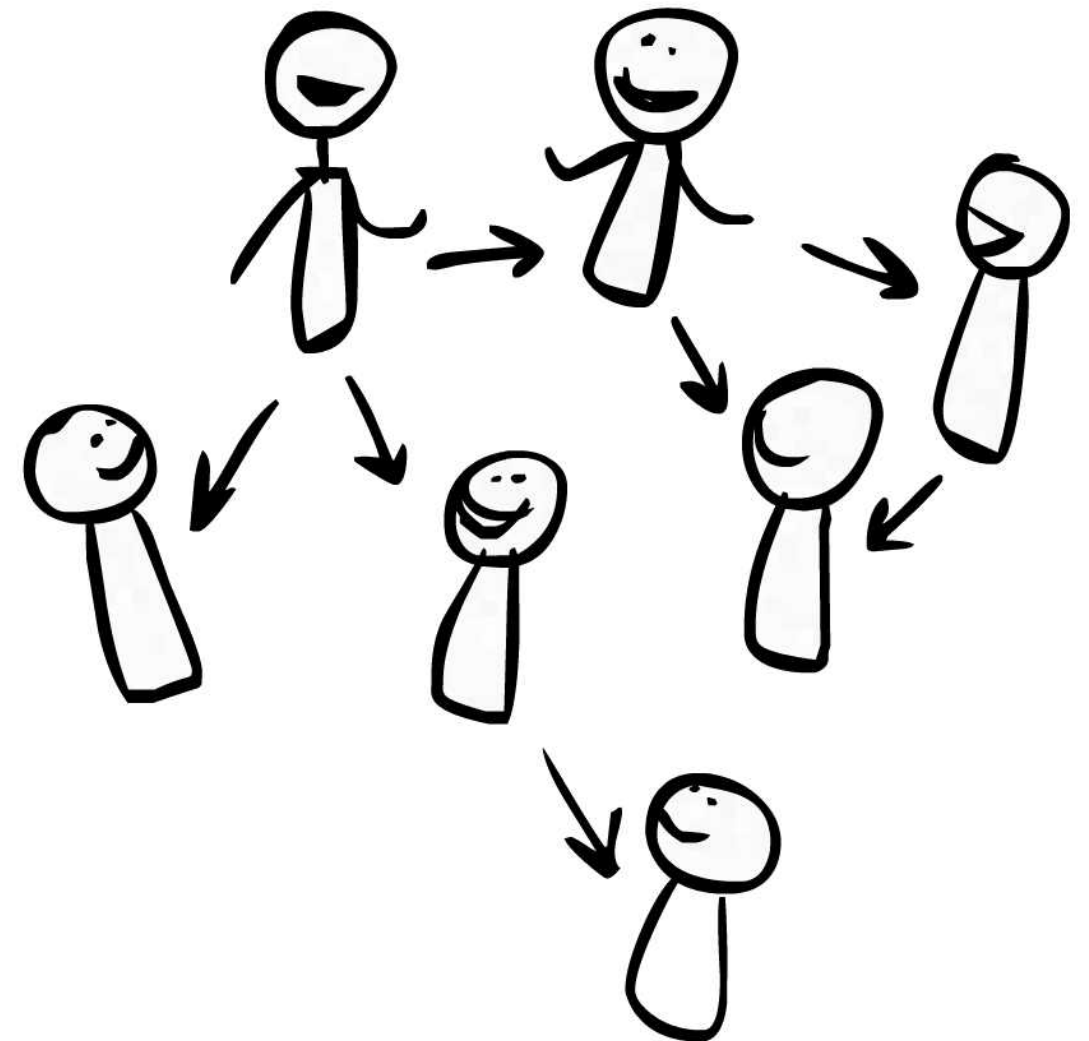# Open Source in Research : From Consumption to Community Building

– Lessons from the Field –
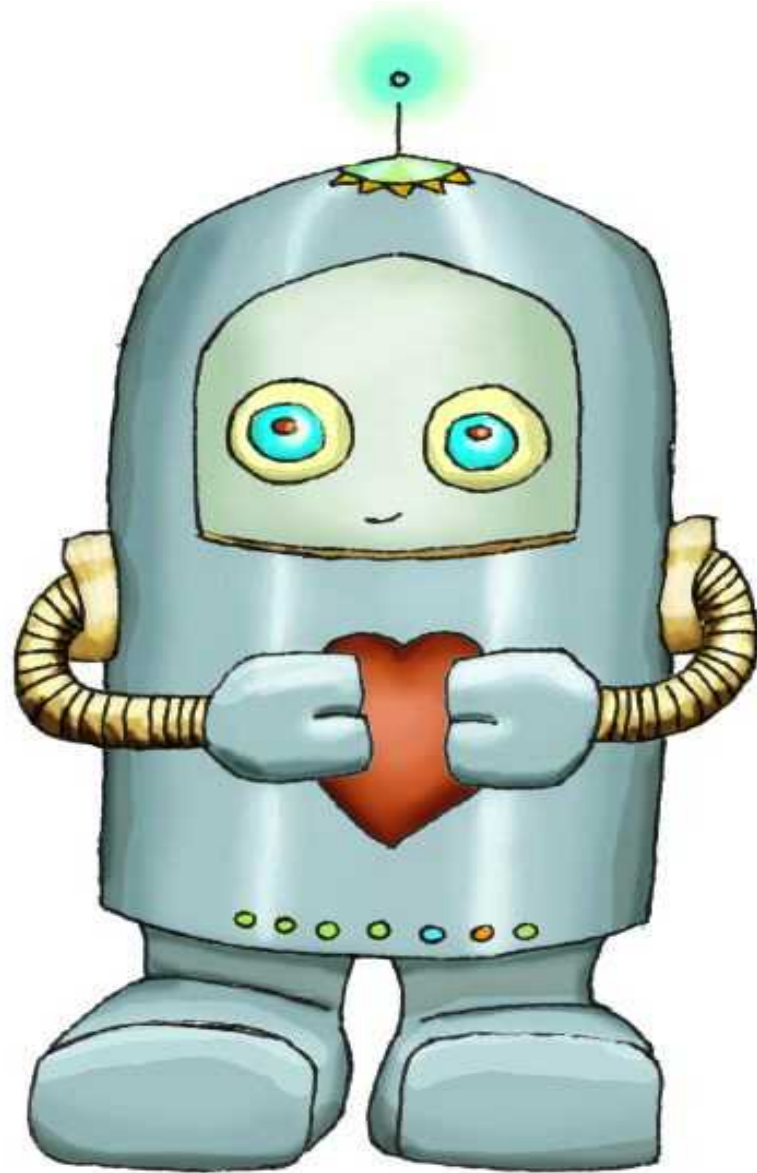
Stéphane Ribas
Open Source Program Manager DSI@INRIA
DSI SUAP

05/12/2025

Who am I ?

Why Open Source Matters ?

Open source is the art of transforming **digital infrastructures** into **common goods**

... so that **technology serves everyone** who needs it, not the other way around !

What is Open Source ?

Open source grants **libre access** to

- **modify** & **redistribute** source code,
- enabling collaboration & innovation across industries & academia.

Industry examples : Linux, Kubernetes

Academic tools : Jupyter, Python, Zotero

Core Benefits of Open Source ?

For IT service companies & research institutes

Reduced costs through "collaboration"

Accelerated innovation cycles

Community-driven improvements

Academia – Industry transfer vehicule

Open standards

Where Open Source Excels ?

Three domains where open source thrives

Non-Strategic Domains

Open source thrives where mutualization matters more than differentiation. LibreOffice demonstrates how shared tools can serve diverse needs without competitive conflict.

Commodity Infrastructure

The automotive industry runs on embedded Linux, yet value derives from design and features—not the operating system itself. The OS becomes infrastructure.

Internal Optimization

Within organisations, open source reduces costs and enhances collaboration, delivering high-quality digital tools without licensing constraints.

International Collaboration

The open source movement is **highly present** in the field of **particle physics**, largely thanks to the involvement of **CERN** & other leading laboratories. Among many benefits of being open, an important international collaboration can be noticed : ROOT, GEANT4, INDICO, Inspire, CERN Open Hardware License, Open Data Portal, SCOAP3, ATLAS, etc.

Understanding the limitations

When Open Source May Not Be Suitable ?

In **strategic domains** where differentiation drives competitive advantage open source may be less suitable.

Key Question :

How do you identify if a project is strategic for your laboratory?

Answer ?

A/ Ask your grand mother

B/ Choose your own license whatever my institute Open Source politics advice

C/ Choose an exotic license to be original and different

D/ Consult your innovation department to assess strategic value & competitive/co-opetition positioning.

The True Value Equation

Value in Open Source: **Community, Code, Data, Energy**

Open source value emerges from the synergy of four elements working in concert. Code alone is insufficient—it requires computational energy, quality data, and most critically, an engaged community to transform potential into impact.

Open Code

The **foundation** : accessible, modifiable source code shared freely/librement.

Data

Quality datasets that enable algorithms to learn & improve.

Processing Energy

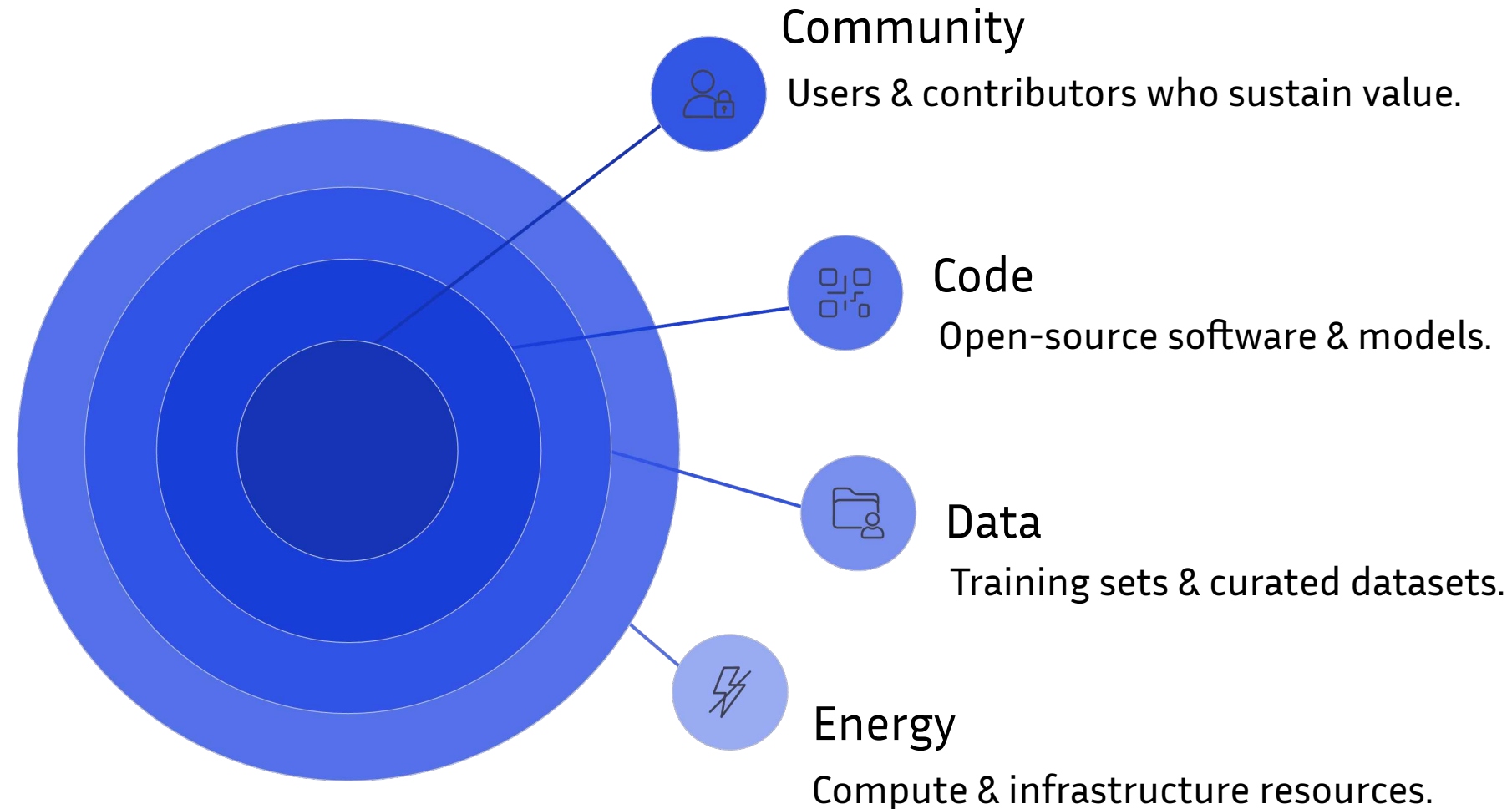Computational resources (kWh) that transform code into deliverables.

Active Community

Users & contributors who sustain & evolve the project.

Case Study : DeepSeek

Why community is the ultimate arbiter of value

DeepSeek's code is open, but without energy to run it and data to train it, the code remains inert.
More importantly, **without a community of users, the service cannot exist**.

Community
Users & contributors who sustain value.

Code
Open-source software & models.

Data
Training sets & curated datasets.

Energy
Compute & infrastructure resources.

Open Source code becomes a commodity, but when combined with algorithms, data & processed results … it creates value … **if used by a community !**

Sustainable open source projects depend on diverse contributors beyond developers;
It's about **management & social dynamics**, **not just IT**.

From Individual to Community : The Open Source Ecosystem

Community as a foundation

Core team developers

Developers

Forum Moderators

Translators

Documentation Writers

Main stream users

etc.

Community Managers

Bug Reporters
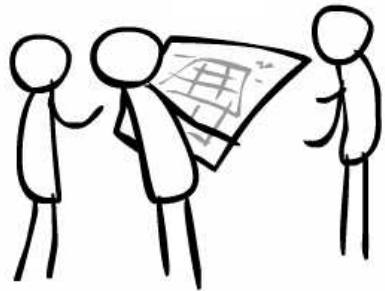
Consumers

How to Build a Community ?

A Simple 4-Step Framework

Building a thriving community doesn't happen by accident. It requires intentional planning, consistent execution & strategic growth.

1. Analyze
Understand your landscape & identify the common dream that will unite your members

2. Build
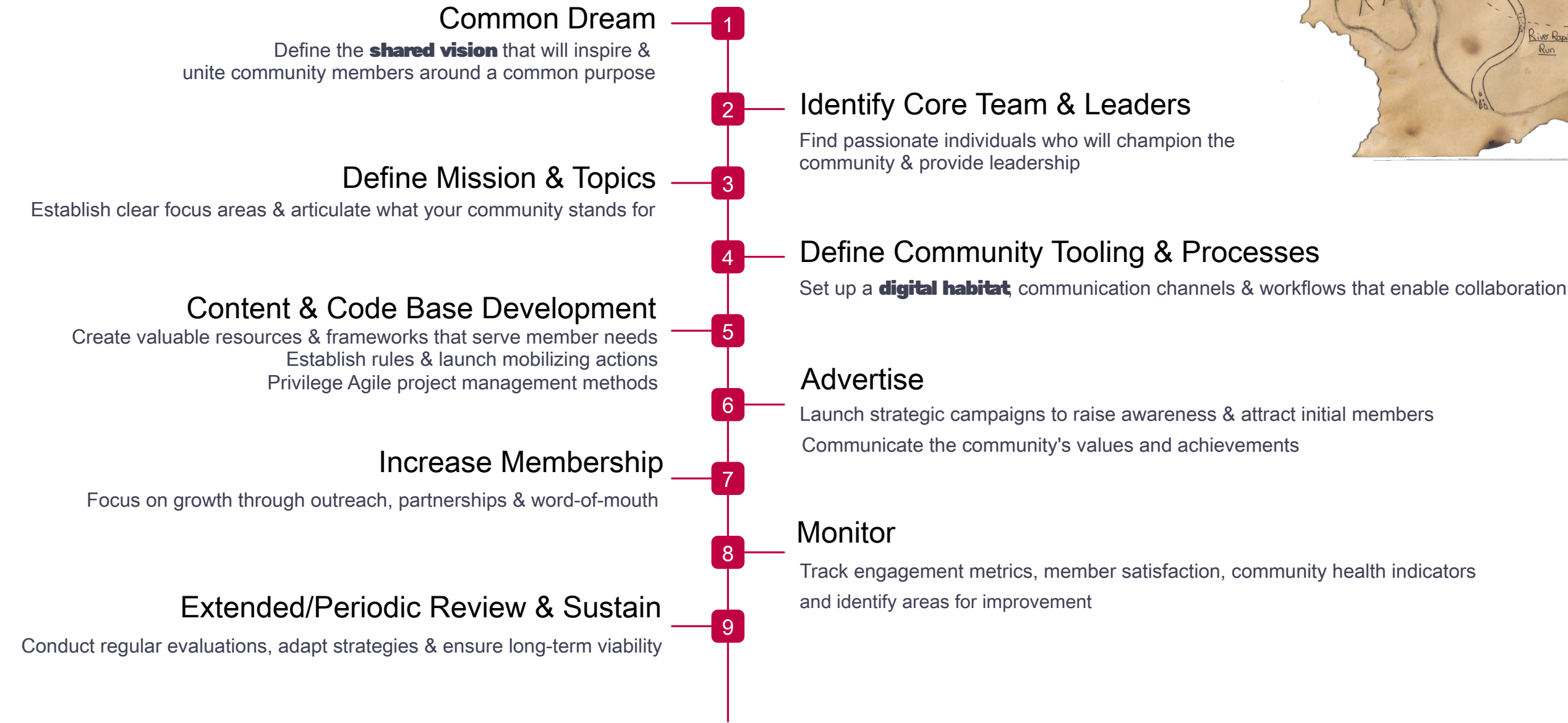Establish your foundation with core team, mission, essential tooling

3. Publicize
Grow your reach through strategic advertising & membership expansion

4. Sustain
Give momentum through regular activities, reviews & monitor progress

Any Step by Step Community Building path ?

1 — Common Dream
Define the **shared vision** that will inspire & unite community members around a common purpose

2 — Identify Core Team & Leaders
Find passionate individuals who will champion the community & provide leadership

3 — Define Mission & Topics
Establish clear focus areas & articulate what your community stands for

4 — Define Community Tooling & Processes
Set up a **digital habitat**, communication channels & workflows that enable collaboration

5 — Content & Code Base Development
Create valuable resources & frameworks that serve member needs
Establish rules & launch mobilizing actions
Privilege Agile project management methods

6 — Advertise
Launch strategic campaigns to raise awareness & attract initial members
Communicate the community's values and achievements

7 — Increase Membership
Focus on growth through outreach, partnerships & word-of-mouth

8 — Monitor
Track engagement metrics, member satisfaction, community health indicators and identify areas for improvement

9 — Extended/Periodic Review & Sustain
Conduct regular evaluations, adapt strategies & ensure long-term viability

Framework adapted from the pioneering work of Stan Garfield, McDermott & Karl Fogel on community development & open collaboration.

Open Source Project/Community xxxxx ?

Building a thriving community doesn't happen by accident. It requires intentional planning, consistent execution & strategic decision about ...
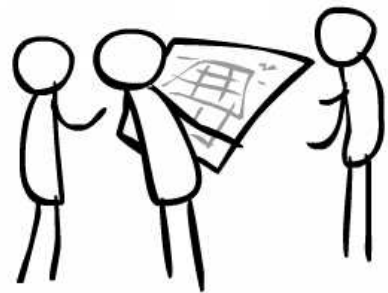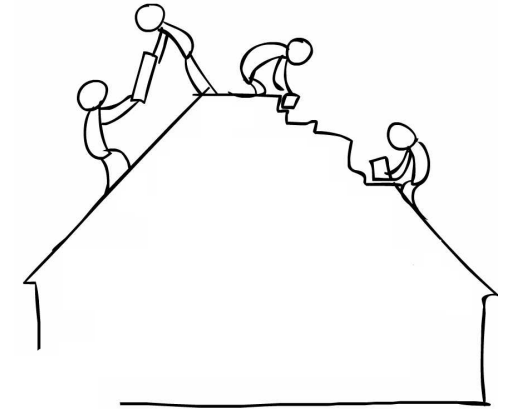
Governance	**Architecture of Participation**
IP Management	**Project/Platform orientation**
Business model	**Things to start with**
Collaboration guidelines	**Animation**
Code base development	**Monitoring**

Digital Habitat & Participation Architecture
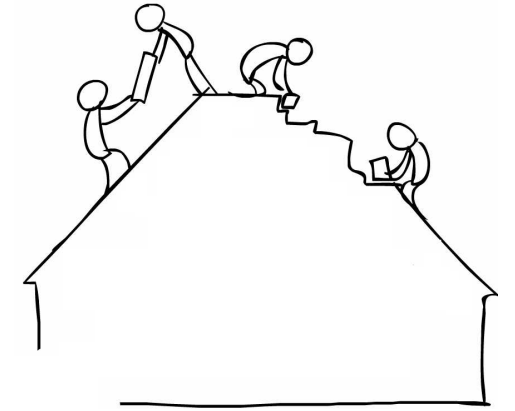
Foster identification & dissemination

Web Portal

Provide all the necessary information to understand, use, and contribute to the project.

The digital habitat forms the essential infrastructure of a digital community. It must be designed to meet various needs: project identity, technical collaboration & interaction between members.

Foster collaboration

Code Repository

Centralize & version the project's source code

Issue Tracking

Manage bugs, features & development tasks

Foster Interaction

Mailing Lists

Asynchronous communication for announcements & in-depth discussions

Forums

Structured spaces for conversations organized by topic

Three Essential Conditions for Open Source Communities

Eben Moglen's framework

Three conditions are essential for an open source community to **emerge & thrive** :

Solve Widely Shared Problems

Address common needs, not just local requirements

Open Everything

Code, discussions, and decisions must be transparent

Foster Positive-Sum Networks

Everyone—developers, users, contributors—must find value

Essential Elements of a Web Portal ?

A good project name

Choose a memorable & descriptive name that reflects the project's mission

Clear Mission Statement

Explain the project's objective & value in a few sentences

Displayed Open Source Nature

Clearly indicate that the project is open & accessible to all

Development Status

Communicate the project's maturity (alpha, beta, stable, etc.)

License Used

Specify the legal conditions for use & contribution

Installation Guide

Provide detailed instructions to get started with the project

Download Links

Facilitate access to the latest versions & archives

Contribution Guidelines

Explain how to join the project & submit changes

Mailing List

Offer a communication channel to stay informed & exchange ideas

meet melody

A COMMUNITY POWERED PUBLISHING PLATFORM

What is Melody?

Melody is an open source content management system for bloggers and publishers where its community of users and contributors is its most important feature. We believe that a vibrant community is the foundation on which all successful products and services are built today.

We are now at the very beginning of that mission. There is much to do and we want you to join us!

Why Melody?

- ✓ Community supported.
- ✓ Secure, scalable and rock solid platform.
- ✓ 100% Open Source. Forever.
- ✓ Proven content management system.
- ✓ Highly extensible and customizable

More questions? Try our FAQ page ▸

How Can I Participate?

⭐ SPREAD THE WORD

🎨 DESIGN A THEME

⚙️ CREATE A PLUGIN

📧 PITCH IN ON THE PROJECT

✨ IMPROVE THE SOFTWARE

✉️ SEND FEEDBACK

Creator-User Alignment

The importance of **consumers**

User Engagement

Users identify bugs, articulate new needs & drive iterative improvements

Needs Alignment

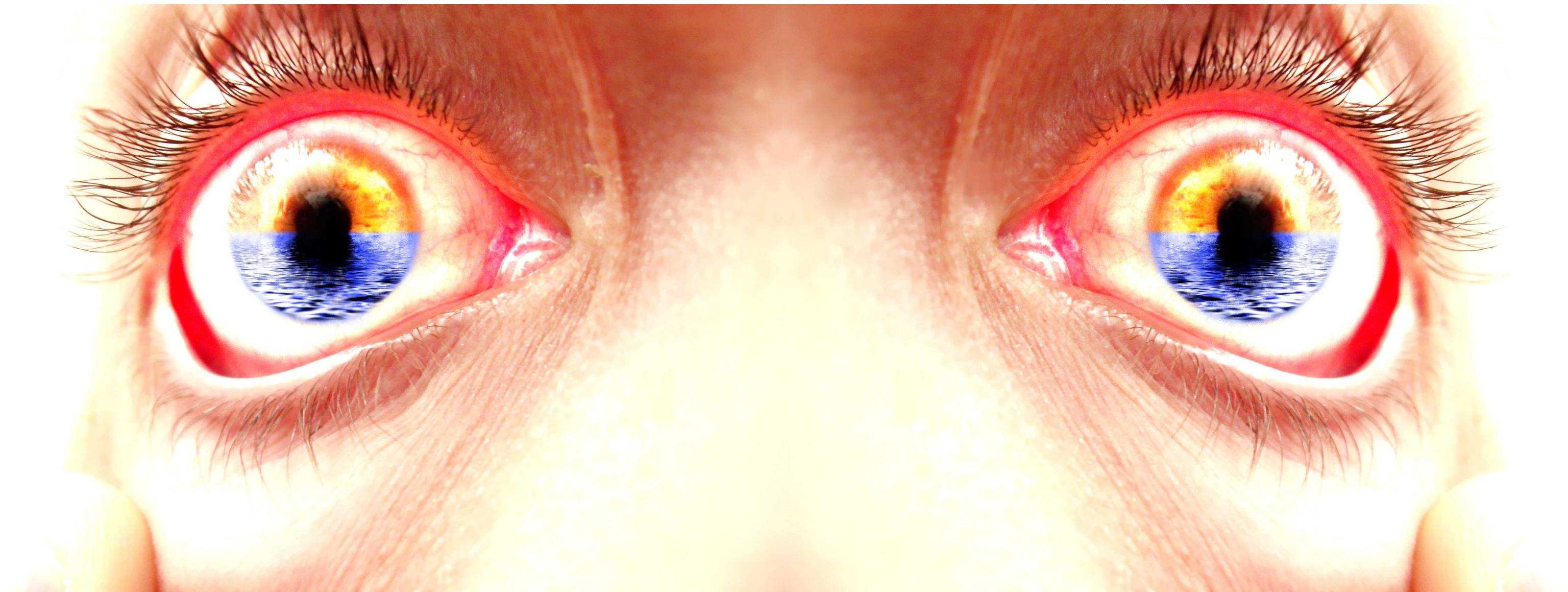Code must address user needs, not just laboratory requirements

Code Health

Strong correlation between community vitality & code quality

Evolution

Over time, usage grows & the project may need to adapt its direction, goals & features to meet broader user needs—perhaps even becoming a **generic platform**.

Are you still with me ?

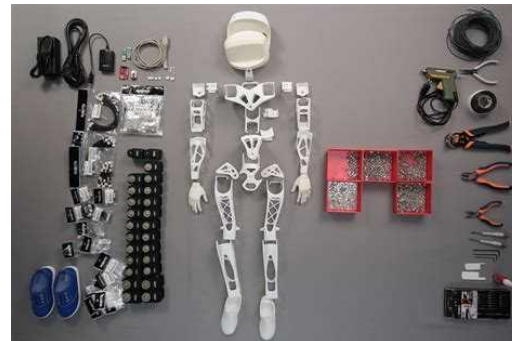# Research Open Source cases studies

Community as a foundation

Eigen

Three developers serving thousands of industrial users through focused problem-solving

Poppy Humanoid

Robotics enthusiasts & research communities collaborating on accessible platforms

AspireRFID

Industrial & community-driven innovation in supply chain technology

C++ Template library for Linear Algebra

AspireRFID/
AspireRFID

Case Study: Eigen – Open Source Linear Algebra library

Visibility doesn't equal success …

1 developer – today 3 - addressing a specific computational need have created lasting impact.
100+ contributors.

Open source works best when there's alignment between what creators want to solve & what **users genuinely need**. This alignment creates a positive feedback loop of improvement.

Creator's Vision

What creators aim to solve through their open-source contributions.

User Needs

The genuine requirements & problems faced by the user community.

Positive Feedback Loop

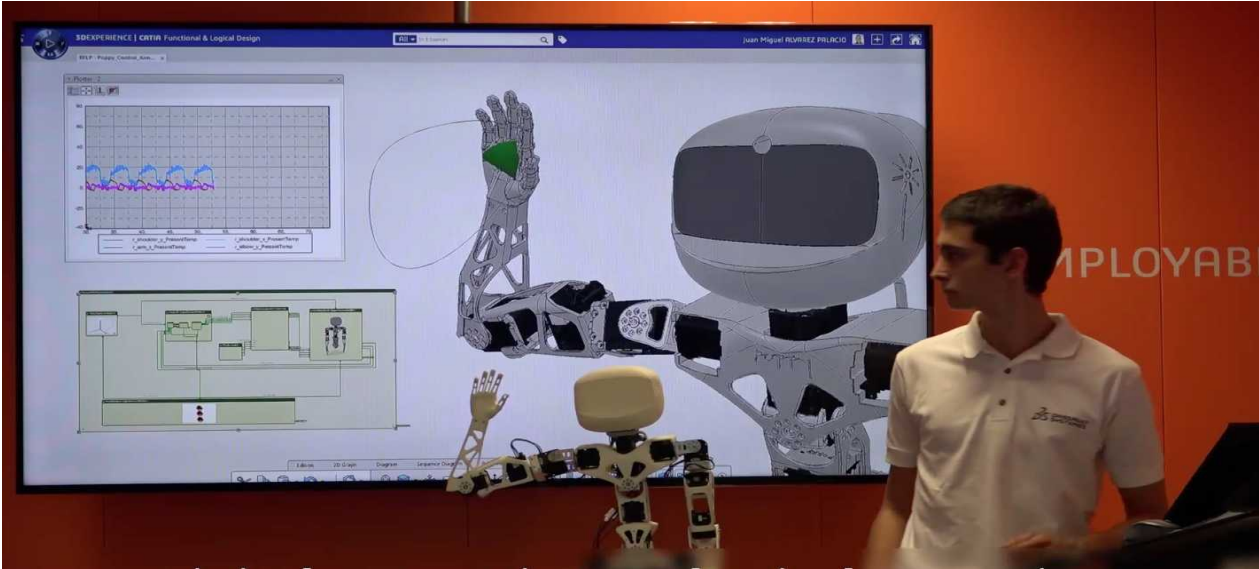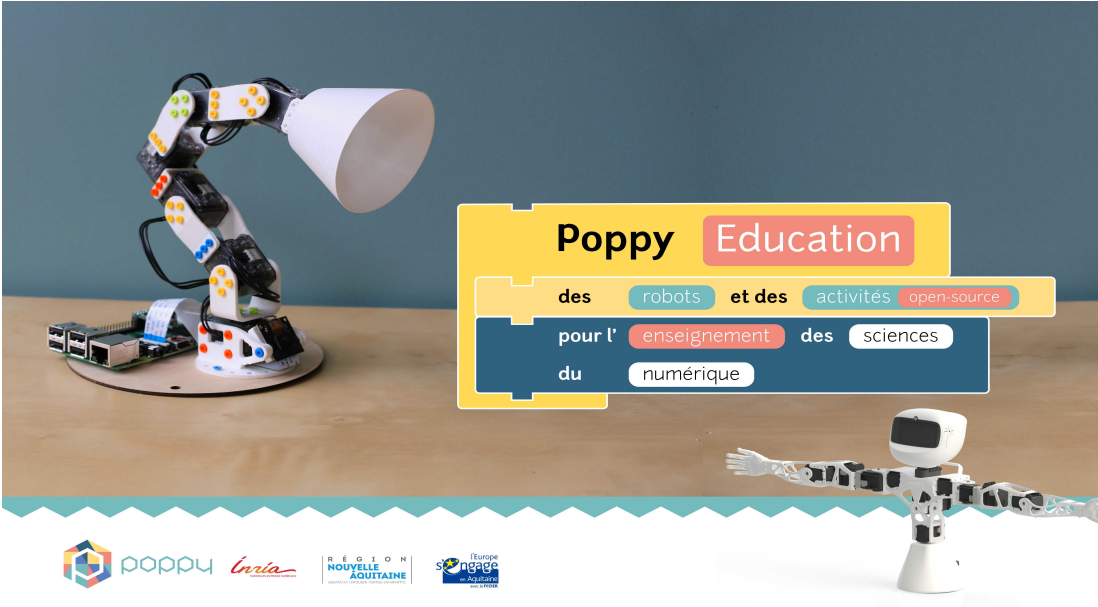Alignment drives iterative improvements & community-led evolution.

Poppy Humanoid project ?

Community as a foundation

Figures from 2014 ... 22 code developpers (github) +880 members (forum) +1500 followers (@poppy_project) Daily interaction of the Poppy forum

Collaborations with High Schools, University, Engineering Schools, Research Labs & Fablabs, Companies, Newspapers, Blogs & TV (Canal+, France TV, Time of India, Le monde, TED, etc.). Several grants (Inria, FEDER, ERC, etc.) and Phd Tthesis prices, 1 Start-up – Inria - **POLLEN ROBOTICS**, 1 company distributed Poppy kits , an ecosystem emerge ; formation @ Dassault, colloque team building @ Fablab, Poppy reads book @ Hachette, Poppy is a companion for children in hospital @ Cherry).

Poppy Education

des robots et des activités open-source
pour l' enseignement des sciences
du numérique

Le Monde.fr   Le fOSSa, bazar techno-participatif

ÉDITION ABONNÉS

Le fOSSa, bazar techno-participatif

LE MONDE SCIENCE ET TECHNO | 24.11.2014 à 16h50 |

Par David Larousserie

Abonnez vous à partir de 1 €   Réagir   ★ Classer   🖨 ✉   f Partager (29)   🐦 Tweeter

Cédric Tran-Xuan @ctranxuan   132d
Nice presentation from @stephaneribas from #INRIA about #Poppy
robot at #SoftShake. Thanks ! cc @poppy_project
pic.twitter.com/HK43wr3Rqr

Le Spécialiste Européen de la Robotique de Service

Mon compte   Inscription

£ $ € CHF

Génération ROBOTS

Ex: Mindstorm, Kit Gadgeteer, Capteur...

PANIER : 1   Livraison en 48h

Robots grand public | **Robots programmables pour l'education** | **Electronique et robotique** | **Robots pour la recherche** | **Marques**

Electronique et robotique

Robots programmables pour l'éducation

Robots domestiques

Robots pour la recherche

Capteurs et outils avancés pour la robotique

Baxter Research Robot

Humanoïdes et interaction homme-robot

Robotique en essaim

Robots mobiles

Poppy

Robot humanoïde Poppy

Robot Poppy Torso

Robots Professionnels

Fin de vie

Promotions

Poppy

Poppy est une plateforme open-source pour la création, l'utilisation et le partage d'objets robotiques interactifs. Elle s'adresse aux débutants comme aux experts, dans les domaines de l'éducation, de la science, de l'art, et plus généralement au monde des makers. Elle a été conçue comme un outil pour apprendre, créer et partager des idées et technologies liées au monde numérique.Pour en savoir plus, n'hésitez pas à consulter la page du projet Poppy.

🤖 Robot humanoïde Poppy

Voir tous les produits

Issu de la recherche française, le robot Poppy Humanoid est la créature artificielle représentative de la plateforme technologique Poppy.
Poppy Humanoid est un robot open-source (...

🤖 Robot Poppy Torso

all categories ▶ all tags ▶ **Categories** Latest Top

Category	Topics
Announcements Staff announcements about the Poppy project and this forum organization. You should read it. Really.	32
Education Utilisez-vous les robots comme moyen d'enseignement ? C'est l'endroit idéal pour partager votre expérience, réfléchir sur de nouvelles idées et demander des conseils. This section is mainly in French because the majority of contributors are francophone teachers but you can write in english. ▎**Activités pédagogiques**	111
Art Have you used the Poppy project for artistic purpose? This is the place to show your creations to other people!	39
Science Share your science: from news to specific research questions. The Poppy project wish for a more open and collaborative science.	25
Technology Anything about technical matters! Electronics, mechanics, programming... you will be surprised by the expertise and dedication of the Poppy project community.	405

Latest

📌 **Getting started with Poppy Project**
Announcements
documentation   howto   english
1
Sep '14

📌 **How to use this forum**
Announcements
1
Jul '14

Motors work with the same protocol
english
5
1d

☑ **Inspiration pour créer des gestes / mouvements avec Poppy**
▎**Education**
art   français   humanoid
5
6d

Anaconda and simulation
▎**Support**
1
6d

☑ **Etcher, and poppy torso img**
▎**Support**
7
7d

Playback of recorded moves not smooth
▎**Technology**
software
14
8d

AspireRFID library

20.000 visitors between 2010 & 2013, huge number of downloads, 70 countries, 35 code developers (OW2 forge), collaborations with industrials & RFID consortia (PICOM , Carrefour, Auchan, Decathlon...), 3 start-ups.

Welcome to the OW2 AspireRFID Wiki

Executive Summary

The AspireRFID project aims at developing and promoting an open-source, lightweight, standards-compliant, scalable, privacy-friendly, and integrated middleware along with several tools to ease the development, the deployment and the management of RFID-based applications and sensor-based applications. It implements several specifications from consortiums such as EPC Global, NFC Forum, JCP and OSGi Alliance.

AspireRFID provides also a set of tools enabling RFID consultants to deploy RFID solutions without a need for tedious low-level programming. AspireRFID allows the specification of RFID enabled processes. Accordingly, the tools generate all the RFID artifacts required to deploy these solutions over the AspireRfid middleware.

The license used by AspireRFID sources is the LGPL v2.1. The license used by AspireRFID documentation is the Creative Commons Share Alike (by-sa).

Keywords: RFID, NFC, Sensor, EPCGlobal, NFC Forum, M2M, IoT (Internet of Things), FOSS (Free Open Source Software).

Contact

For general information, please contact John Soldatos (A@ait.edu.gr where A=jsol) and Didier Donsez (B.C@imag.fr where B=Didier and C=Donsez).

For technical information, please contact the developer mailing list (A@ow2.org where A=aspirerfid-dev).

Links

- The AspireRFID Forge http://forge.ow2.org/projects/aspire
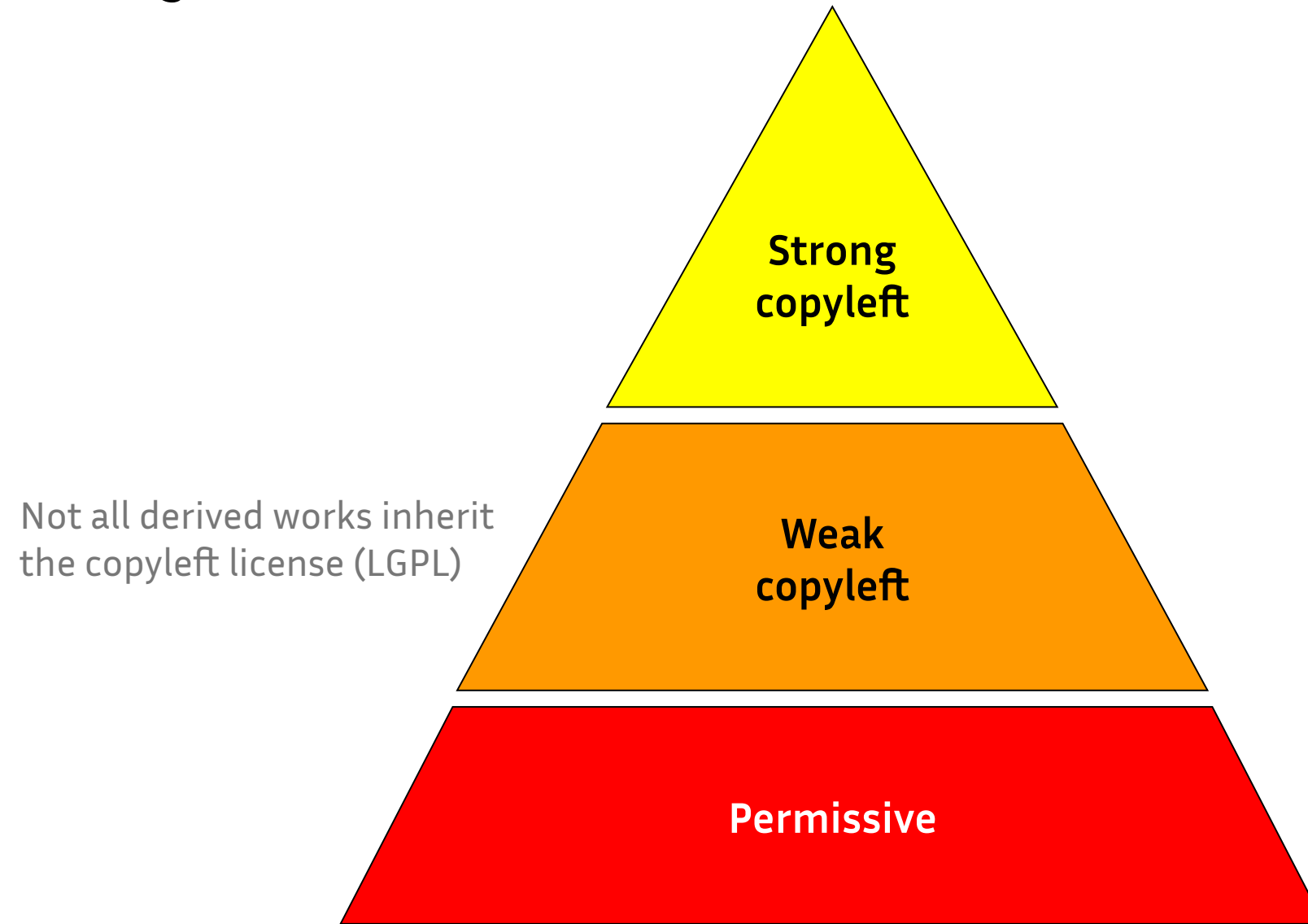- The FP7 ASPIRE Project http://www.fp7-aspire.eu

Stats

ASPIRE RFID

Communities coalesce around common needs,
not individual preferences !

Choosing Open Licenses

Balancing Diffusion & Control

Strong
copyleft

Not all derived works inherit
the copyleft license (LGPL)

Weak
copyleft

Permissive

Strong Copyleft (GPL, AGPL …)

- Ensures modifications stay open

- Preserves freedom downstream

- May deter private sector actors

- Community-focused approach

Permissive Licenses (MIT, BSD, Apache …)

- Encourage widespread adoption

- Minimal restrictions on usage

- May limit control over derivatives

- Industry-friendly approach

Selecting the Right License ?

Any decision framework ?

What do you want to reach ?

Research ? Dissemination/exploitation? Get an impact on society ?

Access new communities Increase an usage ?

Propose an alternative to closed source market ?

Earn money ?

Identify Target Users

Academic, industrial, or mixed communities ?

Consult Experts

Engage internal legal & innovation teams from your lab

Define Your Goals

Code quality ? Aggregate & enhance ? Sustainability Increase/share code developement ? Stabilize your scientific / technical community ? Stabilize collaboration ? Reach a certain number of members ? Increase your visibility & your reputation ?

Identify your license & re-use needs

Inputs needed from your institute & all partners : IPR policies, pre-existing rights, future developments, combination of the code, partner's internal rules, etc.

Avoid Common Pitfalls

Startups often choose overly restrictive licenses out of fear of losing control

Selecting the Right License ?

Key Question :

How do you choose the right licence in the end ?
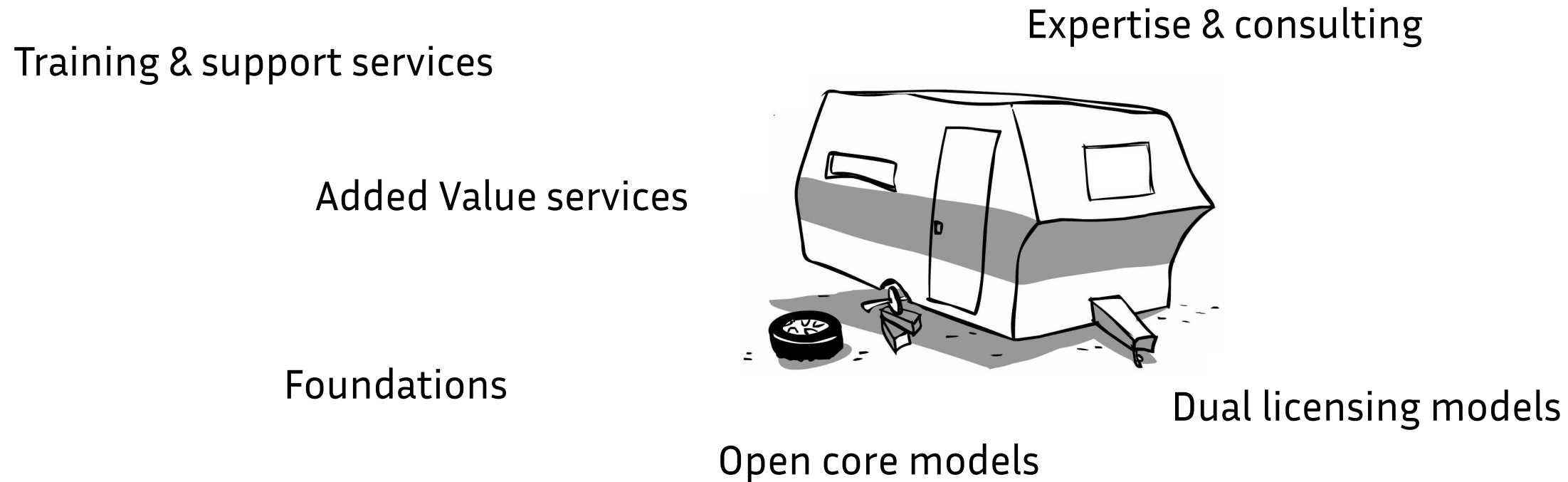
Answer ?

A/ Ask your neighbor

B/ Choose your own license whatever my institute Open Source politics advice nor my partners IPR policies

C/ Consult your innovation department to assess the choice

D/ Choose an exotic license to be original & different

Beyond Licensing : Business Models

Open Source License & IT Business models is a couple !

Training & support services

Expertise & consulting

Added Value services

Foundations

Open core models

Dual licensing models

The temptation : Dual licensing & open core models require careful consideration.

Key principle: Doing business with open source isn't about selling code you didn't pay for, but earning a living around code that isn't sold.

It's now your turn !

Participate to the Open Source movement

Use Open Source

Use & contribute—even feedback matters. Report bugs, suggest features, share use cases.

Develop Solutions

Open it & build community around it. Transparency breeds collaboration.

And ... if You're Hesitant

Join a community—together, we make technology more robust, equitable & innovative.

Still shy ?

Internal optimization...

Conduct an Inventory

Map existing tools/libraries (and before building a new) one used within your lab.
Example: Astrophysics tools include Overleaf INRIA, LibreOffice, Scikit-learn, Excalidraw, Sympa, Notepad++, etc.

Identify Shared Needs

Organize (regular) **meetings** to discuss tools, libraries, and **common** requirements across **laboratories**.
Example: Astrophysics labs collaborating on common tools used, data visualization, etc.
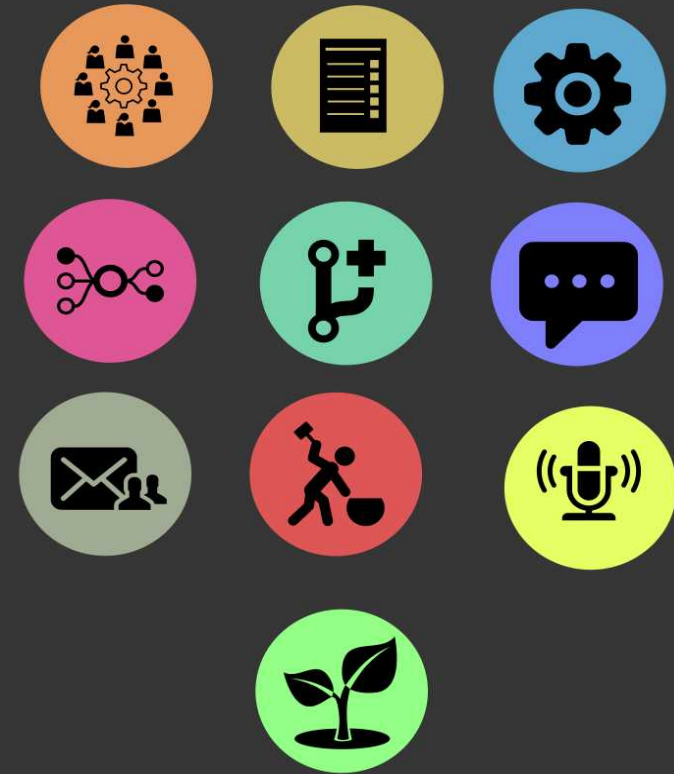
Start Cooperating

Contribute to existing internal projects, needs, etc. adapt them, redistribute improvements... etc.

STOP PARTICIPATING IN COMPETITION, START COOPERATING IN COLLABORATION

This is the end !

Thanks a lot for your attention

Any questions ?

Logiciel Libre, Open hardware :
Comment monter son projet ouvert

Framabook

Inría
INVENTEURS DU MONDE NUMÉRIQUE