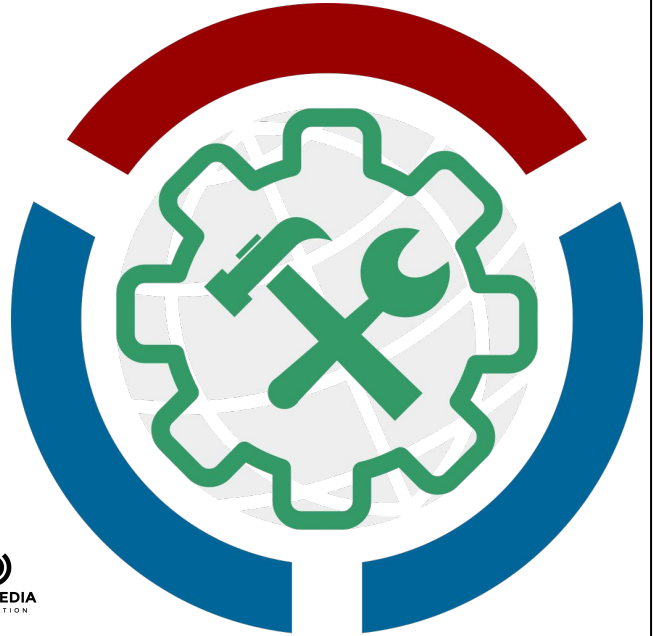


# How to find tools to improve your workflows

[\[\[User:BDavis \(WMF\)\]\]](#), Wikimania 2021



Hello everyone. My name is Bryan Davis. I am a software engineer at the Wikimedia Foundation working on the Technical Engagement team. My preferred pronouns are he/him.

I'm here today to talk to you about the Toolhub project that Srishti Sethi and I have been working on for the last year. Folks should leave the session with a general understanding of where the idea for Toolhub came from, how it builds on past innovations from the technical community, and what core features it provides.

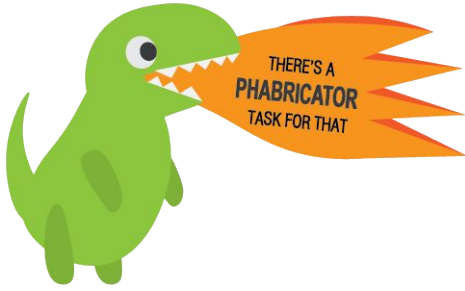
# "Is there a repository of tools, research projects etc related to Wikimedia projects?"

— [\[\[User:Ilva\]\], wikitech-l 2015-10-11](#)



There is a rich ecosystem of "tools" built by volunteers and staff to help fill in workflow gaps in the Wikimedia movement. There are thousands of bots, user scripts, web services, gadgets, desktop apps, and phone apps out there. Maybe even one that makes the exact thing you are trying to do easier (or possible). But how do you find them?

This is a problem that individuals and projects within the community have struggled with for years. There are many, many lists of tools on [wiki pages across the movement](#). There are also lists in spreadsheets, mailing list messages, chat archives, and very likely even physical paper sitting on someone's desk. These lists are great, and I think they could be even better with some help.



# T115650: Create an authoritative and well promoted catalog of Wikimedia tools

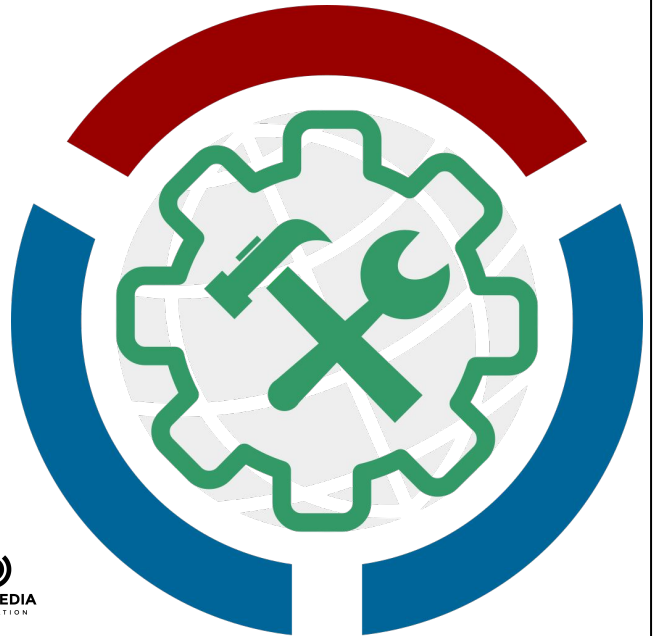
— [\[\[User:Ricordisamoal\]\]](#), [\[\[phab:T115650\]\]](#) 2015-10-15



The wikitech-l discussion that the pull quote on the previous slide was taken from inspired Ricordi Samoa to create a phabricator task that collected links to existing partial solutions. I discovered this task early in 2016 while researching ways to help the volunteer developers working in what we now call Toolforge. It was, and still is, a brilliant idea and a thing that many, many people have asked for over the years.

# Toolhub

- Well defined metadata model for describing a Wikimedia "tool"
- Backwards compatibility with the community developed [Hay's Directory](#) toolinfo.json standard
- API first design to enable using the Toolhub dataset from other tools
- Faceted search
- Curated collections of tools
- Solid base on which to build future features



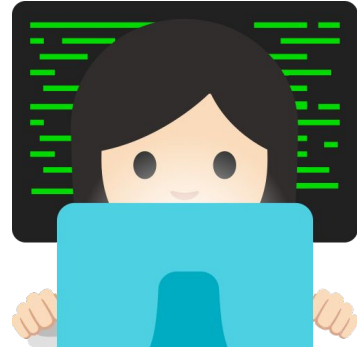
Our initial release of Toolhub is focused on the set of goals on this slide. We are working towards a core product that makes collecting and reusing information about tools as open as we can. Rather than yet another one time list of tools, we want a platform that makes it possible to extend and remix the catalog.

Critical to this openness is our "API first" design. A "web API" is a fancy way of saying that the web application has features that can be used by other software, rather than just humans. And, in our case, Wikimedia volunteers should be able to build tools that interact with the data stored in Toolhub in many ways.

# Personas & use cases

## 1. Editors

- Search for templates, modules, gadgets or tools to help with specific editing-related tasks on-wiki.
- Make or view public lists of tool categories to learn about tools for specific tasks.
- Contribute tools information.
- Write Lua module that queries Toolhub for certain types of tools and use the information returned on wikis.



"Personas" are a tool used in user experience design to help us think about who will be using the software and why.

The core personas for Toolhub include: Editors.

### *[ full presentation ]*

We expect that editors will want to search for existing templates, modules, gadgets, and other tools to help them make edits. They may find these things on public lists made by others. They may want to create their own lists. They will want to add to the information about the tools that they use. They may even want to build on-wiki tools which let them work with Toolhub's data.

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Images:

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[https://commons.wikimedia.org/wiki/File:Emoji\\_u1f469\\_1f3fb\\_200d\\_1f4bb.svg](https://commons.wikimedia.org/wiki/File:Emoji_u1f469_1f3fb_200d_1f4bb.svg)

# Personas & use cases

## 2. Developers

- Build catalog subsets via the Toolhub's API for personal or community use.
- Develop a gadget or user script for registering a tool in Toolhub.
- Learn about the tools available in a wide variety of programming languages they can contribute to (particularly helpful for new developers).
- Connect with users, each other, and resources such as documentation.



### Developers

#### *[ full presentation ]*

Some developers will build tools that display part of the Toolhub catalog in ways that are more accessible for projects or communities they are involved in. Others will build tools that help put new information into Toolhub. Newcomers to Wikimedia's technical spaces may use Toolhub to find existing projects written in programming languages they understand to study from or help contribute to. We hope all tool maintainers will use Toolhub to find ways to connect with other developers and users of their own tools.

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#### Images:

- [https://commons.wikimedia.org/wiki/File:Emoji\\_u1f469\\_1f3fe\\_200d\\_1f3ed.svg](https://commons.wikimedia.org/wiki/File:Emoji_u1f469_1f3fe_200d_1f3ed.svg)

# Personas & use cases

## 3. Researchers

Entry point to learn about specific tools (e.g., bots) available in the Wikimedia ecosystem.



Researchers

**[ full presentation ]**

Many academic researchers use data collected from and about Wikimedia projects in their work. Toolhub should help them find tools to assist in this.

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Images:

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# Personas & use cases

## 4. Movement organizers

Search for a list of tools that help with organizing programs and events (for example Wiki Loves Monuments).



Movement organizers

**[ full presentation ]**

Organizers will find and create lists of tools to help with organizing their programs and events.

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Images:

- [https://commons.wikimedia.org/wiki/File:Noto\\_Emoji\\_Oreo\\_1f9d5\\_1f3fd.svg](https://commons.wikimedia.org/wiki/File:Noto_Emoji_Oreo_1f9d5_1f3fd.svg)
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# Personas & use cases

## 5. Readers

Find tools that recommend articles and new ways to experience Wikimedia content.



And Readers.

**[ full presentation ]**

Readers will use Toolhub to find tools that recommend articles or provide new ways to experience Wikimedia content.

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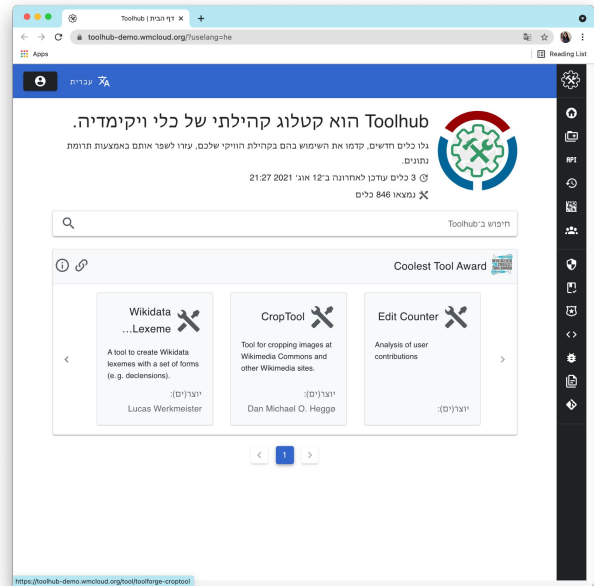
Images:

- [https://commons.wikimedia.org/wiki/File:Emoji\\_u1f939\\_1f3fd.svg](https://commons.wikimedia.org/wiki/File:Emoji_u1f939_1f3fd.svg)

# Features

## 00. Home page

- Search box
- Over 800 tools available already!
- Paginated display of lists of tools
  - Image, title, description, and authors shown on tool cards
  - Link button drills down into list info details
  - Tool card drills down into tool info details



I would now like to quickly show some screen shots taken of the Toolhub demo server and give you an idea of what the screens allow you to do.

The home page gives access to Toolhub's full text search feature.

It also displays "featured lists" of tools which have been curated by the community.

Both search results and lists show will show an "info card" providing a summary of the tool's information.

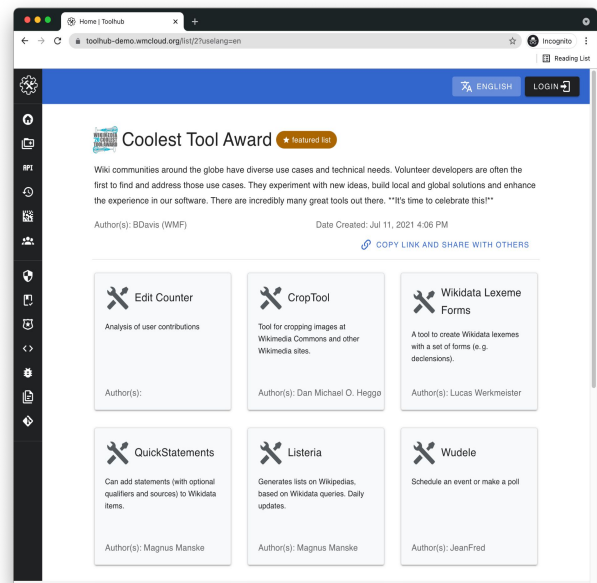
### **[ full presentation ]**

846 tools are currently available on the demo server thanks to our compatibility with Hay's Directory and it's toolinfo.json standard.

# Features

## 01. List info detail

- See detailed information about a list (tools, link to copy, title, description, authors, date created, etc.)

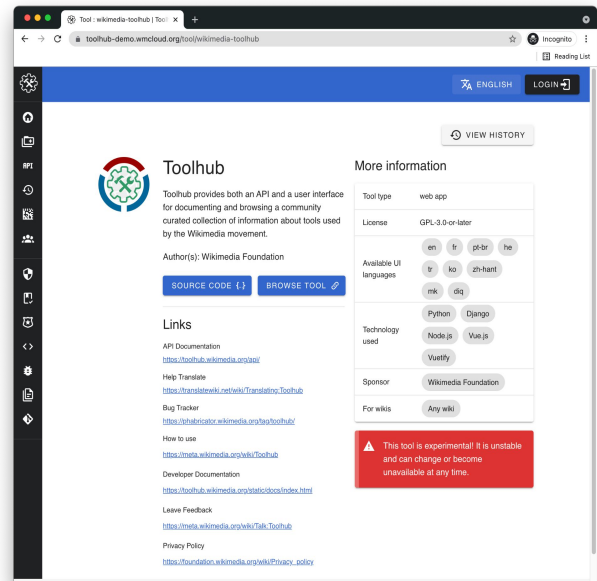


Lists have detail pages which also allow you to share deep links to them from outside of Toolhub.

# Features

## 02. Tool info detail

- See detailed information about a tool (for example: the tool's type, wikis it is designed for, technology used, etc.)

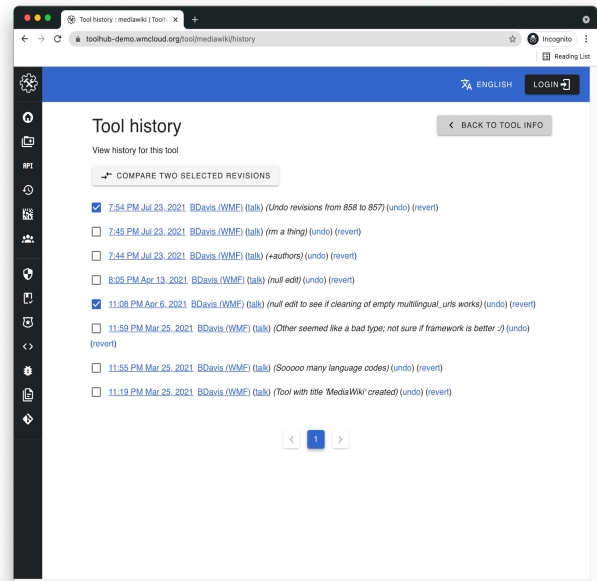


Each tool info card links to a more detailed page listing all the information that Toolhub has about the tool.

# Features

## 03. Edit history

- View edit history for a tool info record
- Compare changes across between two revisions
- Undo the changes from a revision
- Revert to an older revision

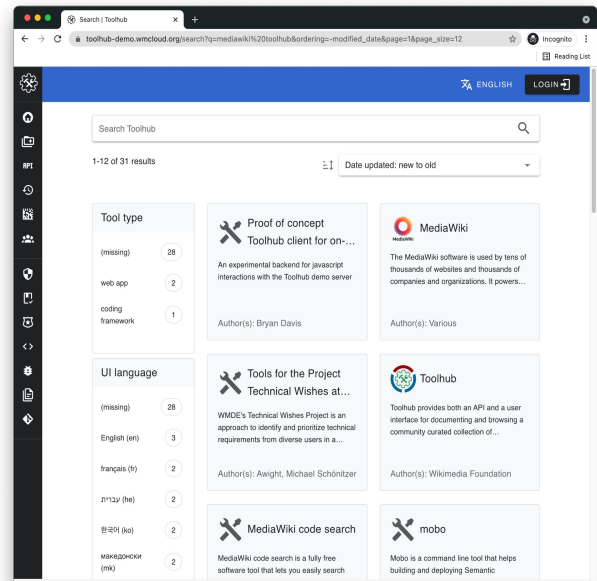


Tool records have a history view similar to wiki pages where you can see what has changed over time and who made the changes.

# Features

## 04. Faceted search

- Full text search using technology similar to the on-wiki search
- Searches can be refined using filters based on faceted classification of various tool info fields like tool type, UI language, keywords, and target wiki



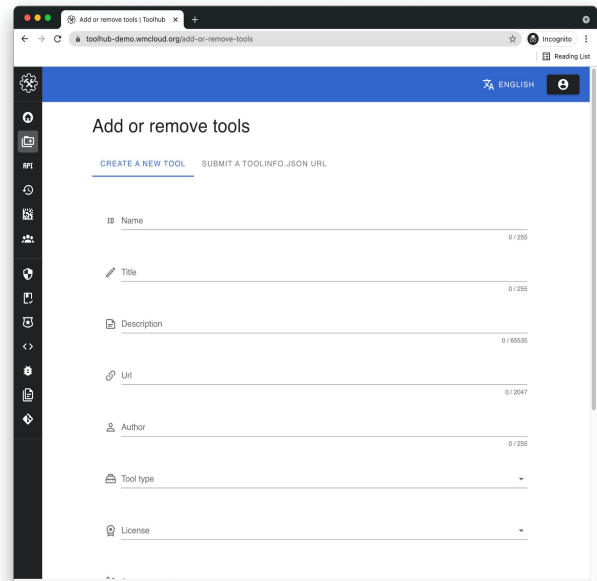
Users can search through the tools and refine those searches by selecting common values from the matched documents.

These "facets" are the sort of search navigation you have probably seen on ecommerce sites where a list of departments, or sizes, or colors is shown along with the results and you can click them to add that attribute and value to the search constraints.

# Features

## 05. Tool registration

- Create and maintain a tool info record directly in Toolhub

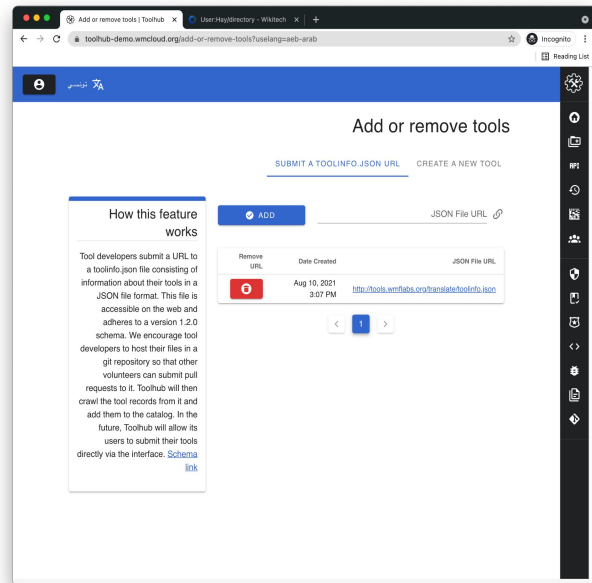


Users can create new toolinfo records using the "add or remove tools" screen.

# Features

## 06. toolinfo.json URLs

- Register an externally hosted toolinfo.json to be indexed by Toolhub's web crawler
- Demo server seeded with all URLs registered with Hay's Directory



Tool maintainers can also submit URLs to JSON files which use the toolinfo schema to describe their tools.

Toolhub will periodically visit the URLs, read the tool records from them, and update the catalog.

**[ full presentation ]**

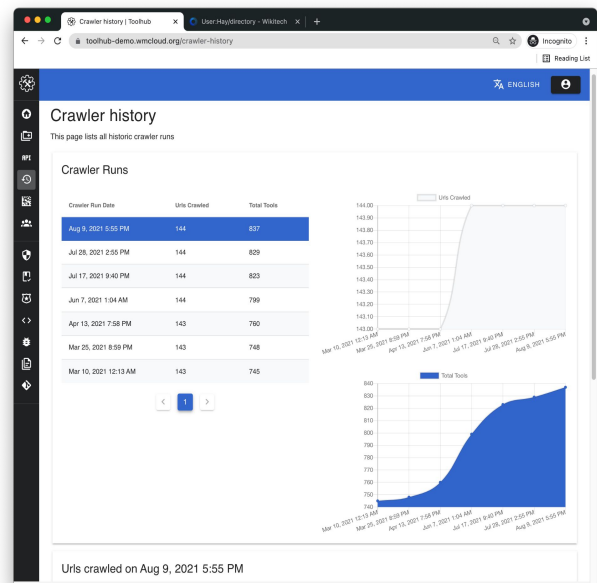
Toolinfo collected from a URL cannot currently be edited via the Toolhub API or user interface. Changes must be made in the external file and then imported by the crawler.



# Features

## 07. Web crawler status

- See when the crawler has run, how many URLs it examined, and how many tools were found

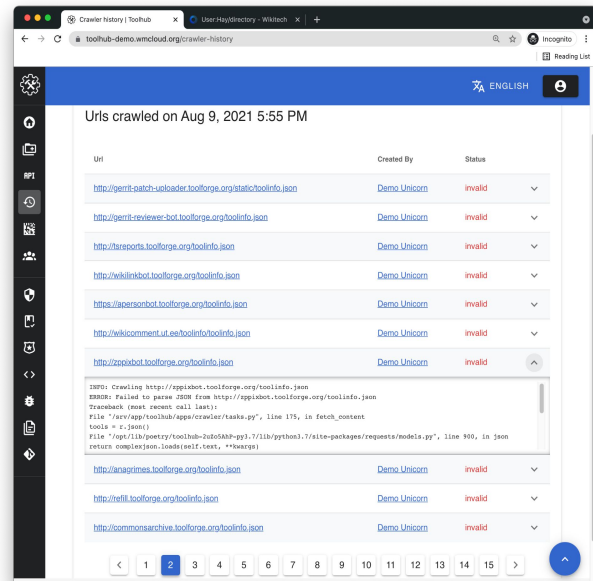


The Crawler history screen displays analytic information about past runs of the URL crawler.

# Features

## 08. Crawler run details

- View details about each URL crawled during a crawler run
- Drill down provides information about specific errors that the crawler encountered fetching or parsing a toolinfo.json URL

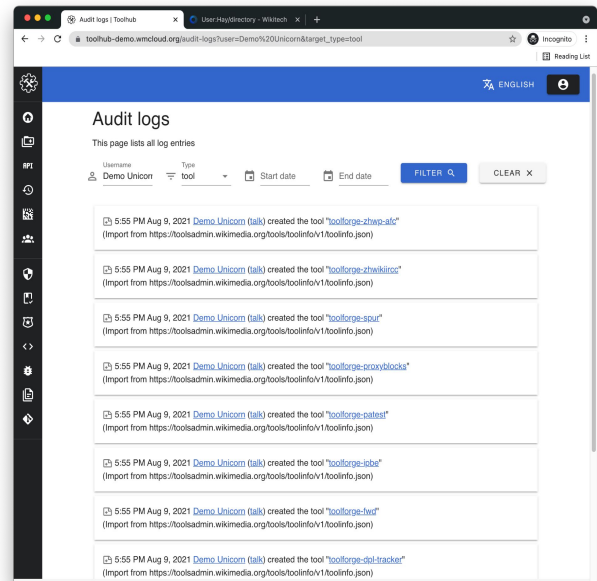


Details of errors in reading a URL or parsing its toolinfo content can be viewed for each crawler run.

# Features

## 09. Audit logs

- Similar to Special:Log and Special:RecentChanges combined into one list of actions taken
- Filter logs by data range, user, and action type



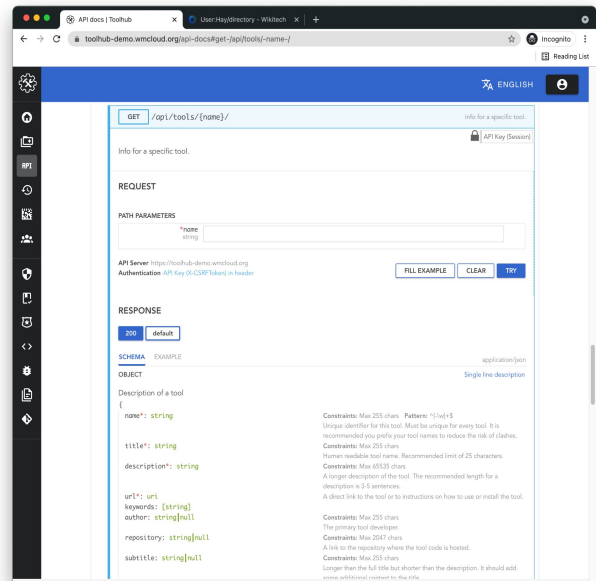
The audit logs feature keeps track of the actions taken on Toolhub (when a user joined, a tool was added, removed, etc.).

You can think of it as a combination of the Special:RecentChanges and Special:Log page on a MediaWiki wiki.

# Features

## 10. API documentation

- OpenAPI Specification information is available for all API endpoints exposed by Toolhub
- RapiDoc UI allows using the APIs directly from your browser for testing and exploration



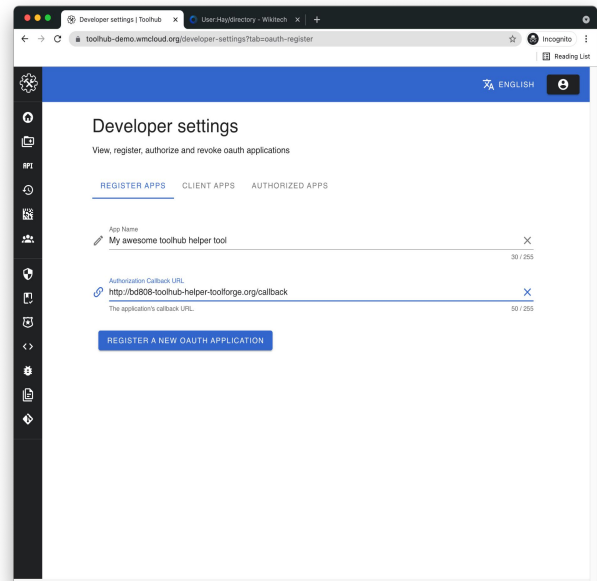
Toolhub has a web API which implements all of the features needed to power its integrated UI, and there is nice documentation available for viewing on the platform itself.

Our API first design means Toolhub acts as a data repository that can be interacted with and other people can use to build upon. A "web API" is a fancy way of saying that the web application has features that can be used by other software, rather than just humans. And, in our case, Wikimedia volunteers can use to build tools that interact with the tools data stored in Toolhub in many ways.

# Features

## 11. Developer settings

- Self-serve OAuth 2 application registration
- See all registered apps
- Manage your app authorizations



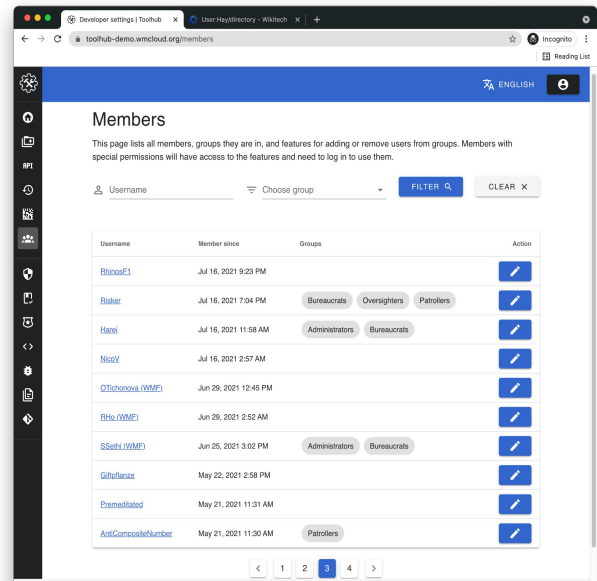
Our API requires that any create, update, and delete API actions be made by an authenticated user (we will not be allowing anonymous edits).

Toolhub provides its own OAuth 2 service to allow you to register a tool that needs to authenticate users so that they can change content. Currently only confidential web flow clients are supported by Toolhub's OAuth 2 server.

# Features

## 12. Members list

- Lists all members, groups they are in.
- Members with special permissions can add or remove users from groups.

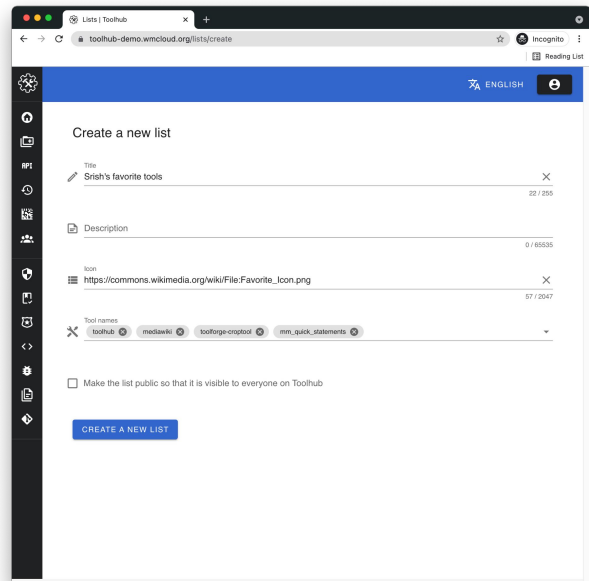


The Members page lists all current members and the groups they are in. Members of the Bureaucrats can also use this page to add or remove users from groups. You can think of it like the Special:ListUsers page on a wiki.

# Features

## 13. List creation

- Create a list of tools. You can choose to keep a list public or private.
- Editing and deleting lists features are a work in progress.



List creation is possible from the "Your lists" page. Editing and deleting lists is currently available via the API, but we have not built a user interface for these actions yet.

# Help us make this awesome!

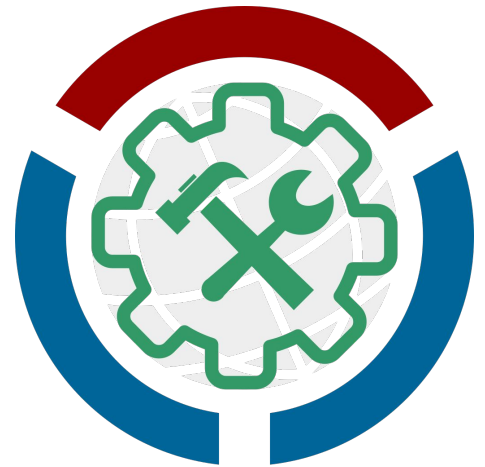
- Play with the demo server at <https://toolhub-demo.wmcloud.org/>
- Add new translations at [translatewiki.net](https://translatewiki.net)
- Report bugs and ideas with [#Toolhub](#) on Phabricator
- Follow our progress at [https://meta.wikimedia.org/wiki/Toolhub/Progress\\_reports](https://meta.wikimedia.org/wiki/Toolhub/Progress_reports)



Hopefully you have heard something in this presentation that gets you a bit excited about Toolhub. We would love to have any and all of you join us in making this project the success that the movement deserves. You can play with our demo server, help translate the user interface, and report bugs and feature ideas. Follow our progress each week on meta, and stay tuned for more direct calls for help as we near our launch date.



# Credits



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# Appendix



# Team and tech stack

- 1 backend + tooling developer
- 1 frontend developer
- 5 member advisory board
  - 1 SRE, 1 Security, 1 Community Relations, 1 wiki power user, 1 RTL native speaker and tech volunteer
- [#Toolhub](#) on Phabricator
- [toolhub-dev@lists.wikimedia.org](mailto:toolhub-dev@lists.wikimedia.org)
- [Decision record](#)
- [Weekly progress reports](#)
- Docker-compose dev environment with few local system requirements
- [Blubber](#) + [PipelineLib](#)
- Django (Python) backend
- Vue.js + Vuetify frontend
- Material Design look and feel
- Cloud VPS [demo server](#)
- Planned Kubernetes production hosting



We are running some social and technical experiments in this project. We formed an "advisory board" to help get input from key roles in the movement during development. Our advisors currently include Foundation staff as well as community volunteers. These folks provide us with feedback on design and implementation ideas. That feedback helps us iterate on our collective thinking about the project from a broader set of perspectives.

We are also trying to leave behind documentation about why certain decisions were made in the form of a decision record. We want Toolhub to have a life beyond the contributions of any single member of the team. We hope that documenting why we have made certain technical choices will help future maintainers when they have to make similar editorial decisions.

To keep the advisors, and anyone else who is interested in following along, up to date with what Srishti and I have been working on we are also producing a progress report at the end of each week on meta and posting a summary to the project mailing list.

On the tech side, we are trying to keep the development environment requirements simple. We are also using newer technologies that are being adopted in other areas of the movement like Vue.js and container based deployment tools.

The dev environment uses docker-compose run containers for the Django backend, Vue frontend, MariaDB database, and Elasticsearch full text search. This environment builds on top of the Blubber and PipelineLib configuration that is used in CI and will be used for the production deployment. It also encapsulates as much as possible in the Docker layer. On your local machine you only need Docker, git, and GNU Make. Everything else that is needed is included in Docker containers with Makefile targets to automate things like running tests and generating localization files. All coding standards are enforced with linters which can be run locally and are voting in CI. Srishti and I don't need to quibble during code review on trivial things like formatting. If it passes the linter then it must be ok--or a new linter is needed!

# Toolinfo.json standard

## Hay's Directory (v1.0.0)

- Name
- Title
- Description
- URL
- Keywords
- Author
- Repository

## Toolhub (v1.2.0)

- All v1.0.0 fields
- Tool type
- License
- UI languages
- For wikis
- Icon
- Technology used
- API, dev docs, user docs, feedback, privacy policy, translate, bug tracker URLs



Using toolinfo.json files to describe your tool is a standard [started by Hay \(Huskey\)](#) with his Tools Directory (<https://hay.toolforge.org/directory/>). This was an awesome innovation for the Wikimedia tools community that came out of discussions at Wikimania in 2014. James Hare and I made a very deliberate decision when designing Toolhub to start from this standard and build on it in a backwards compatible way. This helps Toolhub by providing useful data even before we have launched the project for public use.