakarta.persistence.Column;
        12 + import jakarta.persistence.Entity;
              import jakarta.persistence.FetchType;
            + import jakarta.persistence.GeneratedValue;
              import jakarta.persistence.GenerationType;
        16 + import jakarta.persistence.Id;
              import jakarta.persistence.JoinColumn;
              import jakarta.persistence.ManyToOne;
              import jakarta.persistence.SequenceGenerator;
              import jakarta.persistence.Table;
        21 + import jakarta.persistence.Transient;
              import org.dspace.core.Context;
        23 + import org.dspace.core.HibernateProxyHelper;
              import org.dspace.core.ReloadableEntity;
            import org.hibernate.annotations.Type;

    import org.hibernate.proxy.HibernateProxyHelper;

27
        25 + import org.hibernate.Length;
```



Major changes in SOLR

- There are no major changes 🙂 still 8.11.x
- Two new cores have been introduced: suggestion, qaevent. The could contain data not available elsewhere (decision taken over the proposed suggestion or correction) so it is a good idea to include them in your backup strategy



Overview of Upgrade process from v7 to v8

overview of frontend major changes



Upgrading the Ul from 7 to 8 - Overview

- J. Merge & fix conflicts
- 2. Upgrade node & install dependencies
- 3. Upgrade to standalone components
- → 4. Run ESLint to apply the new rules



1. Merge & fix conflicts

Checkout the DSpace 8 tag from the community github

\$ git checkout -b dspace-8-upgrade dspace-8.0.0

Merge in your DSpace 7 branch

\$ git merge prod



1. Merge & fix conflicts

Why in that order?

- Ensures that your customizations show up as changes in the merge commit
- You'll know why those changes are there
- you can re-evaluate if they are still necessary



1. Merge & fix conflicts

- Fix any merge conflicts you might have with custom code
- For lists (e.g. of injected services in a constructor, or config properties etc), it's good practice to put the community changes on top, and yours at the bottom
- Leads to fewer merge conflicts down the line, because new community changes will happen above your changes, not in between



Upgrading the Ul from 7 to 8 - Overview

- → 1. Merge & fix conflicts
- 2. Upgrade node & install dependencies
- 3. Upgrade to standalone components
- → 4. Run ESLint to apply the new rules



2. Upgrade node & install dependencies

Switch to node 18 or 20 if you haven't already

```
$ nvm install 20
```

\$ nvm use 20

Install the dependencies

```
$ yarn run clean
```

\$ yarn install



Upgrading the Ul from 7 to 8 - Overview

- → 1. Merge & fix conflicts
- 2. Upgrade node & install dependencies
- 3. Upgrade to standalone components
- → 4. Run ESLint to apply the new rules



PR <u>#2750</u> converted the UI to use standalone components:

- Every component specifies its own dependencies
- They don't need to be declared in a module
- Can be more easily reused in a different context
- Can be lazy-loaded separately, so better for performance



Differences to the component decorator:

- → Property standalone: true
- → Optional list of imports

```
@Component({
    selector: 'ds-base-login-page',
    styleUrls: ['./login-page.component.scss'],
    templateUrl: './login-page.component.html',
    standalone: true,
    imports: [ThemedLogInComponent, TranslateModule],
})
export class LoginPageComponent implements OnDestroy, OnInit {
```



More info on the wiki:

https://wiki.lyrasis.org/display/DSPACE/Migration+to+Standalone+Components





Convert your custom components to standalone. Path is optional

\$ ng generate @angular/core:standalone --path src/themes/your-theme-name

Choose the option: "Convert all components, directives and pipes to standalone"

- ? Choose the type of migration: (Use arrow keys)
- > Convert all components, directives and pipes to standalone

Remove unnecessary NgModule classes

Bootstrap the application using standalone APIs



The script will sometimes not add all required imports to the component decorator

Compare the list of imports in your themed components with the custom theme.

E.g. after the tool

```
@Component({
    selector: 'ds-footer',
    styleUrls: ['footer.component.scss'],
    templateUrl: 'footer.component.html',
    standalone: true,
    imports: [NgIf, RouterLink]
})
```



The custom theme version:

```
@Component({
    selector: 'ds-footer',
    styleUrls: ['footer.component.scss'],
    templateUrl: 'footer.component.html',
    standalone: true,
    imports: [NgIf, RouterLink, AsyncPipe, DatePipe, TranslateModule]
})
```

So copy those imports to your version



If you've added additional components to your templates and they haven't been detected by the script you'll get errors like this, when you build:

The solution is then to add the corresponding component class to the imports:

```
imports: [NgIf, RouterLink, ThemedThumbnailComponent]
```



Then the next error is about the async pipe:

So add that as well

```
imports: [NgIf, RouterLink, ThemedThumbnailComponent, AsyncPipe]
```



Find the correct component class by ctrl/cmd clicking the HTML in your IDE

If that doesn't work, search for "selector: 'ds-name-of-selector'"

```
@Component({
    selector: 'ds-thumbnail,
    styleUrls: [],
    templateUrl: '../shared/theme-support/themed.component.html',
    standalone: true,
    imports: [ThumbnailComponent]
})
export class ThemedThumbnailComponent extends ThemedComponent<ThumbnailComponent>
```



Upgrading the Ul from 7 to 8 - Overview

- → 1. Merge & fix conflicts
- 2. Upgrade node & install dependencies
- 3. Upgrade to standalone components
- → 4. Run ESLint to apply the new rules



4. ESLint - New rules

PR <u>#2343</u> added stricter ESlint rules

Goals:

- → fewer merge conflicts
 - Imports in alphabetical order
 - multiple imports from same file on separate lines
 - enforce trailing commas



4. ESLint - New rules

Goals:

- → Remove ambiguity
 - · disallow ! (value\$ | async) in Angular templates
 - disallow != and == in Angular templates
 - disallow "harmful" types
 - E.g. use **string** instead of **String** or () => {} instead of **Function**



4. ESLint - New rules

Goals:

- → Follow RxJS recommendations
 - Don't import from internal modules
 - Instead of

```
import { of as observableOf } from 'rxjs/internal/observable/of';
```

Instead of

```
import { of as observableOf } from 'rxjs';
```



4. ESLint - New rules

Goals:

- → Follow RxJS recommendations
 - Don't nest subscribes
 - Instead of

```
obs$.subscribe((v1) =>
  this.someService.someMethod(v1).subscribe((v2) => console.log(v2))
);
```

Use

```
obs$.pipe(
   switchMap((v1) => this.someService.someMethod(v1)),
).subscribe((v2) => console.log(v2));
```



4. ESLint - Running ESLint

Run lint-fix to automatically fix most issues

```
$ yarn run lint-fix --quiet
```

You may get a few errors that can't be fixed automatically:

```
src/themes/workshop/app/shared/object-list/community-list-element/community-list-element.component.html
6:24 error Async pipe results should not be negated. @angular-eslint/template/no-negated-async
7:15 error Expected `!==` but received `!=` @angular-eslint/template/eqeqeq
7:54 error Expected `===` but received `==` @angular-eslint/template/eqeqeq
```



4. ESLint - Fix issues

"Async pipe results should not be negated"

```
<div *ngIf="!(isLoading$ | async)">
```

Reason: isLoading\$ could be undefined, null or 0 too

Fix it by explicitly checking if it's false

```
<div *ngIf="(isLoading$ | async) === false">
```



4. ESLint - Fix issues

"Expected `!==` but received `!=`" or "Expected `===` but received `==`"

```
<a *ngIf="linkType != linkTypes.None" [target]="(linkType == linkTypes.ExternalLink) ? ...</pre>
```

Reason: != and == follow complicated rules.

```
E.g. 100 == '100' would be true true == 'true' would be false
```

Fix it by using !== and ===

```
<a *ngIf="linkType !== linkTypes.None" [target]="(linkType === linkTypes.ExternalLink) ? ...
```



In DSpace 7, to make MyComponent themeable:

- Create ThemedComponent<MyComponent>
- Use selector ds-themed-my-component
- Replace all usages of ds-my-component with ds-themed-my-component
- Easy to forget a place it's used
- When you forget, the app keeps working
- You'll only notice when you theme it and realize the themed version isn't used in a certain context



In DSpace 8:

- Create ThemedComponent<MyComponent>
- → But use the original selector ds-my-component
- Replace the selector of MyComponent with ds-base-my-component
- All existing usages now refer to the themed version automatically
- When using the component in a theme use ds-themed-my-component
 - This is a convection: not strictly necessary
 - · The selector for a themed version of a component is never used directly



- PR <u>#2865</u> adds an ESLint plugin to enforce these rules
- Jet Journal of the style of the new one

```
<ds-themed-thumbnail [thumbnail]="(object.logo | async)?.payload">
```

becomes:

```
<ds-thumbnail [thumbnail]="(object.logo | async)?.payload">
```



```
@Component({
    selector: 'ds-themed-thumbnail,
    ...
})
export class ThemedThumbnailComponent extends ThemedComponent<ThumbnailComponent>
```

becomes:

```
@Component({
    selector: 'ds-thumbnail,
    ...
})
export class ThemedThumbnailComponent extends ThemedComponent<ThumbnailComponent>
```



```
@Component({
    selector: 'ds-thumbnail,
    ...
})
export class ThumbnailComponent implements OnChanges {
```

becomes:

```
@Component({
    selector: 'ds-base-thumbnail,
    ...
})
export class ThumbnailComponent implements OnChanges {
```

Q&A and Open Discussion