6th - 7th March 2023

Open Toolchain Hackathon Summary

Open Toolchain
FOUNDATION

Open Toolchain Hackathon Summary

On 6th and 7th of march 2023 the first Hackathon by the Open Toolchain Foundation was hosted in Fab City Haus Hamburg.

Context & Background

The Open Toolchain Foundation

The Open Toolchain Foundation

The idea for the Open Toolchain Foundation arose in the context of the INTERFACER Project that can be seen in the light of the Fab City Initiative that challenges cities to co-develop globally and produce everything they consume locally by 2054. These projects are all about exchanging data globally to produce goods locally, so think of CAD designs, assembly manuals, user manuals, settings for machines, in short all the documentation that is required to produce goods locally.

Unfortunately, we recognize that the software tools to reach the above goal have various restrictions: proprietary tools have high licensing fees or various restrictions, the terms and conditions of use may change any time, whereas open source tools are fragmented, some features lack quality, or a consistent user experience or intercompatibility. So we draw inspiration from the open source tools that are available to software developers (compilers, editors, libraries) and aim to create a similar ecosystem of tools for engineering and manufacturing targeting the whole toolchain that is required to manufacture goods.

In short, the Open Toolchain Foundation aims to democratize engineering, making it available to anyone who wants to design, exchange designs, or manufacture products. The Open Toolchain Foundation is initiated by members of Fab City Hamburg, HIWW, and Open Source Ecology Germany.

Open Toolchain FOUNDATION

open source software ecosystems
for better engineering

foundation roadmap

- Q1 2022 initial commit
- Q3 2022 first community kick-off event
- Q3 2022 program design & operational action plan
- Q3 2022 set up legal body
- Q4 2022 website & forum launch
- Q4 2022 official OSS development program start
- Q1 2022 publishing database of engineering OSS
- Q1 2023 stand at FOSDEM and other events
- **Q1 2023 official launch & first community hackathon**
- Q2 2023 acquiring funds and partnerships based on achievements and community needs

What does it take to create an all-inclusive open source ecosystem for engineering and design as we know it from open source software?

Support a **robust open source ecosystem** that produces **interoperable software toolchains** to enable **collaborative and resilient engineering.**

simply BETTER engineering!

Every design process consists of a specific software toolchain. In the future all tools are intercompatible and have respective open formats. This will become the standard in engineering and it needs an open source ecosystem for a pioneering foundation.

areas:

- **supporting the development** of open source software
- **promoting the adoption** of open source software

means:

- **scholarships** fund development
- **community events** bring people together
- **academia** promote open toolchains in research and education

initiators: FAB CITY HAMBURG · HIWW · OPEN SOURCE ECOLOGY GERMANY

funded by: EUROPEAN UNION European Regional Development Fund · INTERFACER

v1.2.0

interfacerproject.eu/imprint

Open Toolchain Hackathon:
A Community Event as a Prototype

The goal of the Open Toolchain Foundation is to support the open source software toolchain for engineering. Usability of this toolchain is paramount for its success.

During the hackathon we worked on the (open source) hardware design of the Nimble mesh network project using only tools in the open source software ecosystem. The hardware design journey was documented, both the successes and the pain points.

Alongside the hardware hacking we wanted to have software developers from projects within the open toolchain. These developers would be able to observe how users use these projects/software tools, provide guidance, and even to hack together new features during the event for better interoperability.

The event was about collaboration. Collaboration on hardware design; collaboration between users of the open toolchain and its developers; and collaboration between different projects within the toolchain. We are confident that these collaborations will grow and flourish after the event to form strong partnerships.

The Hackathon was part of the EU-EFRE funded collaborative project INTERFACER.
More see Blogpost.

Open Toolchain Hackathon

SCHEDULE

6th of March (Monday)

11:00	Arrival @ FabCity House
11:15	Opening
11:30	Speed-meeting-warm-up
12:00	Introduction of projects and attendees, collection of hacking-unit topics
13:00	Lunch
14:00	Hacking-unit setup
15:00	Group photo and quick unit-updates
15:20	Break
15:30	Hacking
19:00	Pizzatime
20:00	Hacking

7th of March (Tuesday)

09:00	Breakfast
09:40	Orga & collective check-in
10:00	Hacking
12:00	Hacking finalisation
13:00	Lunch
14:00	Presentation of results
15:30	Closing ceremony
16:00	Drinks / networking

EUROPEAN UNION
European Regional Development Fund
INTERFACER
OPEN SOURCE ECOLOGY GERMANY
Hamburg
HIWW
FABCITY Hamburg

Goals

- Demonstrating how an open source documentation workflow could be implemented (complete open toolchain for nimble)
- Gather ideas and specific approaches on how the open toolchain can be improved (taking the nimble as example demo case study)
- Form alliances and partner up with other projects to further extend the open toolchain(s)

Components

- Communication:
  - Forum
  - Matrix Chat
- Tools:
  - Hacking Units (Template)
  - Pads
  - Git Repositories

Extras & Networking

- Warm-ups
- Good Food
- “Rule of 2 Feet”
- Remix & Project exchange
- Social Meetups
- more? (what made the event feel fluid?)

Partners

Attending Partners

OSS: FreeCAD, KiCAD, CadQuery, Gitbuilding, OSH-AutoDoc, MakerStick,

OSH: Nimble, OpenFlexure, UniProKit, LibreSolar, Showerloop

Org: OSEG, FabCity Hamburg, HIWW, Wakoma, Freifunk, Internet of Production, WikiFactory, FabLab Munich, EnAccess, be-able, #ASKnet, sensor.community, 7BIndustries

Initiating Partners

FAB CITY HAMBURG

HIWW

OPEN SOURCE ECOLOGY GERMANY

Funded By

EUROPEAN UNION

European Regional Development Fund

Hamburg | Behörde für Wirtschaft und Innovation

INTERFACER

Event Summary

Around 40 creative minds achieved a lot with good vibes while working on 13 hacking units in less than 24 hours.

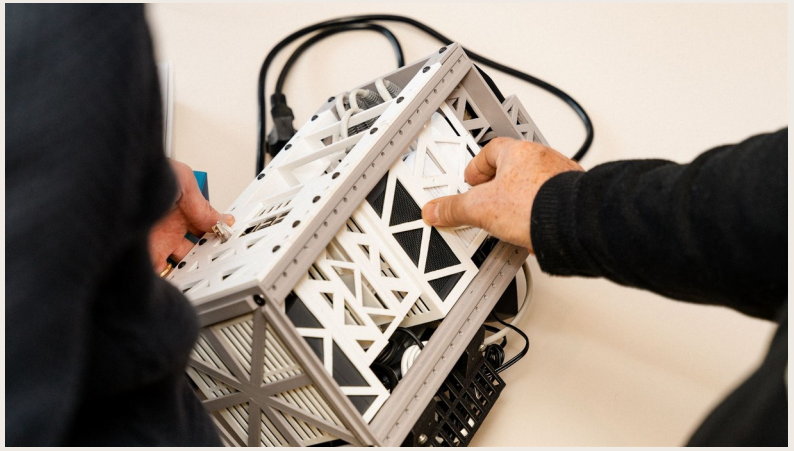
Event summary

Starting into the Hackathon

The first Hackathon organised by the Open Toolchain Foundation started on Monday the 6th of March at Fab City Hamburg.

The space filled up with around 40 people from diverse backgrounds with the shared interest to invest their energy into contributing to open toolchains and the Open Source Ecosystem. More specifically at this hackathon they were eager to support the open toolchain of the Nimble — an Open Source project with hard- and software components that allows remote communities to install and run their own local Internet systems and thus distribute access to knowledge and digital tools.

With it's potential to empower more and more communities in the global south and elsewhere the Nimble gave the Hackathon participants an inspiring use case for improving an open tool chain and finding new connections to projects and contributors. Other open source projects with related products and services were invited and connected by the organising team.



Event summary

Becoming one Team

The first part of the Hackathon was dedicated to collectively setting up a productive Hacking Environment. The organising team was welcoming everyone in the space at fab city hamburg that would soon turn into a creative hub with small teams working on an array of hacking units. But how to get there?

As some of the hackers and makers in open source Hard- and Software had not met before in person we started with a speed-meeting activity. „Tell me about an open source project that inspires you?“, „How would you invest 100 000€ for the OS Ecosystem?“, „Tell me about a tool that you misused?“, „what is a toolchain challenge you want to solve?“, „Which projects are you contributing to?“ …were some of the questions asked in pairs that were constantly changing after a short time for exchange. This way everyone gained insights form about five new people and the group formed into a collective body - a bigger connected team - in a short amount of time.

Event summary

Organising Hacking Units

Socially warmed up we then gathered in the main hacking space to learn about the challenges and projects and to define potential hacking units to be worked on. The Nimble Project was represented by Eric who talked about the organisations needs and wishes for becoming a fully open licensed project. Other projects like LibreSolar, Freifunk, Makerstick and UniProKit shared Ideas on how they could imagine to support and be supported by the nimble.

On this basis the individuals in the group suggested the work packages to be tackled that we refer to as Hacking Units. In total more than 12 Hacking Units with a wide range of topics were collected and clustered on a marketplace wall. The predefined topic clusters were: Hardware Development for the nimble, Software Development for the nimble, Documentation/Collaboration Setup, Open Toolchain Development, and OTFN Ecosystem. Education was added as a cluster as proposed by a participant. From here small teams formed and started to work on the first batch of units.

Event summary

Hacking in units till late at night

After the Hacking Units were collectively formed the teams fully owned their process and could organise themselves freely until the moment of presentation on the next day after lunchtime. Fab City Haus was a perfect location to allow teams to spread over several rooms.

A silent room was very appreciated and could even be used for little naps in between. The Fab Corner was ready to be taken over with it’s 3D printers and hardware tools. The lounge and the kitchen always offered great opportunities for chats over snacks and really good coffee. Teams set up their spaces for teamwork and their activities like writing code, experimenting and building with hardware parts, brainstorming, planning drawing and discussing. In the evening pizza and drinks lounged us into the open ended hacking.

Event summary

Hacking on and wrapping up

The 2nd day started with breakfast and fresh motivation from short status updates from the units and the gratitude for the work that had been done so far from Eric, who represented the nimble project at the end of breakfast. The atmosphere was productive and loaded with a good chilled vibe. Hacking could have easily gone on for longer. Still we had to stick to the plan and finalise the work just before lunchtime.

Documentation was playing a more and more important role on the 2nd day. All Hacking Units were advised to collect and document their work in their digital Hacking Unit Template, that was provided by the team. After being nourished by another nice lunch we got ready for the short presentations with setting up tech and some yoga moves for those who wanted to stretch.

Event summary

Presentations

At the final presentation 12 units proudly presented their work of the last hours in a short report based on their hacking unit pad. In 3-5 minutes they talked about their initial challenge, what they had done and achieved and where they saw further need and potential for development.

We saw and heard stories behind prototypes, sketches, new research insights from User Testings, the new open license for the nimble, potential business models and future activities of the Open Toolchain Foundation. Hacking Units and their documentation ranging from Set Up Repo, to Energy-grid for nimble grid, Parametric enclosure workflow, Open Educational Resources & Learning Management Systems , Business Model exploration, Compliance (certification, liability, etc. - CE) , Uni-Pro Kit, FreeCAD UI Improvement, FreeCAD doc, Tool/Addon/setting collection for Makerstick platform , to Next activities for OTFN and OTFN Visioning.

A last unit was compiled by the whole group as a closing of the hackathon. After words of gratitude by the organisers, Eric from the Nimble and participants we boarded an imaginary time machine to envision a bright future for the open source eco-system and it's community.

Impressions

Methods & Process

The methods and process-design of the Hackathon were inspired by a wider social design toolset including Warm-Ups, Open Space and Design Thinking. A central design element for enabling democratic co-creation were the Hacking Units.

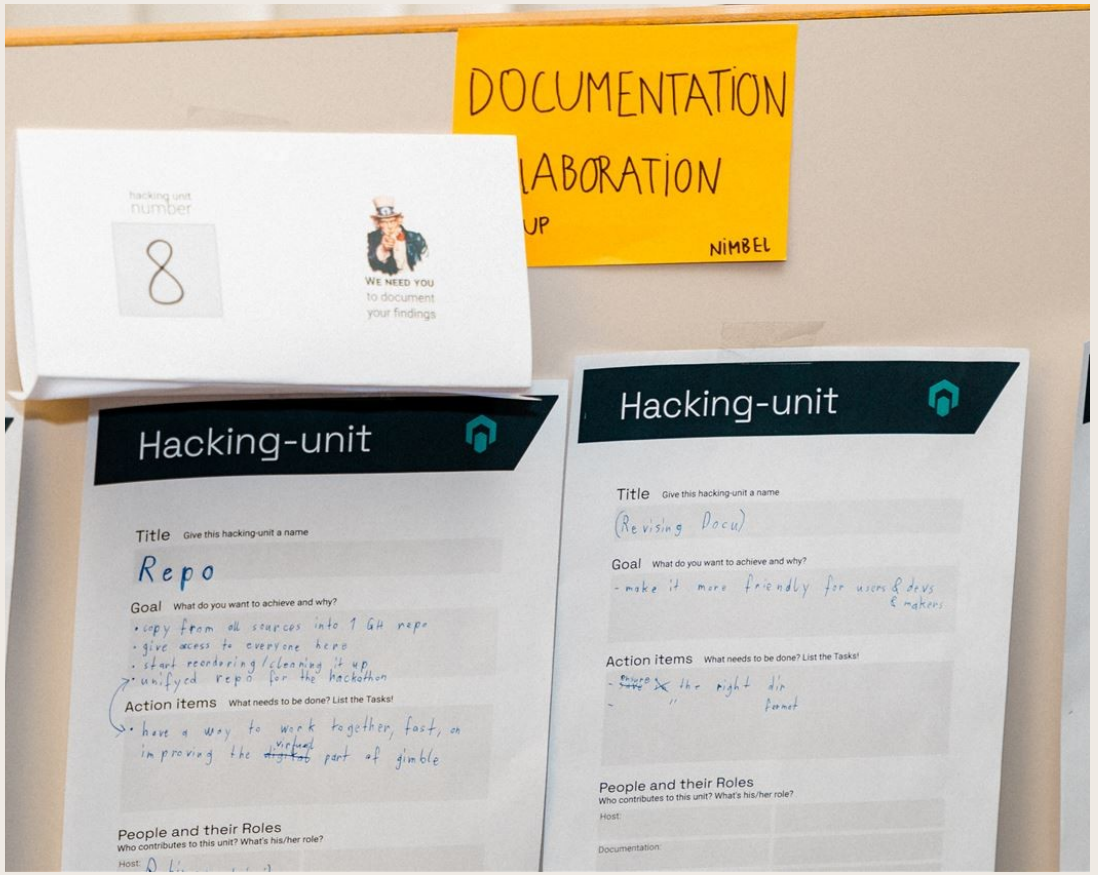
Hacking Units

Hacking Units

As a framework for flexible workflows in fluid teams we created a template for creating and defining Hacking Units. A Hacking Unit is meant to be a defined chunk of Work that can be executed by a small team (about 2-7 People) in the timeframe of a hackathon, such as “FreeCAD UI Improvements”. Hacking Units can vary in size of the work package, of the team and time that is needed for the fulfilment.

Set Up: The Hacking Units are meant to be defined by the Hackathon participants. The Hackathon Team is there to support and facilitate this process and can guide and suggest topics. Each hacking unit needs a host in order to have someone as a go to person. Ideally the host also holds some knowledge and motivation for the execution of the unit. Other roles within the Unit are possible and can vary. We recommend to have someone dedicated to documentation.

The structure of the Hacking Unit can be seen here: https://md.opensourceecology.de/hackathon-links?both#Pads + Link Pdf., Link Pad?



Hacking Units

This Template was provided as a sheet of Paper and as a Pad. We designed the paper version to be used in the initiation process of forming units with a clear Name, goals and contributors and the Pads to be used after the forming Process. Therefore the Pads had a more detailed structure that aimed to provide some guidance for the Team of Contributors to organise their Work and Document their Process. The Pads were also used for Presentations.

After discussing and collecting the Hacking Units with and from the participants they can be showcased on a large surface like on a market place in order to give people who want to contribute an overview and the possibility to sign up. From there teams can form and start with planning their unit with some more detail before they start. Which Units were addressed first and which later happened organically. For a next run we imagine to iterate and improve the process of forming Hacking Units (this process could for example even start before the Hackathon).

Hacker Warm-Up

Warm Up Speed Meeting

Tell me about … Something that you would really like to hack? A project that inspires you? Your favourite open source tool? What would you do with 100 000€? …

In order to get to know each other, to connect and to get in the mood of hacking together we started with a speed meeting activity. Every person had to write down an Icebreaker question related to hacking and find a person he or she had not met before. After a chat based on the questions in that pairing the pair had to swap their questions and move to a new person each.

Hackathon Closing

Time machine visioning

The Participants were asked to close their eyes and board an imaginary time Machine to travel to 2033 and see themselves in the OS Ecosystem with the OFTN.

We asked „What do you see?“ and collected diverse visions from the audience into the Pad of Hacking Unit 13.

We asked „How did we get there?“ and collect and added ideas for steps to be taken.

Evaluation Summary

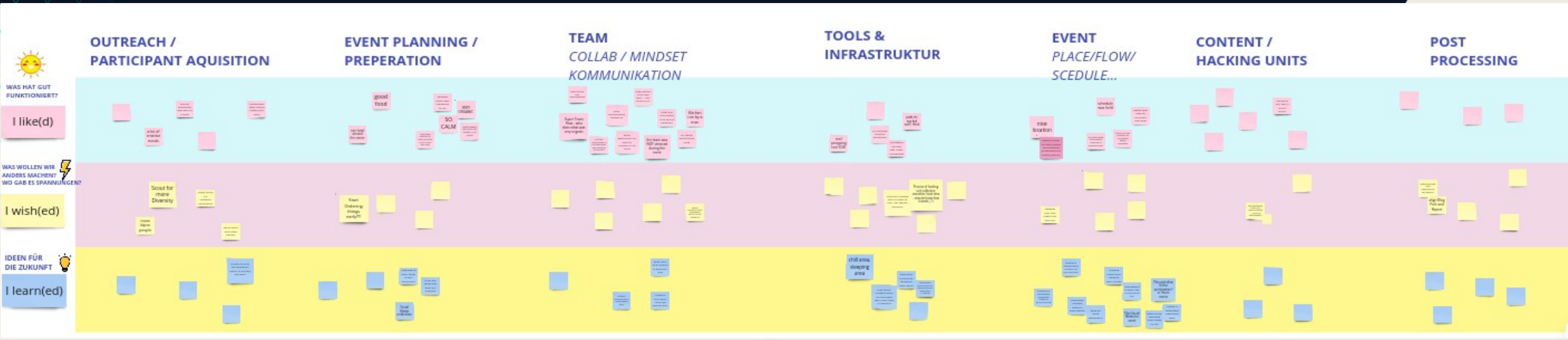
Most relevant insights and impressions of the event outcome

Hacking Units (Teams)

- Energy-grid for nimble grid
- Parametric enclosure workflow
- Open Educational Resources & Learning Management Systems
- Sheet Metal Enclosure → topic merged into unit 02
- FreeCAD doc
- Business Model exploration
- UniProKit for nimble
- Set Up Repo for nimble
- FreeCAD UI Improvement
- Tool/Addon/setting collection for Makerstick platform
- Next activities for OTFN
- Compliance (certification, liability, etc. - CE)
- OTFN Visioning

→ [All Pads Overview]

Learnings



- Scout for more Diversity
- It helps to have the hackathon closely to another big event
- Outward communication & Social Media role needed
- providing enough space is important!
- Shift from hacking unit on Paper to Pad/Online - any Idea to improve?
- need for silent workspaces

Visions for an Open Toolchain in 2033

What do we see as a future Vision for the Open Source Ecosystem?

- we will be able to close the OTFN because there is no more work to do
- and start the Open Anything Foundation OAFN
- there will be more female power in the ecosystem
- we will have a textile open toolchain
- non-nerdy people can use it, because it is so self-explanatory
- there will be a open source fusion power plant
- we will host an open source festival
- there is a beautiful venue in the countryside where people build open source hardware and have a good time
- we can collaborate without proprietary software
- the software is so easy to use that you don't need a long time to be versatile in it
- the big proprietary players in the field are contributing to OS projects
- there is an open CAD ecosystem
- a future where I can develop hardware without needing to code something to be able to do it
- big industry players use OS tools for their products, so they contribute to them and help us in developing them
- the open source idea is spreading to even more industries, like food industry, etc
- we have radically democratized development tools (all over the world)

Visions for an Open Toolchain in 2033

How do we get there?

- start with the next generation our kids, educate them open
- change the dynamic: big industry players use and depend on OS dev tools
- OS projects that have similar goals bundle their resources (no redundant projects)
- don’t focus too much on digital infrastructure/ software
- overcome ego to be able to really emerge together
- smaller tools which do one thing well rather then big tools which do many things
- have good standards for that
- spread the word of libre/free/open-source to general public
- have the language to explain to everyone why this is beneficial for all human beings and the planet

Closing

Some Numbers, Team and Thanks

Numbers

Attending initiatives

- OSS:
  FreeCAD, KiCAD, CadQuery, Gitbuilding,
  OSH-AutoDoc, MakerStick, FabAccess, ...
- OSH:
  Nimble, OpenFlexure, UniProKit, LibreSolar,
  LibreSolarBox, Showerloop, ...
- Org:
  OSEG, FabCity Hamburg, HIWW, Wakoma, Freifunk,
  Internet of Production, WikiFactory, FabLab Munich,
  EnAccess, be-able, #ASKnet, sensor.community,
  7BIndustries and others ...

Hackathon Team

Acknowledgments and Thanks

Dear participants, network members and partners,

we would like to express our deep gratitude to you. For the exciting and exhilarating experience of working together on ideas, achieving incredibly diverse and fast results and a dreamlike time together.

Every single contribution was valuable, an experience and inspiration for upcoming hackathons, a true enrichment for the community.

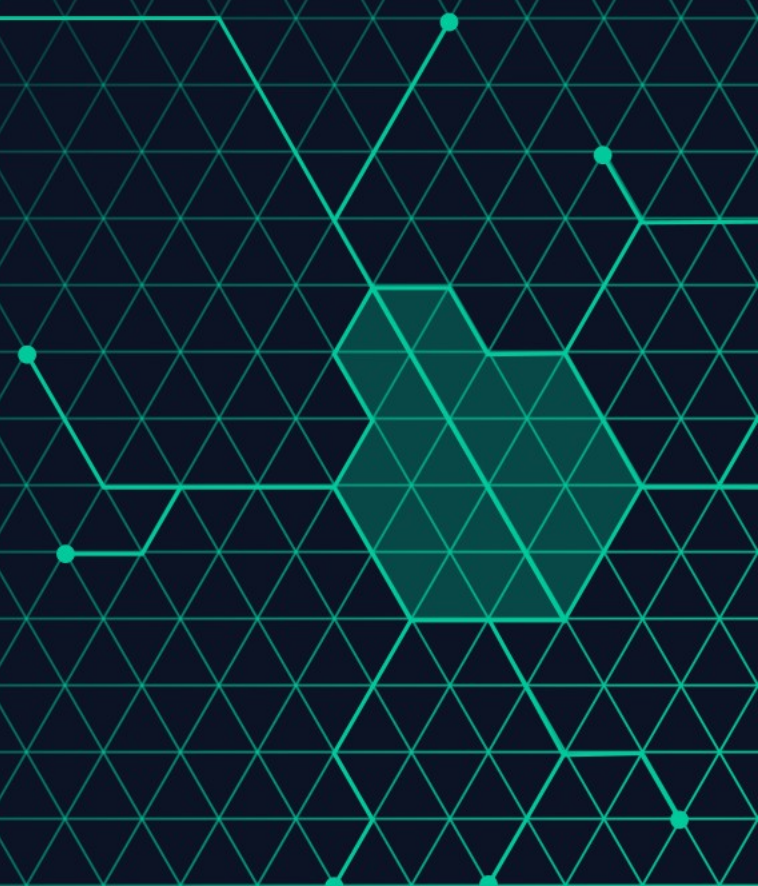
We will meet again! Thank you!

Thank You!
Let's connect:

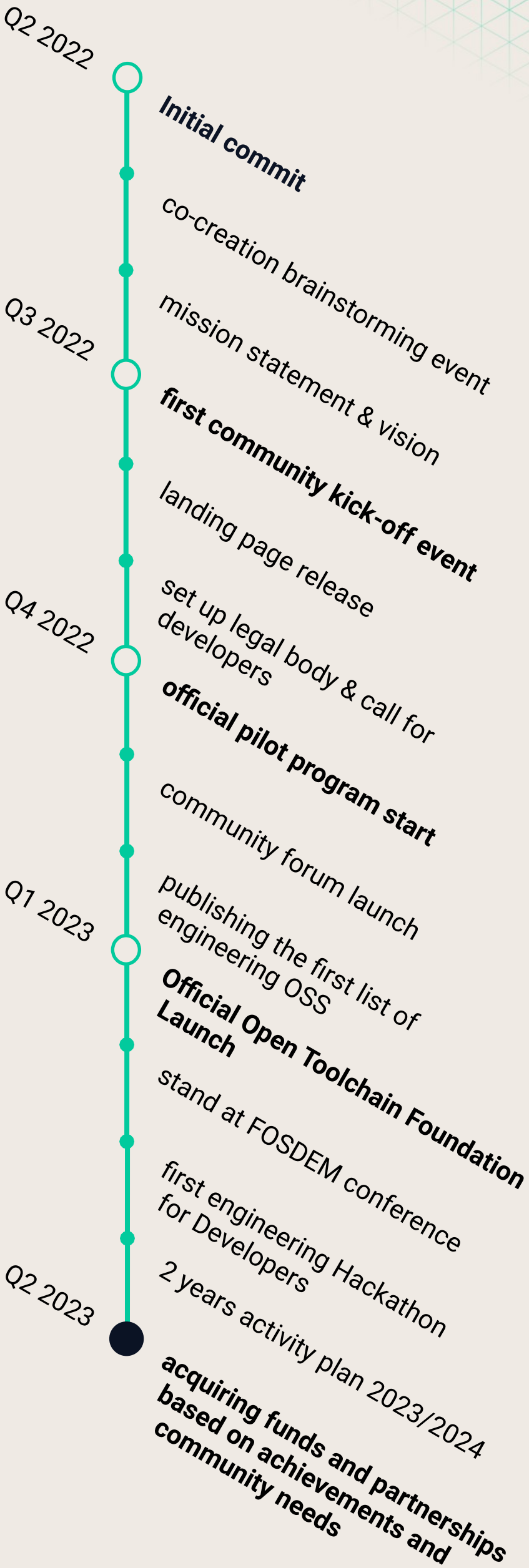
For more information please visit:
opentoolchain.org

For further exchange please join our chat & forum:
#opentoolchain:fabcity.hamburg (Matrix)
forum.opentoolchain.org (Discourse)

Follow up and share on social media:
#OTFN #opentoolchain #opensource
#OpenToolchainFoundation



Roadmap


Q2 2022
Initial commit
co-creation brainstorming event
Q3 2022
mission statement & vision
first community kick-off event
landing page release
Q4 2022
set up legal body & call for developers
official pilot program start
community forum launch
Q1 2023
publishing the first list of engineering OSS
Official Open Toolchain Foundation Launch
stand at FOSDEM conference
first engineering Hackathon for Developers
Q2 2023
2 years activity plan 2023/2024
acquiring funds and partnerships based on achievements and community needs

Annex

Resources, Slides, References

Resources

Video

https://spectra.video/w/jXbxzA5ytEy9kFq9LpzCtn