

Liquidshop 3

The State of the Liq

Romain Beauxis, May 29, 2023

Le Programme

Le Programme

- General Updates

Le Programme

- General Updates
- Liquidsoap 2.2.x technical review

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- General Updates
- Liquidsoap 2.2.x technical review
- Liquidsoap 2.3.x roadmap

Le Programme

- General Updates
- Liquidsoap 2.2.x technical review
- Liquidsoap 2.3.x roadmap
- Questions?

FODSEM 2023

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Advanced programmable use of Liquidsoap with FFmpeg

Explore how the liquidsoap language can be used in new, safe ways for building media pipelines and leverage FFmpeg functionalities

- ▶ Track: [Open Media devroom](#)
- ▶ Room: [K.3.401](#)
- ▶ Day: [Saturday](#)
- ▶ Start: [12:00](#)
- End: [12:25](#)
- Video only: [k3401](#)
- Chat: [Join the conversation!](#)

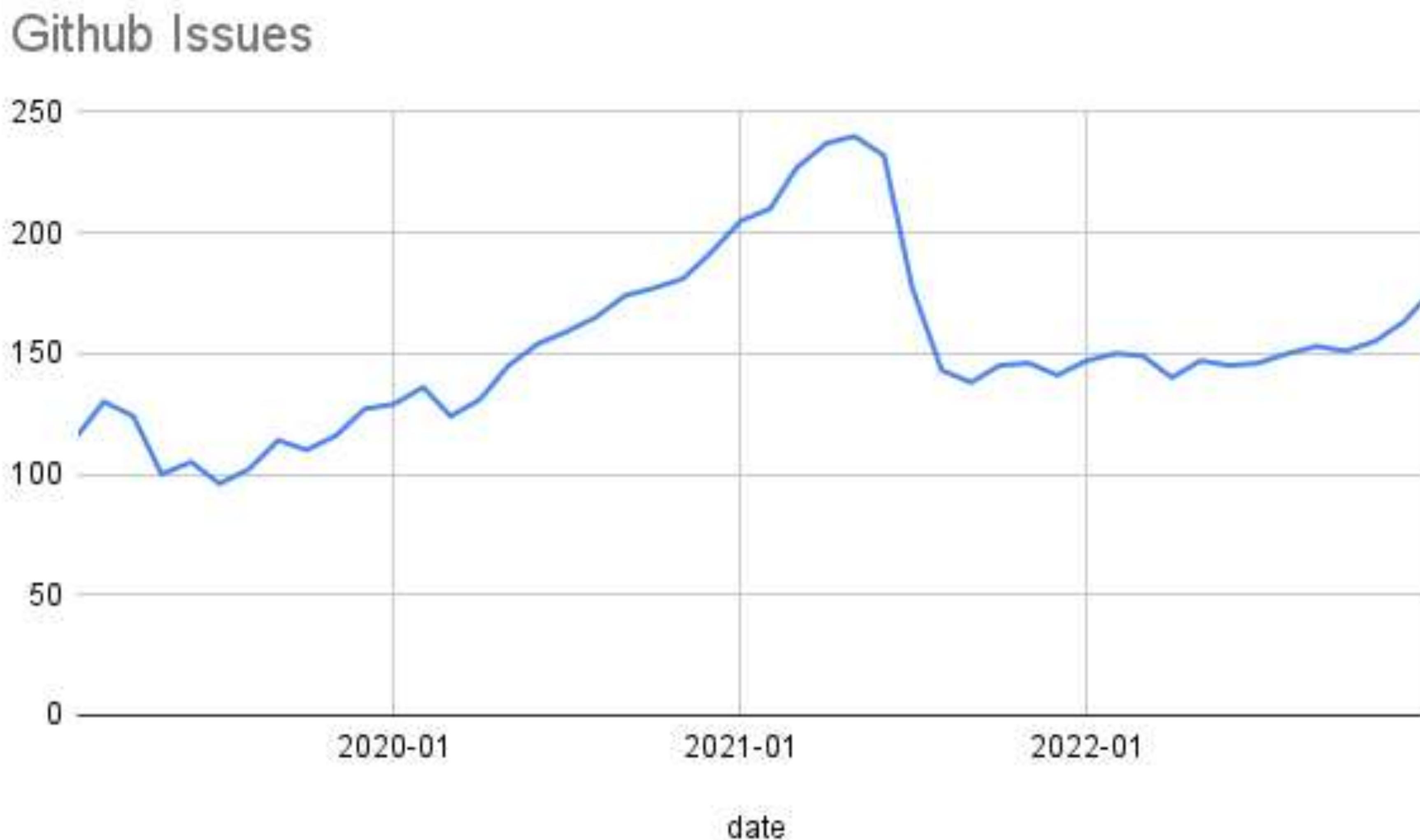
In the three years that have passed since the last Liquidsoap presentation, much change has happened! During this walk we will:
* Give an update on the community growth during the pandemic and recap what we learned during our two liquidshop events that mixed technical presentations with actual user projects presentations!
* Present some the recent advanced in the Liquidsoap language and how they can be used to leverage awesome programming language ideas to create powerful, rich and safe media project scripts
* Showcase the new integration with FFmpeg and how Liquidsoap provides flexible and advanced usage of the excellent FFmpeg features and APIs.

This talk should be of interest for anyone with interest in community radio, media broadcasting and anything related to audio and video handling in general, including integration with online APIs and websites and more!

We would also love to present and discuss our implementation of media APIs and the new abstractions that could be emerging in future implementations.

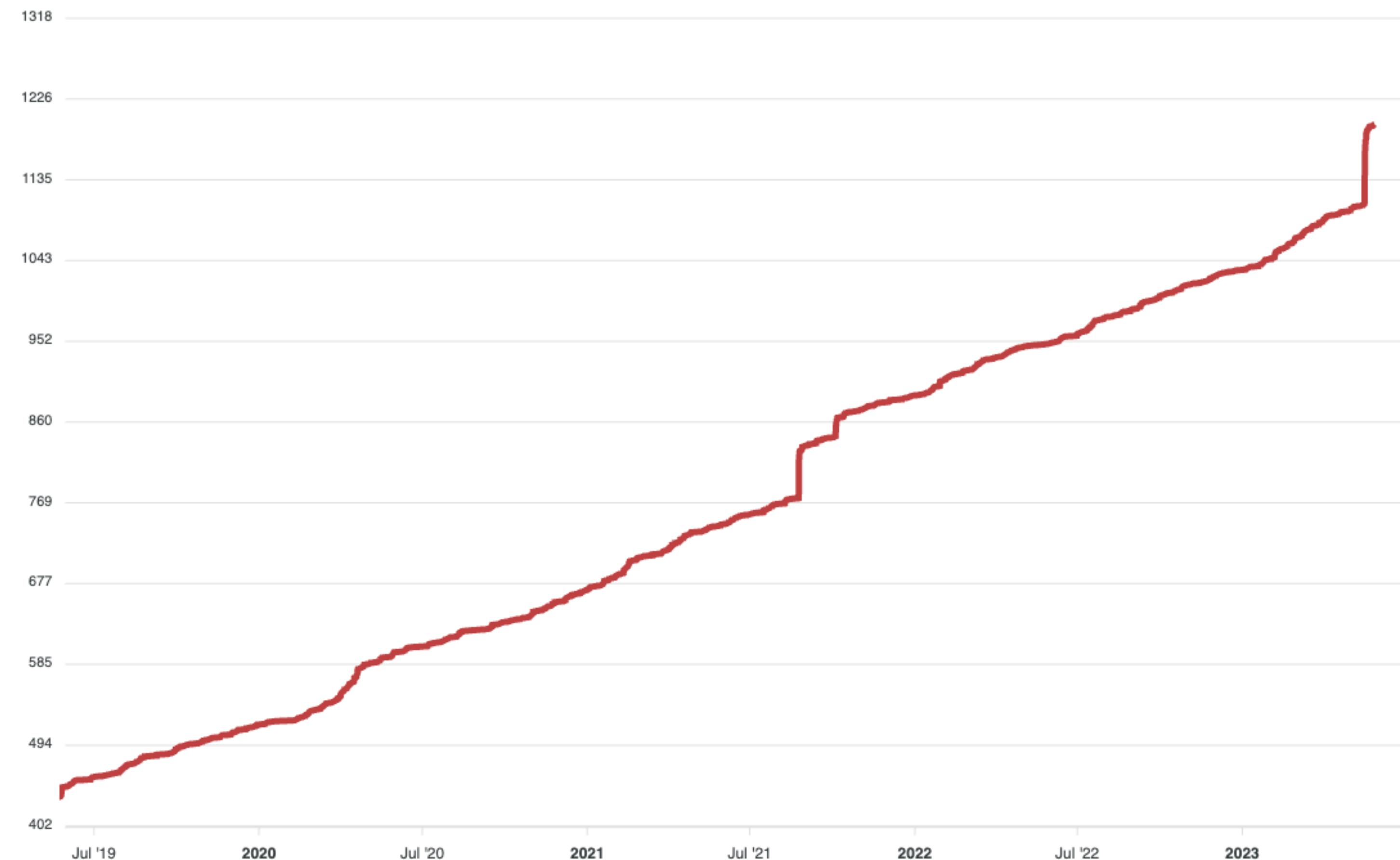
Community Growth

Community Growth



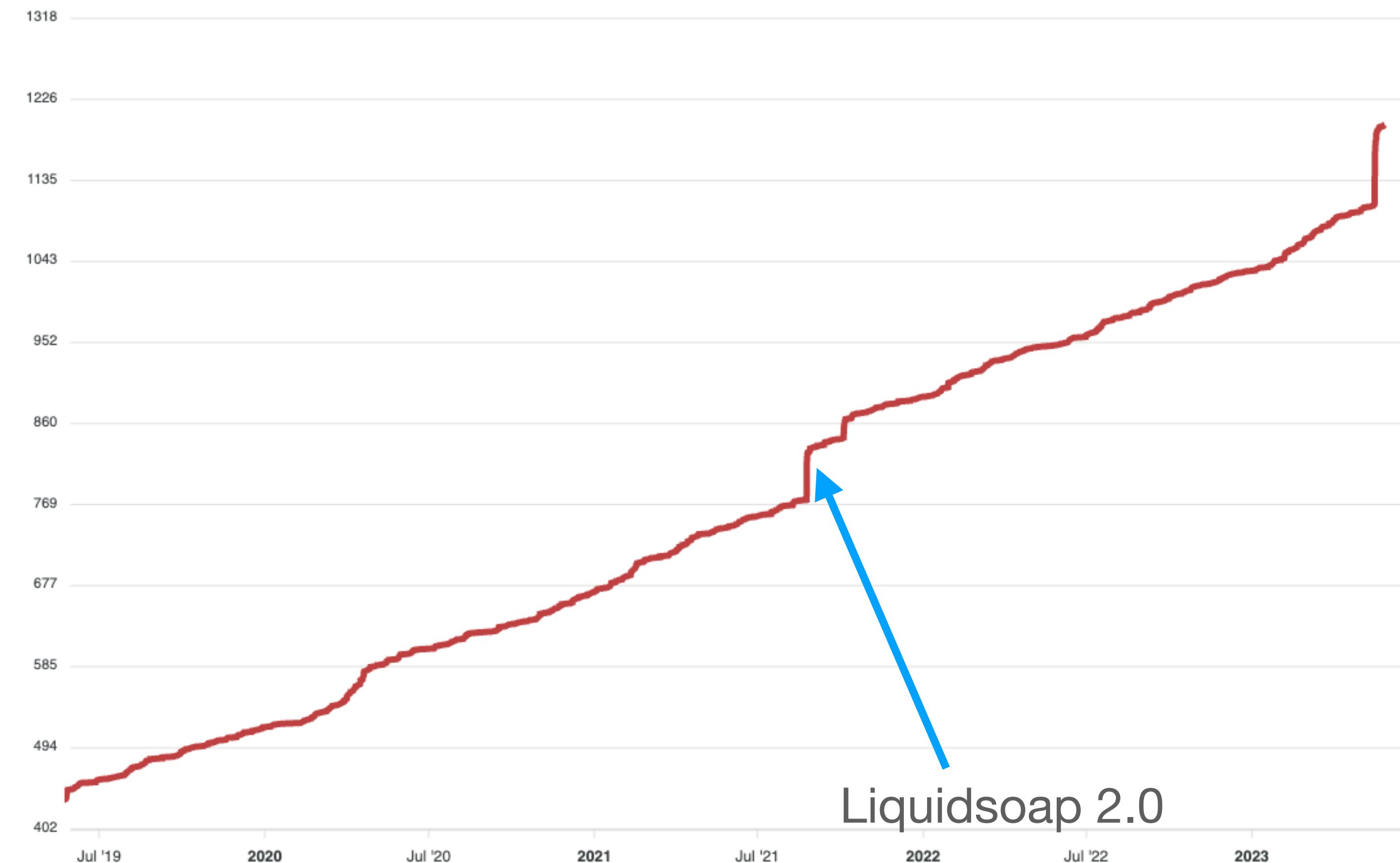
Community Growth

Github Stars



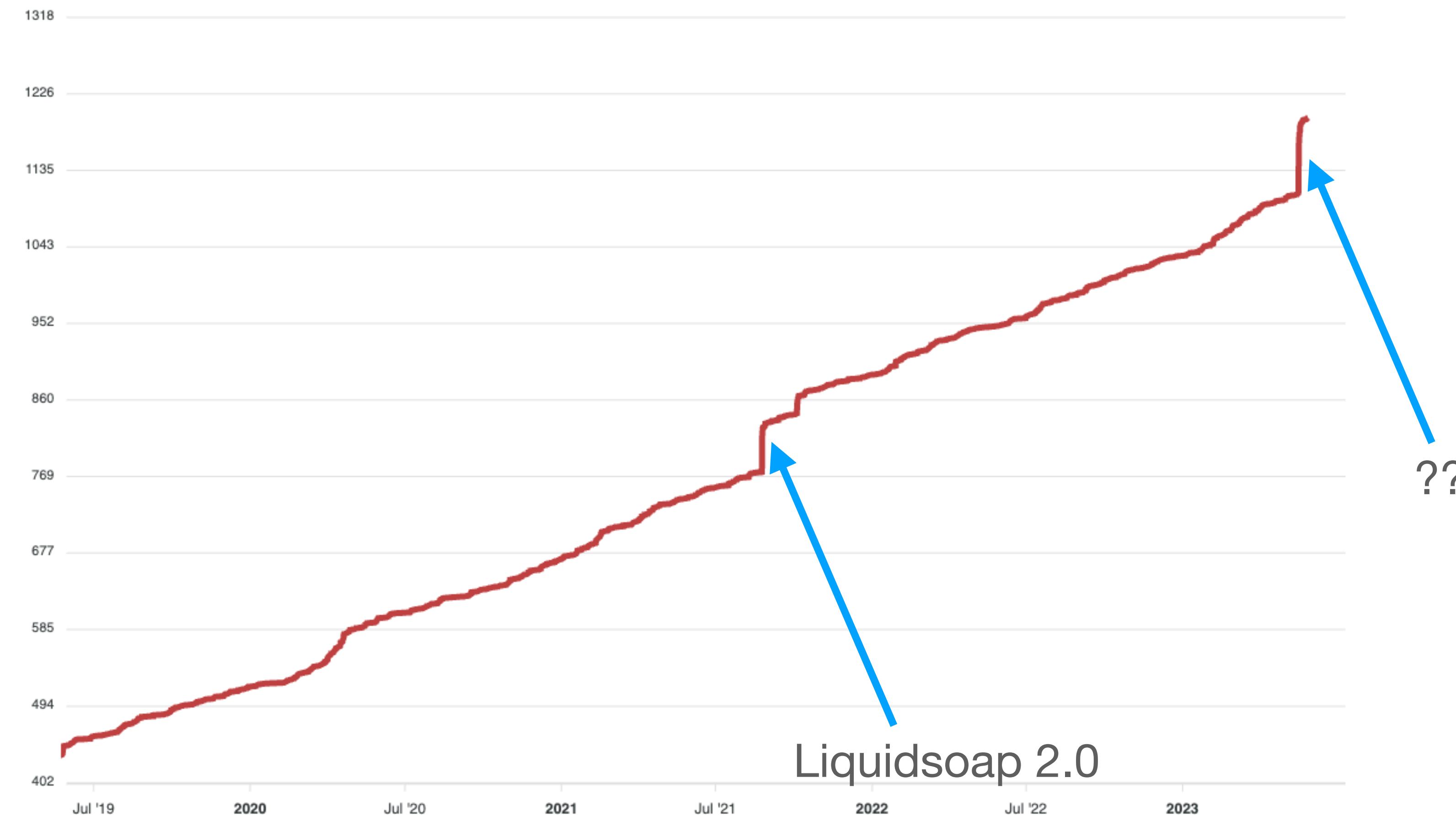
Community Growth

Github Stars



Community Growth

Github Stars



Community Growth



Referring sites

Site	Views	Unique visitors
rekt.network	3,349	2,752
Google	882	297
github.com	410	39
liquidsoap.info	343	89
DuckDuckGo	138	10
ocamlverse.net	47	3
norfipc.com	30	4
yandex.ru	23	5
Bing	13	9
discuss.ocaml.org	3	2

Community Growth

The screenshot shows a digital interface for a radio station. At the top, the logo "REKT.NETWORK" is displayed with a play button icon. Below the logo, the station name "Vosto - Vosto's Sound Exploration's" is shown. The interface includes a navigation bar with links for "EQ", "Milkdrop", "Station", "Chat", "Archive", and "Releases". On the left, a sidebar lists various users or tracks: "Heart Beat Hero", "The Microgram", "us3r", "CYBERTHING!", "Vosto", "Coral Candle", "Inexedra", "TORLEY", "Liuos", "Offish", "Moonraccoon", "HEIFEHEN", "Turbo Knight", "SVENS", "Death Sworn", and "Noctue". The main content area features a banner for "Rue Jules Verne" with details: "Date 2018", "Label Nightride.FM", and "Genres Electronic, Synthwave, Outrun". Below the banner, a tracklist is displayed:

Rank	Track
01	A World Within
02	In Zbor
03	Sunset of Synths
04	Arpeggion Crystals
05	Trails of Freedom
06	Night Drive Wanderers
07	Metro Holografix
08	Nano Fire Flies Feat. Kashmir11
09	Forgotten Robots
10	Home (Vosto Remix)
11	Jacked In

Community Growth

- Still in dire need of help!
- Code development
- User support (shootout to @vitojucepil!)
- User experience feedback
- Knowledge spread

Community Growth

Fix content length calculation in blit. #3110

 Open

toots wants to merge 4 commits into `main` from `fix-blit-conversion` 

 Conversation 0

 Commits 4

 Checks 19

 Files changed 4



toots commented 3 hours ago · edited

Member ...

This PR fixes blit length calculation.

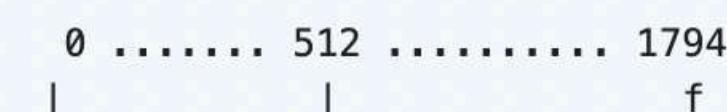
Here's an illustration of the problem. Let's say a frame is `1794` ticks and contains `1` single video image. If we are trying to consolidate a video content that has one chunk with offset = `0` and length `512` and one with offset `512` and length `1192` we would:

1. Initialize a full video content of length `1794`
2. Do a first blit of length `Frame.video_of_main 512 = 512 / 1794 = 0`
3. Do a second blit of length `Frame.video_of_main 1192 = 1192 / 1794 = 0`

Annd we have nothing..

Morally, what we want is the following:

1. Video frame are placed at the *end* of their chunk, i.e.



In this case, the last chunk would transfer its frame. But this requires that we are sure that this chunk contains at least one frame, which leads us to our second assumption:

2. Video chunks contain a number of video frame rounded up to the nearest integer

Community Growth



The screenshot shows a web browser displaying the [Liquidsoap Blog](https://liquidsoap.info/blog/). The page has a pink header bar with the text "The Liquidsoap Blog" on the left, a logo in the center, and links for "LIQUIDSOAP", "GITHUB", and a search icon on the right. The main content area features a large, bold title "The Liquidsoap Blog" with a horizontal line underneath. Below the title is a subtitle "Random bits about liquidsoap and other related topics". There are two blog posts listed: "Ogg bitstream compliance" posted on May 17, 2023, and "Precise scheduling of tracks" posted on March 25, 2023.

The Liquidsoap Blog

LIQUIDSOAP GITHUB

The Liquidsoap Blog

Random bits about liquidsoap and other related topics

Ogg bitstream compliance

Posted on May 17, 2023

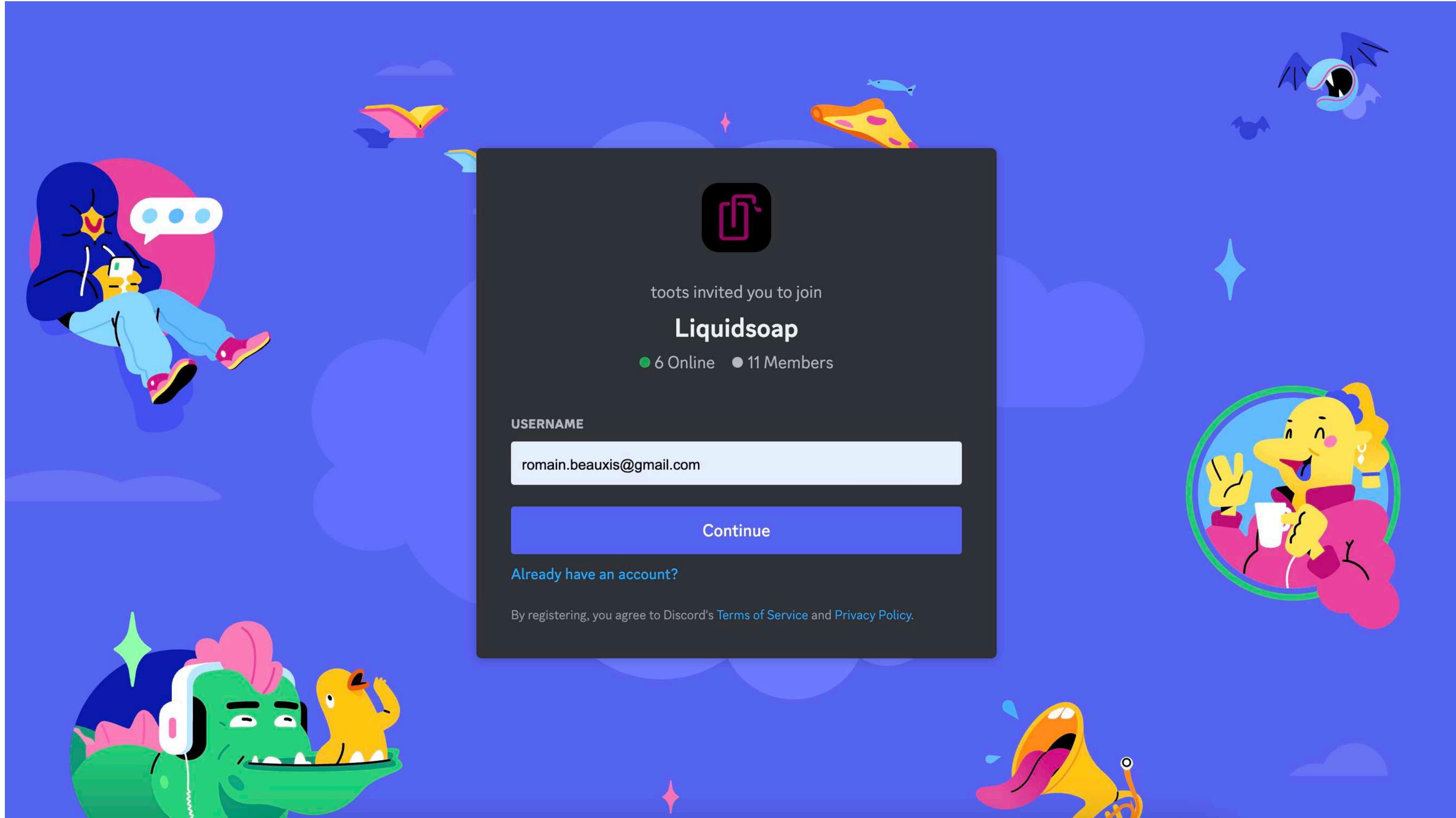
One of the interesting things with a long-term project is the ability to look back in the past, some times way far back and consider the consequences of certain decisions. One example of that came up recently with ogg bitstream muxing and demuxing..

[\[Read More\]](#)

Precise scheduling of tracks

Posted on March 25, 2023

Moving to Discord!



Moving to Discord!

- Open-source friendly

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- Open-source friendly
- Chat history as documentation

Moving to Discord!

- Open-source friendly
- Chat history as documentation
- Accessible?

Liquidsoap 2.2.x

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- Switched to dune/opam

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- Separate language core and standard library

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- Multitrack support

Dune/Opam

Pros:

- OCaml main compilation framework (dune & opam)
- Modular and abstract (dune)
- Support for external dependencies (opam)
- Great support for cross-compilation (opam, windows build)

Cons:

- Compiles into a local path (opam, `~/.opam/4.14.0/bin`)
- Hard to integrate system-wide

Separate language core

Separate language core



The screenshot shows a web-based online interpreter interface for Liquidsoap. At the top, there's a header bar with navigation icons (back, forward, search) and a URL field containing "liquidsoap.info/try/". Below the header is a code editor area displaying the following Liquidsoap code:

```
# Welcome to liquidsoap's online interpreter!
# Language version: 2.2.0+git@8b3c820a8

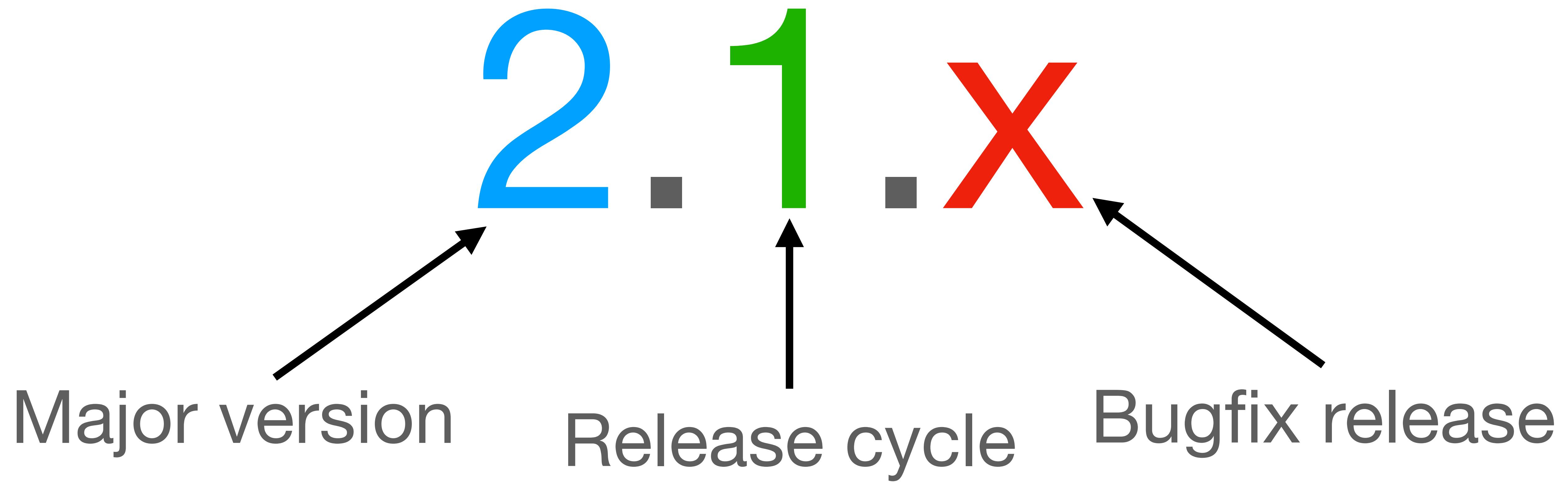
let json.parse ({ foo }: {foo:int}) = '{"foo": 1}'
- : unit = ()

foo
- : int = 1
```

Below the code editor is a large, empty rectangular area, likely a results or output pane. At the bottom of the page is a single button labeled "Execute".

Rolling Release

Rolling Release



Rolling Release

- Provide early builds for testing and rollout planning

Rolling Release

- Provide early builds for testing and rollout planning
- Change download links while keeping previous release assets

Rolling Release

Mar 3
 github-actions
 rolling-releas...
-o cdb94a1
[Compare ▾](#)

Liquidsoap Rolling Release 2.2.x

Pre-release



This release provides liquidsoap assets before they are published as a new versioned release.

You can use it to install the latest stable code before it is published and test/prepare your production environment for it.

Rolling releases can also be useful for us to quickly detect and report bugs before the final published release!

⚠ Warning ⚠

Assets in this release will be deleted. If you are looking for permanent links to release assets, please head over to <https://github.com/savonet/liquidsoap-release-assets/releases>

For more details about our release process, please checkout <https://github.com/savonet/liquidsoap#release-details>

2.2.0 (unreleased)

New:

Rolling Release

▼ Assets 19

 liquidsoap-cdb94a1-2.2.0-win64.zip	45.1 MB	2 days ago
 liquidsoap-cdb94a1-aarch64-2.2.0-r0.apk	38.6 MB	2 days ago
 liquidsoap-cdb94a1-aarch64-dbg-2.2.0-r0.apk	4.87 MB	2 days ago
 liquidsoap-cdb94a1-dbgsym_2.2.0-debian-bookworm-1_amd64.deb	5.51 MB	2 days ago
 liquidsoap-cdb94a1-dbgsym_2.2.0-debian-bookworm-1_arm64.deb	4.84 MB	2 days ago
 liquidsoap-cdb94a1-dbgsym_2.2.0-debian-bullseye-1_amd64.deb	5.04 MB	2 days ago
 liquidsoap-cdb94a1-dbgsym_2.2.0-debian-bullseye-1_arm64.deb	4.4 MB	2 days ago
 liquidsoap-cdb94a1-x86_64-2.2.0-r0.apk	35.5 MB	2 days ago
 liquidsoap-cdb94a1-x86_64-dbg-2.2.0-r0.apk	5.27 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-debian-bookworm-1_amd64.deb	9.64 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-debian-bookworm-1_arm64.deb	10.2 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-debian-bullseye-1_amd64.deb	9.6 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-debian-bullseye-1_arm64.deb	10.1 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-ubuntu-focal-1_amd64.deb	9.58 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-ubuntu-focal-1_arm64.deb	10.1 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-ubuntu-jammy-1_amd64.deb	10.8 MB	2 days ago
 liquidsoap-cdb94a1_2.2.0-ubuntu-jammy-1_arm64.deb	11.7 MB	2 days ago
 Source code (zip)		2 days ago
 Source code (tar.gz)		2 days ago

Rolling Release

github.com/savonet/liquidsoap-release-assets/releases/tag/rolling-release-v2.2.x		
liquidsoap-2a3bf62-dbgsym_2.2.0-debian-bookworm-1_amd64.deb	2.96 MB	Apr 11
liquidsoap-2a3bf62-dbgsym_2.2.0-debian-bookworm-1_arm64.deb	2.95 MB	Apr 11
liquidsoap-2a3bf62-dbgsym_2.2.0-debian-bullseye-1_amd64.deb	2.59 MB	Apr 11
liquidsoap-2a3bf62-dbgsym_2.2.0-debian-bullseye-1_arm64.deb	2.61 MB	Apr 11
liquidsoap-2a3bf62-x86_64-2.2.0-r0.apk	34.9 MB	Apr 11
liquidsoap-2a3bf62-x86_64-dbg-2.2.0-r0.apk	3.56 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-debian-bookworm-1_amd64.deb	7.03 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-debian-bookworm-1_arm64.deb	8.06 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-debian-bullseye-1_amd64.deb	7 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-debian-bullseye-1_arm64.deb	8.03 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-ubuntu-focal-1_amd64.deb	6.97 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-ubuntu-focal-1_arm64.deb	8 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-ubuntu-jammy-1_amd64.deb	7.78 MB	Apr 11
liquidsoap-2a3bf62_2.2.0-ubuntu-jammy-1_arm64.deb	9.22 MB	Apr 11
liquidsoap-2cab684-2.2.0-win64.zip	45.1 MB	2 weeks ago
liquidsoap-2cab684-aarch64-2.2.0-r0.apk	39.1 MB	2 weeks ago
liquidsoap-2cab684-aarch64-dbg-2.2.0-r0.apk	4.87 MB	2 weeks ago
liquidsoap-2cab684-dbgsym_2.2.0-debian-bookworm-1_amd64.deb	5.52 MB	2 weeks ago
liquidsoap-2cab684-dbgsym_2.2.0-debian-bookworm-1_arm64.deb	4.83 MB	2 weeks ago
liquidsoap-2cab684-dbgsym_2.2.0-debian-bullseye-1_amd64.deb	5.05 MB	2 weeks ago
liquidsoap-2cab684-dbgsym_2.2.0-debian-bullseye-1_arm64.deb	4.41 MB	2 weeks ago

Rolling Release



savonet/liquidsoap ☆

By [savonet](#) • Updated 2 days ago

Production-ready docker images for liquidsoap

[Image](#)

[Pulls 50K+](#)

[Overview](#) **Tags**

Sort by [Newest](#) ▾ [Filter Tags](#)

TAG	DIGEST	OS/ARCH	SCANNED	COMPRESSED SIZE ⓘ
cdb94a1 Last pushed 2 days ago by liquidsoap	5c29e5645700 9a3a736046c6	linux/amd64 linux/arm64	---	316.33 MB 291.9 MB

TAG	DIGEST	OS/ARCH	SCANNED	COMPRESSED SIZE ⓘ
rolling-release-v2.2.x Last pushed 2 days ago by liquidsoap	5c29e5645700 9a3a736046c6	linux/amd64 linux/arm64	---	316.33 MB 291.9 MB

New HTTP Stack

New HTTP Stack

```
def handler(request, response) =
  log("Got a request on path #{request.path}, protocol version: #{request.http_version}, \
      method: #{request.method}, headers: #{request.headers}, query: #{request.query}, \
      body: #{request.body()}")

# Sets content-type to json and data to `json.stringify({foo = "bla"})`
response.json({foo = "bla"})

# Sets content-type to html and data to `"<p>It works!</p>"`
response.html("<p>It works!</p>")

end

harbor.http.register(port=8080, method="POST", path, handler)
```

New HTTP Stack

The screenshot shows a web browser displaying a Liquidsoap documentation page. The URL in the address bar is `liquidsoap.info/doc-dev/harbor_http.html#nodeexpress-api`. The page has a purple header with the Liquidsoap logo and navigation links for 'Install', 'Starters', and 'Reference'. The main content area is titled 'Node/express API' and contains text explaining the `harbor.http.register` function and a code example.

Node/express API

The `harbor.http.register` function offers a higher-level API for advanced HTTP response implementation. Its API is very similar to the node/express API. Here's an example:

```
def handler(request, response) =  
    log("Got a request on path #{request.path}, protocol version: #{request.http_version}, \  
        method: #{request.method}, headers: #{request.headers}, query: #{request.query}, \  
        body: #{request.body()}")  
  
    # Set response code. Defaults to 200  
    response.status_code(201)  
  
    # Set response status message. Uses `status_code` if not specified  
    response.status_message("Created")  
  
    # Replaces response headers  
    response.headers([{"X-Foo", "bar"}])  
  
    # Set a single header  
    response.header("X-Foo", "bar")  
  
    # Set http protocol version  
    response.http_version("1.1")  
  
    # Same as setting the "Content-Type" header  
    response.content_type("application/liquidsoap")
```

New HTTP Stack

```
transport = http.transport.ssl(  
    # Server mode: required,  
    # client mode: optional, add certificate to trusted pool  
    certificate="/path/to/certificate/file",  
  
    # Server mode: required, client mode: ignored  
    key="/path/to/secret/key/file",  
  
    # Required if key file requires one.  
    # TLS does not support password encrypted keys!  
    password="optional password"  
)  
  
harbor.http.register(transport=transport, port=8000, ...)  
  
input.harbor(transport=..., port=8000, ...)  
  
output.harbor(transport=..., port=8000, ...)  
  
output.icecast(transport=..., port=8000, ...)
```

Multitrack support

Multitrack support

- Provide access to individual media tracks, e.g. audio 1, audio 2, video etc.

Multitrack support

- Provide access to individual media tracks, e.g. audio 1, audio 2, video etc.
- Create an abstraction for manipulating metadata and track marks

Multitrack support

- Provide access to individual media tracks, e.g. audio 1, audio 2, video etc.
- Create an abstraction for manipulating metadata and track marks
- Unify typing and expected runtime content

Multitrack support

```
s = single("/path/to/movie.mkv")  
  
# Copy first audio track and video:  
output.file(  
    %ffmpeg(  
        %audio.copy,  
        %video.copy  
    ),  
    "/path/to/copy.mkv",  
    s  
)
```

Multitrack support

```
2023/05/29 14:44:45 [decoder:4] Available decoders: ffmpg (priority: 10), image (priority: 1),
2023/05/29 14:44:45 [decoder:4] Trying decoder "ffmpg"
2023/05/29 14:44:45 [decoder.ffmpg:3] Requested content-type for "/tmp/rt/vid/12 - I'm The Zydeco Man - Clifton Chenier.mp4": {audio=ffmpeg.copy,video=ffmpeg.copy}
2023/05/29 14:44:45 [decoder.ffmpg:3] FFmpeg recognizes "/tmp/rt/vid/12 - I'm The Zydeco Man - Clifton Chenier.mp4" as video: {codec: h264, 640x640, yuv420p}, audio: {codec: aac, 4800Hz, 2 channel(s)}
2023/05/29 14:44:45 [decoder.ffmpg:3] Decoded content-type for "/tmp/rt/vid/12 - I'm The Zydeco Man - Clifton Chenier.mp4": {audio=ffmpeg.copy(codec="aac",channel_layout="stereo",sample_format=fltp,sample_rate=48000),video=ffmpeg.copy(codec="h264",width=640,height=640,aspect_ratio=4/3,pixel_format=yuv420p)}
2023/05/29 14:44:45 [decoder:4] Selected decoder ffmpg for file "/tmp/rt/vid/12 - I'm The Zydeco Man - Clifton Chenier.mp4" with expected kind {audio=ffmpeg.copy(codec="aac",channel_layout="stereo",sample_format=fltp,sample_rate=48000),video=ffmpeg.copy(codec="h264",width=640,height=640,aspect_ratio=4/3,pixel_format=yuv420p)} and detected content {audio=ffmpeg.copy(codec="aac",channel_layout="stereo",sample_format=fltp,sample_rate=48000),video=ffmpeg.copy(codec="h264",width=640,height=640,aspect_ratio=4/3,pixel_format=yuv420p)}
```

Multitrack support

```
s = single("/path/to/movie.mkv")

# Copy first audio track and video track
# and re-encode second audio track:
output.file(
    %ffmpeg(
        %audio.copy,
        %audio_2(
            channels=2,
            codec="aac"
        ),
        %video.copy
    ),
    "/path/to/copy.mkv",
    s
)
```

Multitrack support

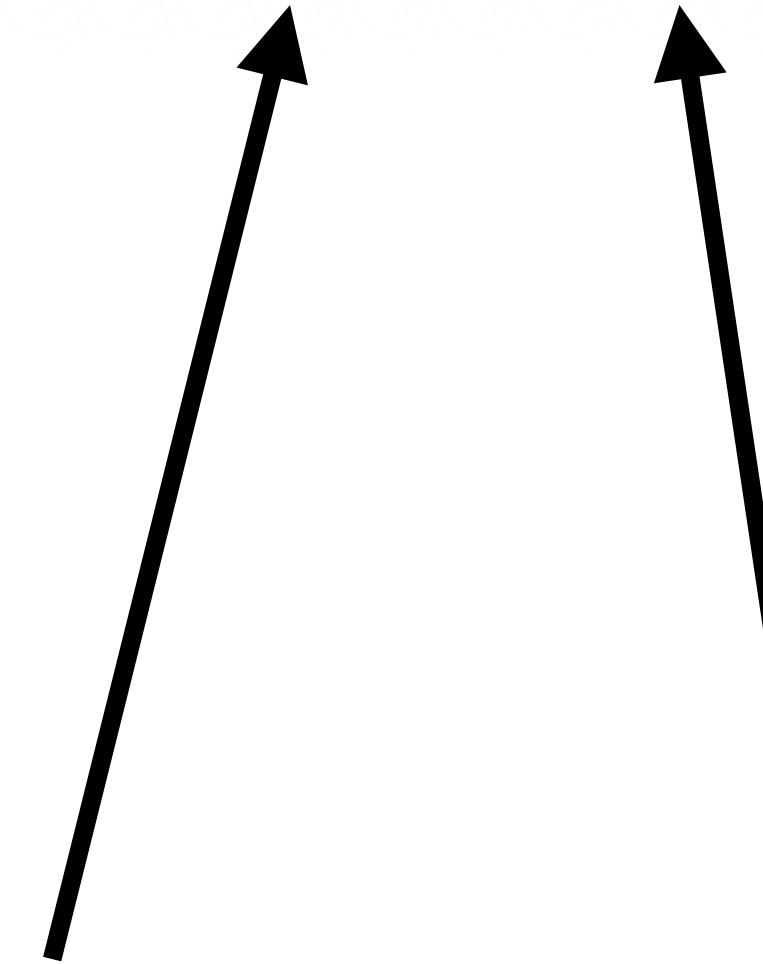
```
s = playlist("/path/to/playlist")  
# Copy first audio track and video track  
# and re-encode second audio track:  
output.file(  
    fallible=true,  
    %ffmpeg(  
        %audio.copy,  
        %audio_2(  
            channels=2,  
            codec="aac"  
        ),  
        %video.copy  
    ),  
    "/path/to/copy.mkv",  
    s  
)
```

Multitrack support

```
let {audio, video, metadata, track_marks} = source.tracks(s)
```

Multitrack support

```
let {audio, video, metadata, track_marks} = source.tracks(s)
```

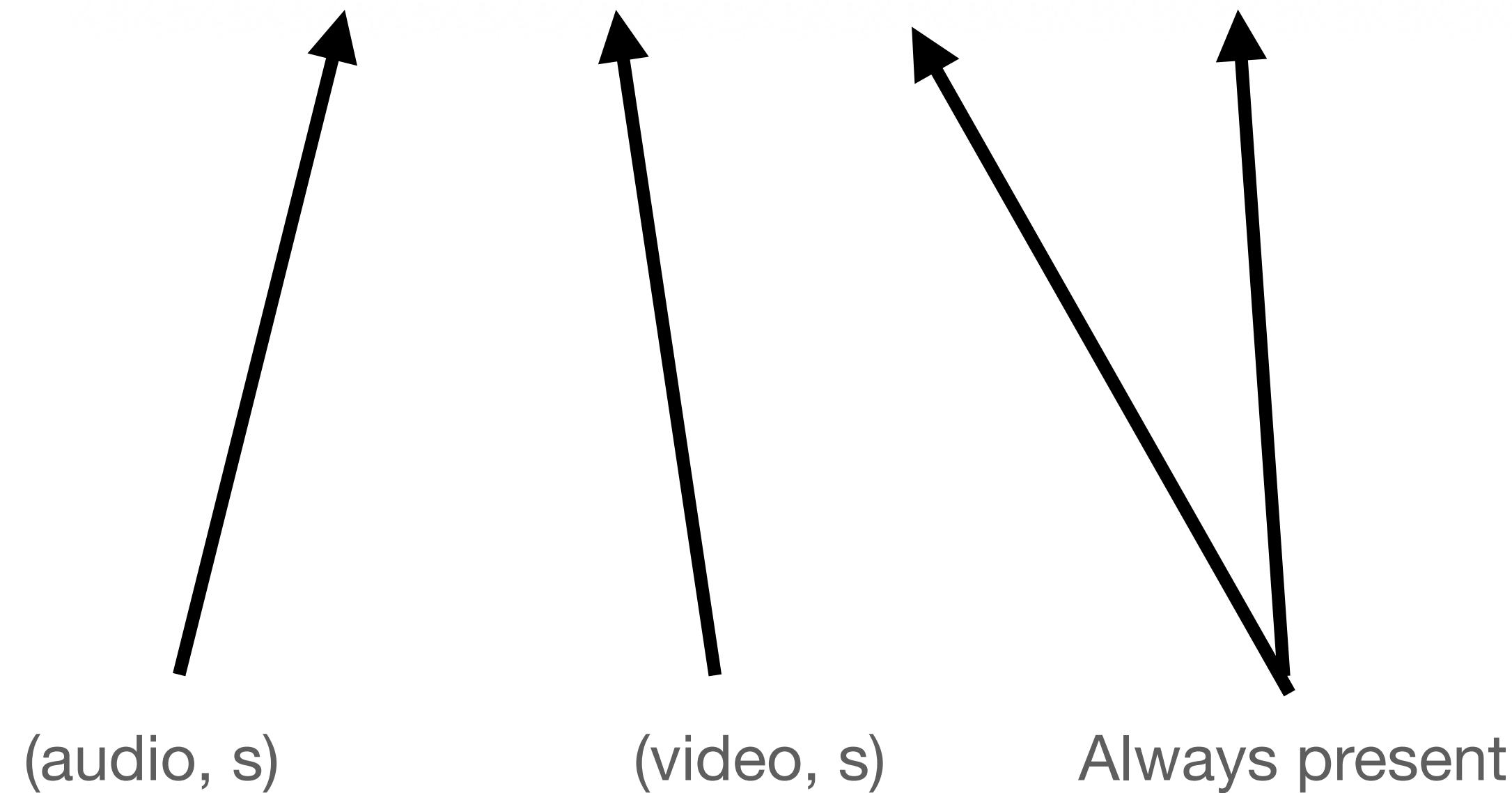


(audio, s)

(video, s)

Multitrack support

```
let {audio, video, metadata, track_marks} = source.tracks(s)
```



Multitrack support

```
# A playlist of audio files
s = playlist(...)

# A static image
image = single("/path/to/image.png")

# Get the playlist's audio track, metadata and track marks
let {audio = playlist_audio, metadata, track_marks} = source.track(s)

# Get the video track from our static image
let {video = image_video} = source.tracks(s)

# Mux the audio tracks with the image
s = source({
    audio=playlist_audio,
    video=image_video,
    metadata=metadata,
    track_marks=track_marks
})
```

Multitrack support

```
s = playlist(...)

# Extract all tracks except track_marks:
let {track_marks=_, ...tracks} = source.tracks(s)

s = source(tracks)
```

Multitrack support

```
s = playlist("...")

let { audio, metadata } = source.tracks(s)

audio_aac = trackffmpeg.encode.audio(%ffmpeg(%audio(codec="aac"))), track.audio.mean(audio))
audio_mp3 = trackffmpeg.encode.audio(%ffmpeg(%audio(codec="mp3"))), audio)

source({
  audio_aac=audio_aac,
  audio_mp3=audio_mp3,
  metadata
})
```

Multitrack support

```
s = playlist("...")

let { audio, metadata } = source.tracks(s)

audio_aac = trackffmpeg.encode.audio(%ffmpeg(%audio(codec="aac"))), track.audio.mean(audio))
audio_mp3 = trackffmpeg.encode.audio(%ffmpeg(%audio(codec="mp3"))), audio)

source({
  audio_aac=audio_aac,
  audio_mp3=audio_mp3,
  metdata
})
```

Multitrack support

```
s = playlist("...")

let { audio, metadata } = source.tracks(s)

audio_aac = track.ffmpeg.encode.audio(%ffmpeg(%audio(codec="aac"))), track.audio.mean(audio))
audio_mp3 = track.ffmpeg.encode.audio(%ffmpeg(%audio(codec="mp3"))), audio)
metadata = track.metadata(audio_aac)

source({
  audio_aac=audio_aac,
  audio_mp3=audio_mp3,
  metadata
})
```

Multitrack support

Conventions

Multitrack support

Conventions

```
    output.file(  
        %ffmpeg(  
            %en(codec="aac"),  
            %fr(codec="aac"),  
            %director_cut(codec="libx264")  
        ),  
        "/path/to/copy.mkv",  
        s  
    )
```

Multitrack support

Conventions

```
    output.file(  
        %ffmpeg(  
            %audio_en(codec=audio_codec),  
            %audio_fr(codec="aac"),  
            %director_cut_video(codec=video_codec)  
        ),  
        "/path/to/copy.mkv",  
        s  
    )
```

Multitrack support

Conventions

1. A `copy` track is any track named `%<track_name>.copy`. We do not need to know the track's content in this case.
2. If a track has `audio_content` or `video_content` as parameter (for instance `%foo(audio_content, ...)`) then it is considered, resp., `audio` or `video`.
3. If the track name has `audio` or `video` in it (for instance `%dolby_audio_fr`) then it is considered, resp., `audio` or `video`
4. If the track codec is hardcoded (for instance `(%foo(codec="aac", ...)`) then the codec is used to detect the content.

Multitrack support

Future work

- Dynamically add a track?

```
let { video = default_video } = source.tracks(single(...))

def next() =
    url = get_url()
    s = single(url)
    tracks = source.tracks(s)

    source(tracks.{
        video = tracks.video ?? default_video
    })
end

s = source.dynamic(next)
```

Liquidsoap 2.2.x release?

Liquidsoap 2.2.x release?

Soon!



Liquidsoap 2.2.x release?

Soon!



- Mostly doing bug fix
- Performance and regression
- Please test, prepare your systems and report!

Liquidsoap 2.3.x roadmap

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- Update the liquidsoap book

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- Rewrite the streaming loop

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```
%include "foo.liq"
```

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```
%import { foo } from "foo.liq"
```

```
def bla() =  
    foo(123)  
end
```

```
%export bla
```

Liquidsoap 2.3.x roadmap

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- Proper module support
- Address standard library performance issues

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- Take advantage of OCaml 5 concurrency
- Proper module support
- Address standard library performance issues
- Add developer tooling: linter/prettier, syntax highlighting, etc.

Questions?