

PrivateRecSys

## **D2. Searx Integration**

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3rd September, 2022

## Introduction

This deliverable presents the architecture of the PrivateRecsys and Searx System integration.

The integration of Privacy Recsys is achieved by introducing a “**login**” to privacy recsys from the Searx Interface, filtering the results received by the engines and adding a new category on searx, to make available the results of the Integration.

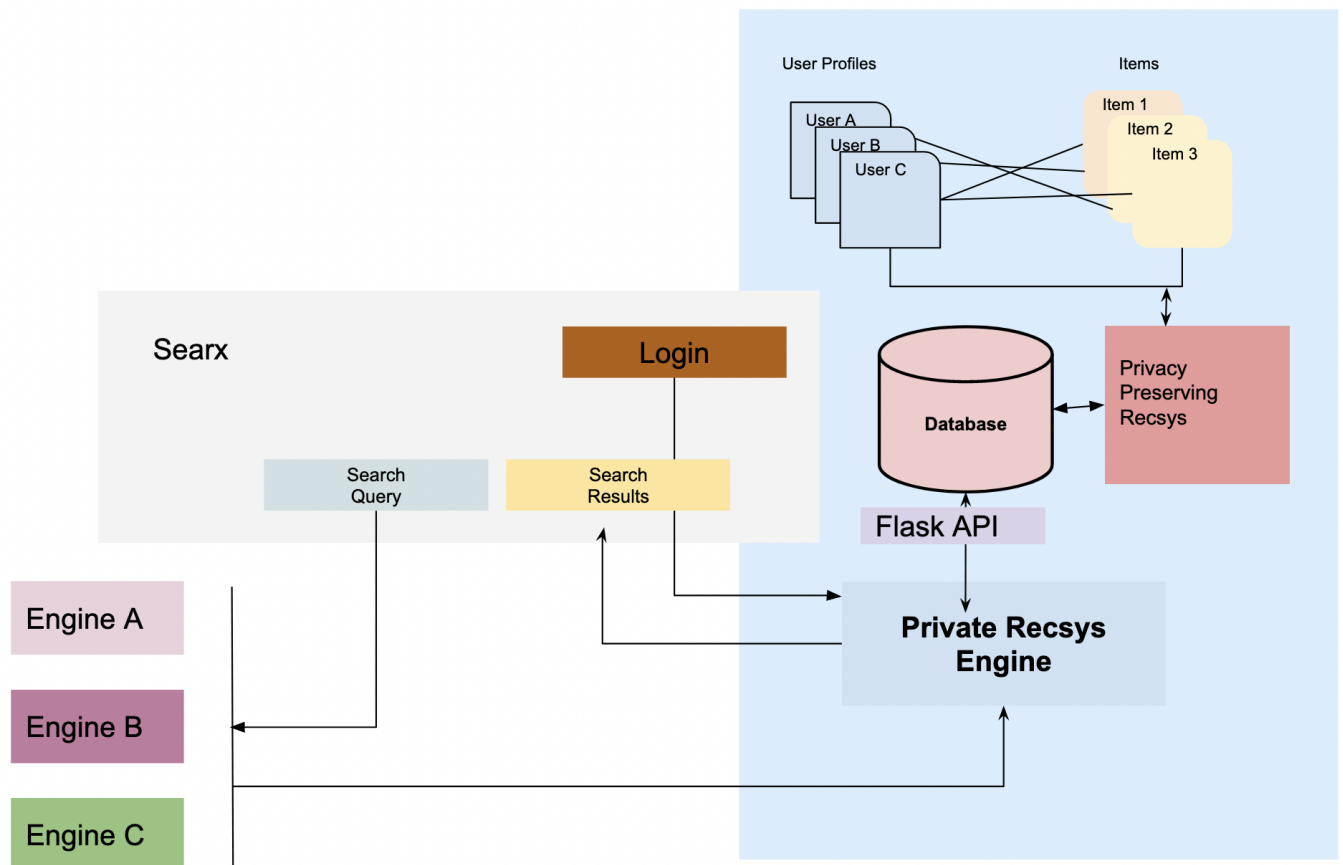
In the future, when all items are used for recommendations, and all results will be filtered by PrivateRecsys before they are presented to the user, this category will not be needed.


This guide can be useful to anyone interested in extending the PrivateRecSys project or building other integrations for the Searx system.

# RecSys Searx System Architecture

## System Diagram

The following diagram demonstrates the system architecture of the Integrated PrivateRecys -Searx System.





**The Private Recsys system**, demonstrated above includes the Private Recsys Engine, an API that communicates with the database and the Privacy Preserving Recsys library. The components presented are discussed below.

1. Privacy Preserving Recsys Library

**Access to the raw user profiles and items** is only available through the privacy **Privacy Preserving Recsys library** which guarantees the differential privacy of the users. It includes algorithms for producing privacy preserving recommendations.

2. Flask API

The system includes an API (implemented via Flask) that enables the registration of new users, rating items, running recommendations using the Privacy Preserving Recsys Library and serving the recommendations to the users.

3. The Database

The database stores all the data before they are served to the users, including recommendations, privacy preserving averages of top items and the similarity between users to produce privacy preserving recommendations.

4. The Login

**Login** is implemented on Search to assist in the integration of the PrivateRecsys into Rec, and various UIs must be implemented to present the information. Using the Login, the user is matched with a user profile and this allows access to its profile and produced recommendations.

5. Privacy Recsys Engine

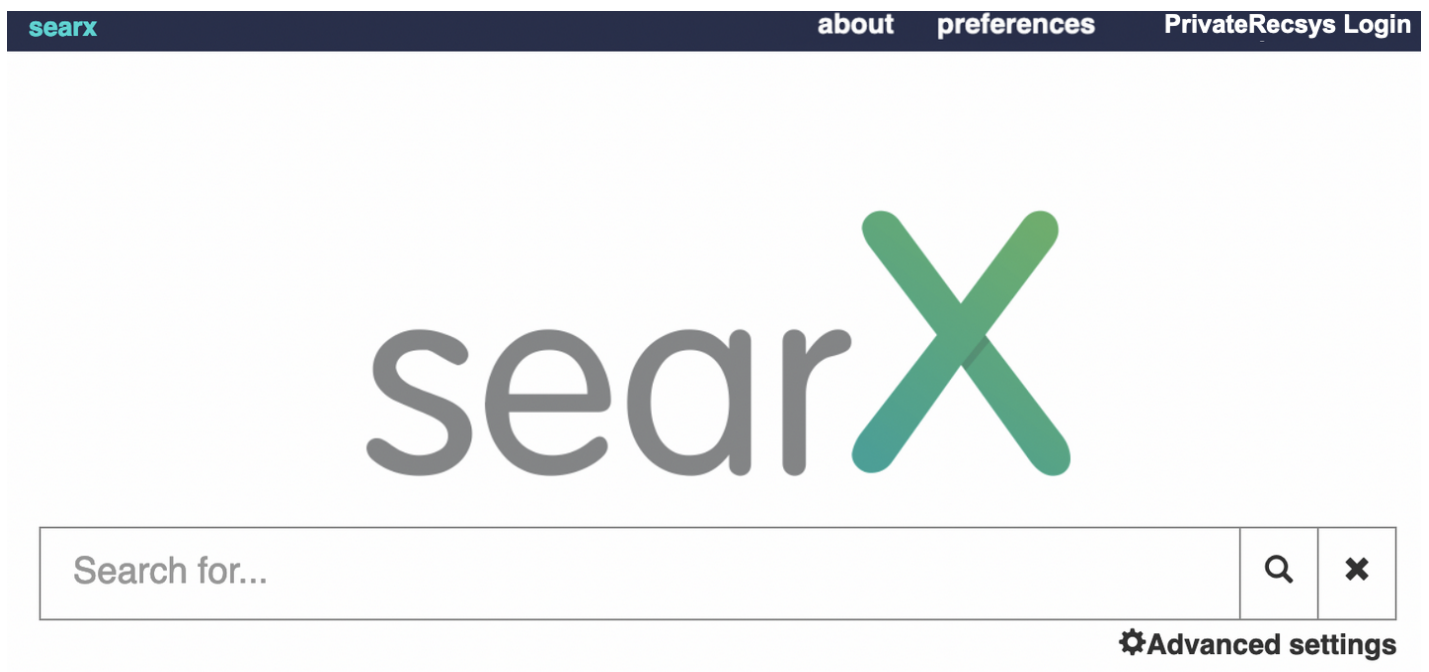
For producing effective recommendations integrated into the Searx, a “Privacy Recsys Engine” is used to filter the results from the search **engines** before they are presented to the users. This allows the user to receive personalized yet privacy preserving recommendations.

## User Interface Prototype Design

### Login:

In order to receive privacy preserving filtering and recommendations, the user shall be able to **login** to the PrivateRecsys from the Seax system.

A button on the top right of the screen, will guide the user to login, and redirect to the user profile.



The image shows a user interface prototype for SearX. At the top, there is a dark blue navigation bar with the text 'searx' in green on the left, and 'about', 'preferences', and 'PrivateRecsys Login' in white on the right. Below the navigation bar is a large, light gray area containing the 'searX' logo, where 'sear' is in gray and 'X' is in green. Below the logo is a search bar with the placeholder text 'Search for...'. To the right of the search bar are two buttons: a magnifying glass icon and a close icon (an 'x'). Below the search bar, on the right side, is a gear icon followed by the text 'Advanced settings'.

By clicking on the **profile** button the user must be able to see what items. (previously rated items or items the user has interacted with ) are considered for these recommendations. The user must be able to remove items from the user profile and from being used for recommendation. In this way, the user has control over what data are stored.

## Log in

Not registered yet? [Sign up](#)

Log In

Forgot [password?](#)

User Profile: **userA**

Items Considered

- Item A

X
- Item B

X
- Item C

X

For accessing the recommended items , a new card shall be presented to the user in the menu.

The screenshot displays the Searx web interface. At the top, there is a dark navigation bar with links for 'searx', 'about', 'preferences', and 'Profile'. Below this is a search bar containing the text 'toy story', with search and clear buttons. Under the search bar, there are two dropdown menus: one for 'Anytime' and another for 'English (United States) - en-US'. A horizontal navigation bar follows, with tabs for 'General', 'Files', 'Images', 'It', 'Map', 'Music', 'News', 'Privaterecsys' (which is highlighted with a red border), 'Science', 'Social Media', and 'Videos'. Below the navigation bar, the section 'Recommended Items' is visible, containing two large, empty light-blue rectangular boxes.

In the future, the system can be further expanded so all items are considered and all categories are filtered / ranked by the private recsys .

## Conclusion

In this deliverable the system architecture of the integrated PrivateRecsys - Searx system is presented.

This document will be updated after the development of the system, to include the components analysis as well as a sequence diagram. This will provide a better understanding of how the system works and how one can extend and modify it.