The Challenges & Opportunities of Sustaining Open Source Ecosystems

Open Innovation for Earth Observation Programmes
2-4 November 2022 | ESA-ESRIN | Frascati (Rm), Italy

Reflect on lessons from running an OSS community for the past decade

Scaling those practices to diverse audiences

and training research teams to build sustainable open-source ecosystems

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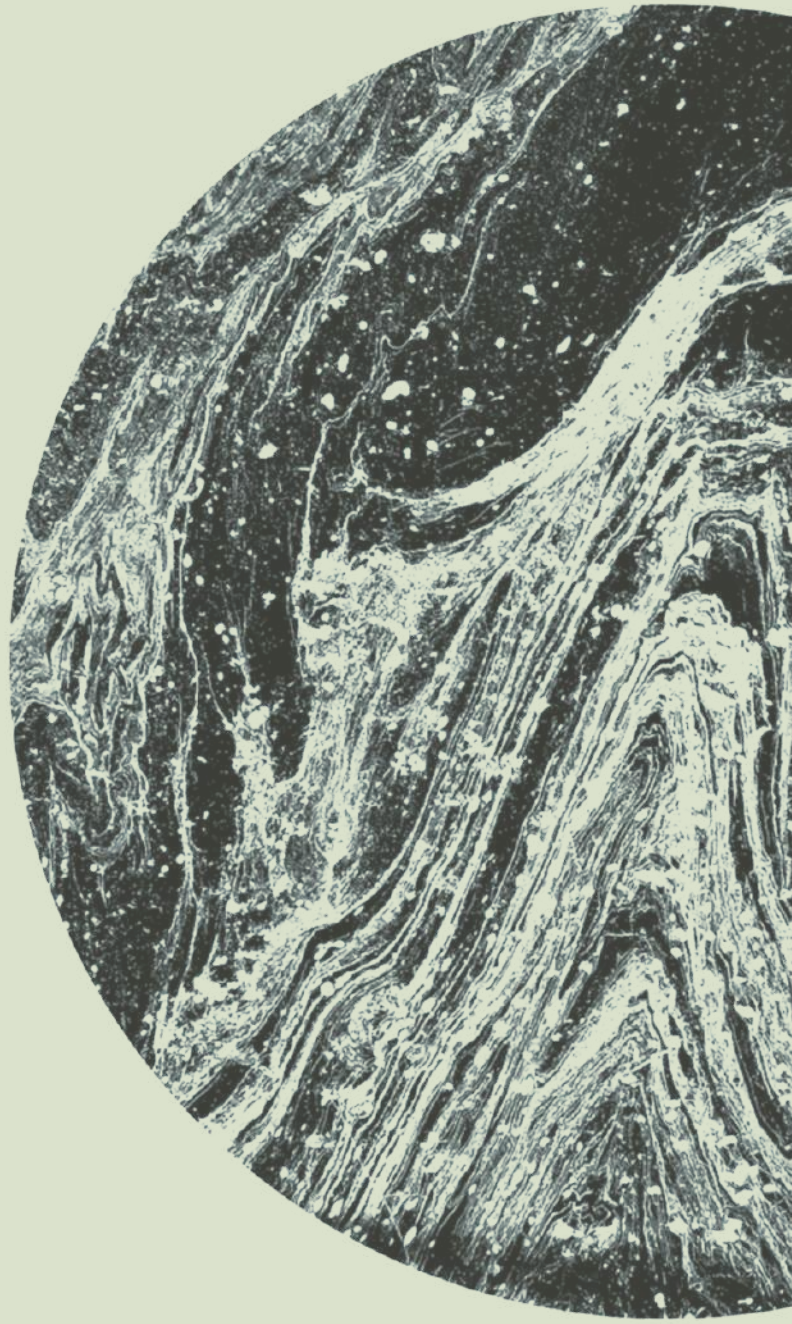
University of California, Berkeley

Pathways for Enabling Open Source Ecosystems

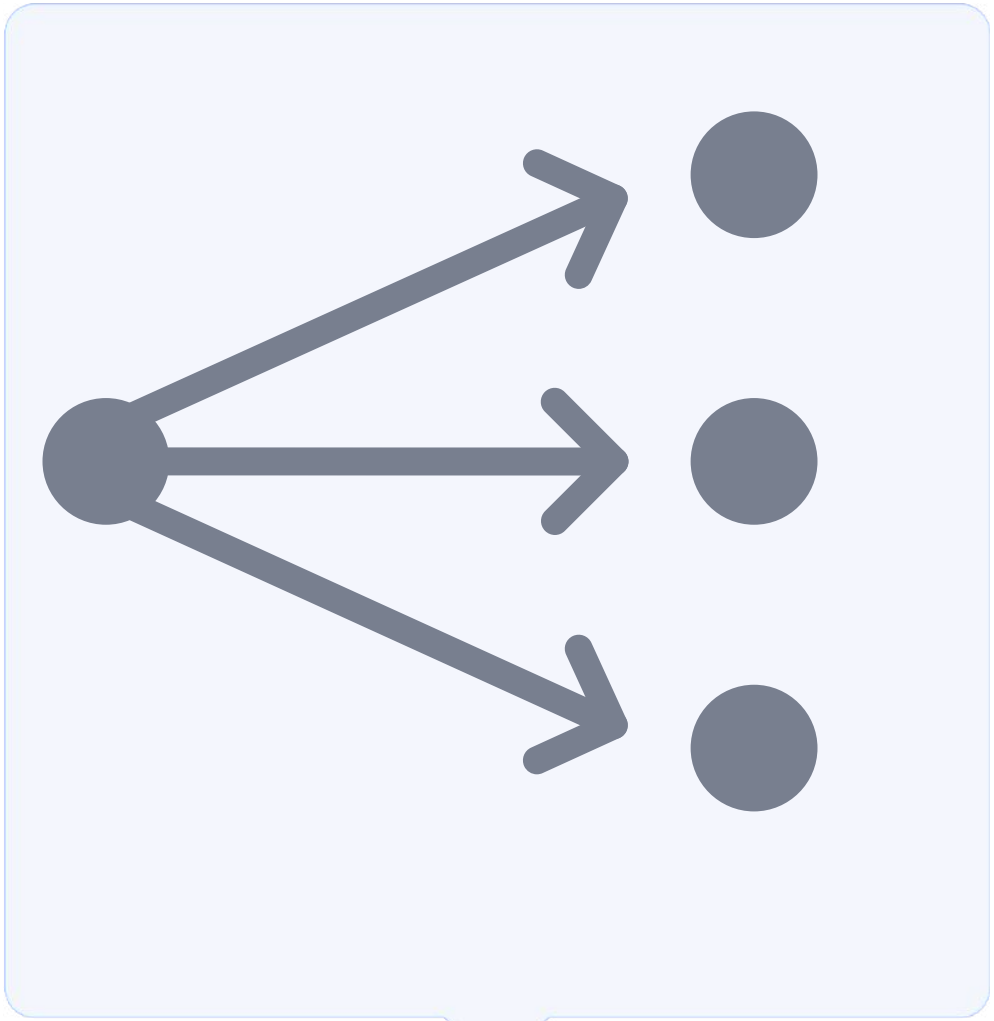
01

Lessons from a decade of OSS community building



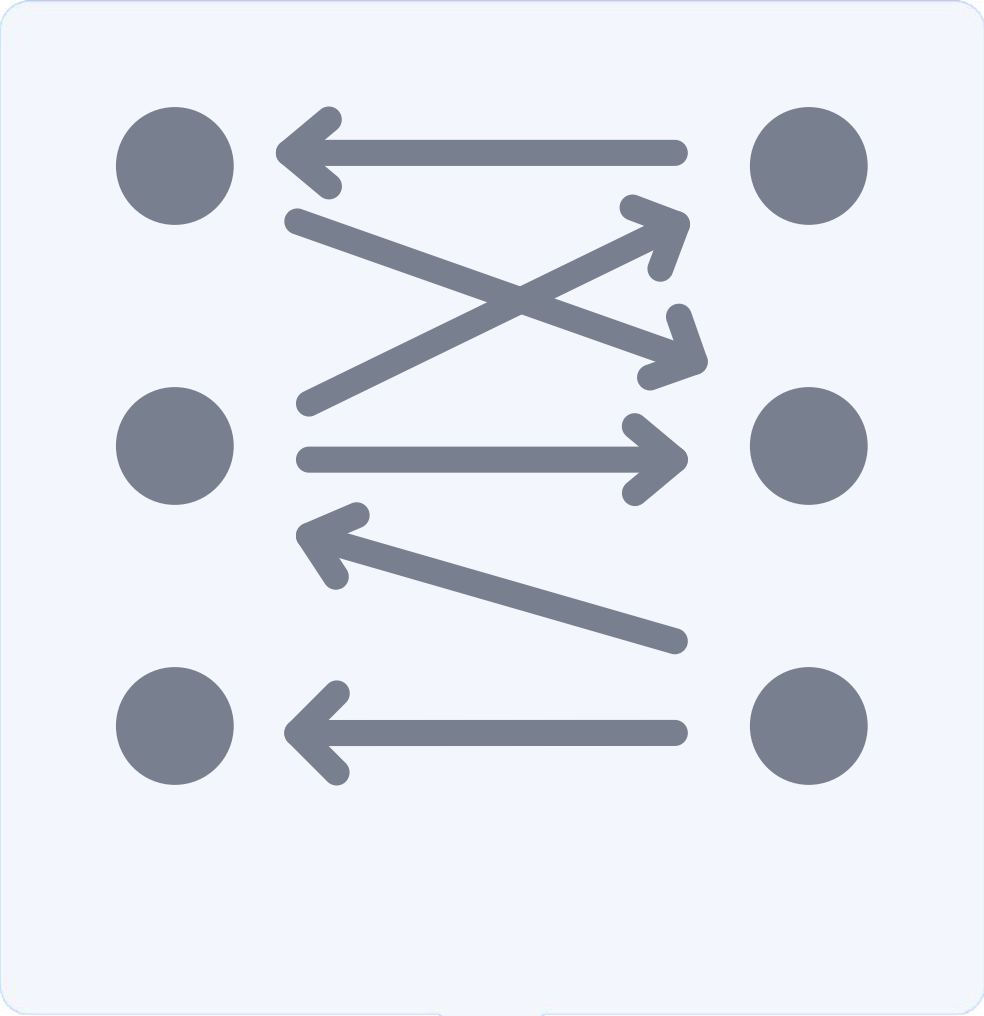

ROpenSci
ESTD 2011

Early days of engaging with our community



In the early days, our core team **built software for researchers**

Inbound Contributions



Then we began accepting contributions. **But 1:1 took a lot of time & effort**

The rOpenSci Dev Guide

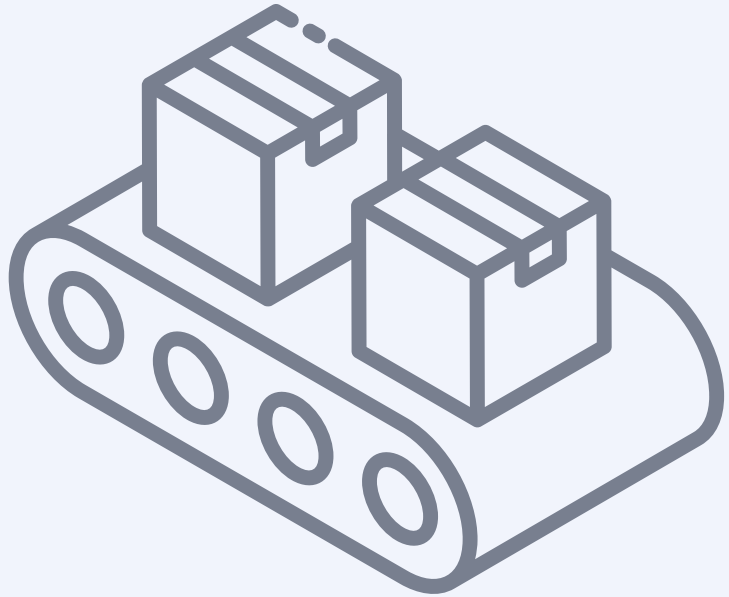
Best practices for software development documented in a living book

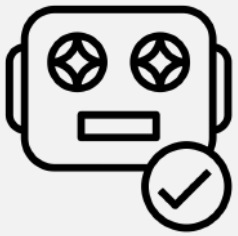
devguide.ropensci.org

Creating a process for standardized peer-review

Created a system to peer-review software

Became inspiration for **The Journal of Open Source Software** & **PyOpenSci**





Ignores conversations between humans

Jump in when called

GitHub Issue

Author: Karthik Ram
Repo: https://github.com/user/repo
....

Arfon: @karthik your submission is incomplete

Karthik: @arfon I'll fix and push an update

Arfon: @bot generate pdf

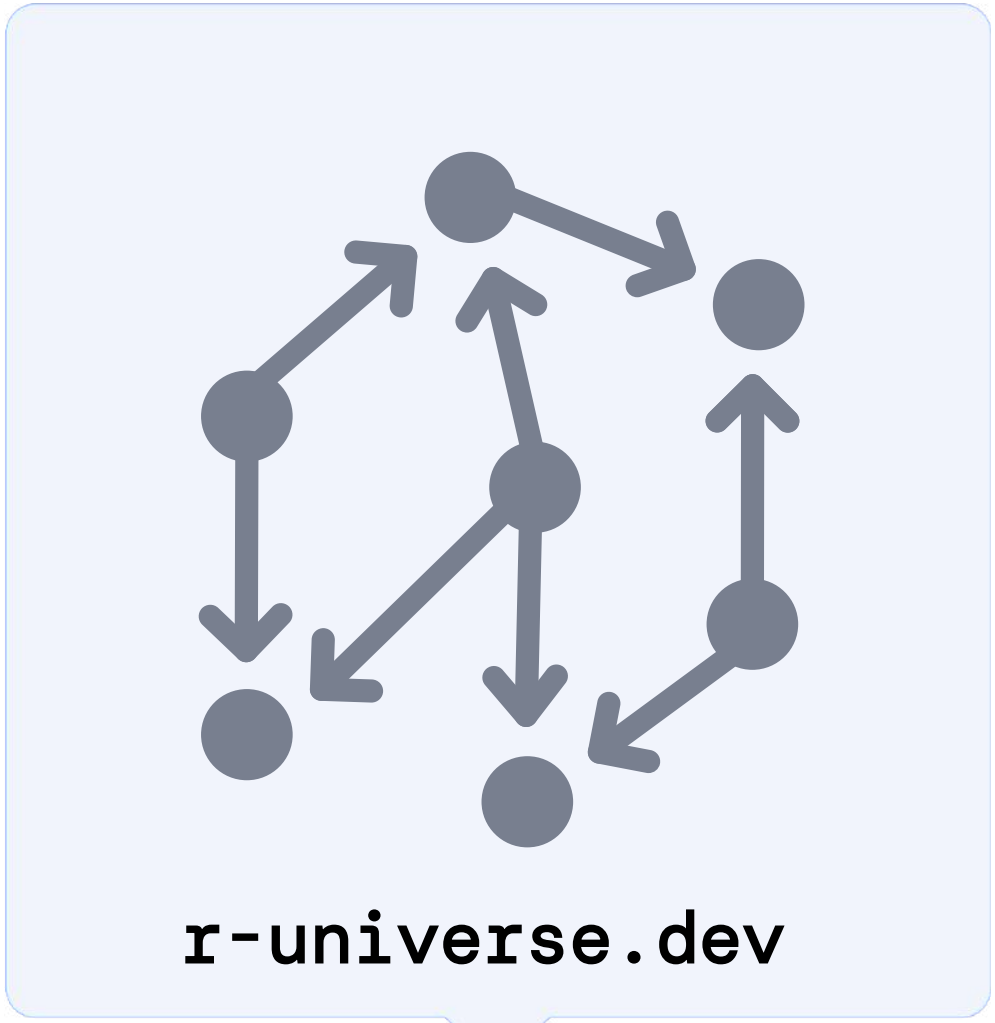
Bot: Sure, here's the latest PDF of the article

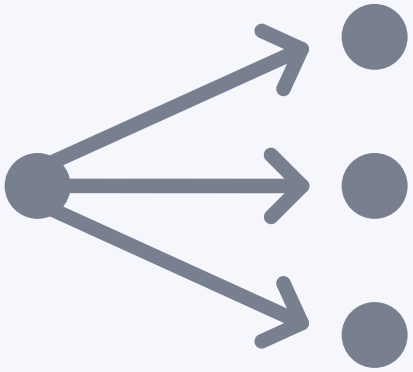
Perform <**actions**>

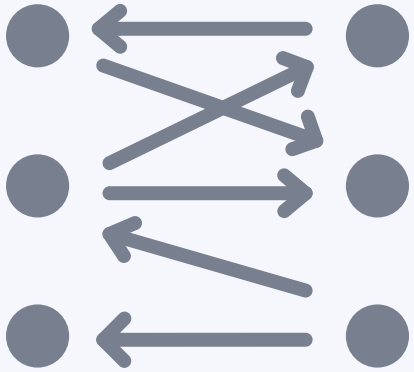
return <**output**>

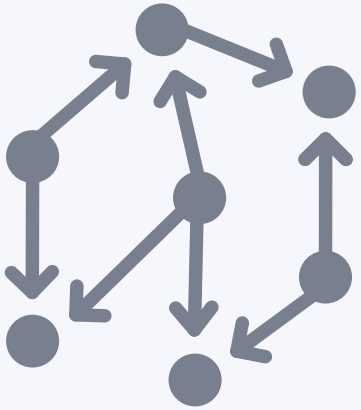
Enabling others to set up & host their own communities

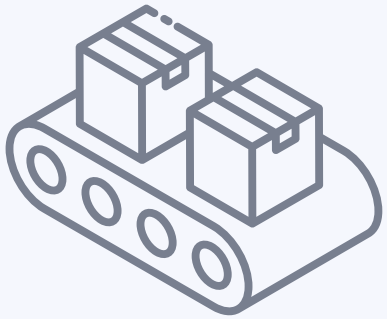
Built **r-universe**, a system that allows any community to **easily set up their own rOpenSci**



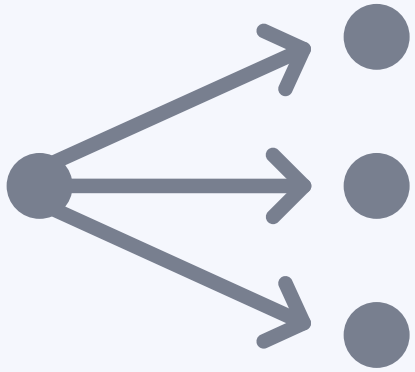




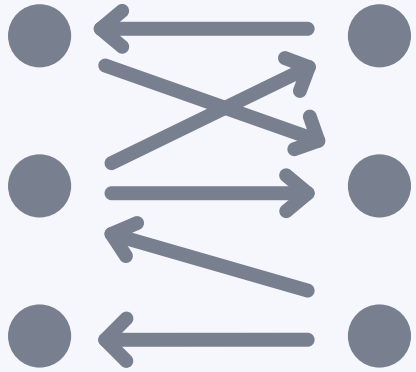




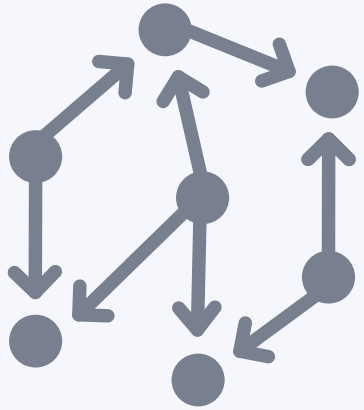
CSCCE Collaboration Model



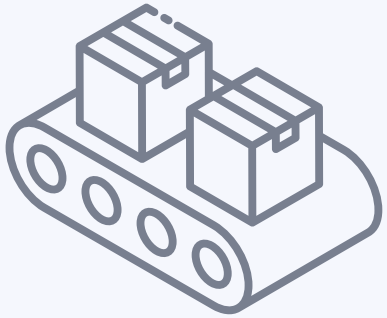
Convey, Consume



Contribute



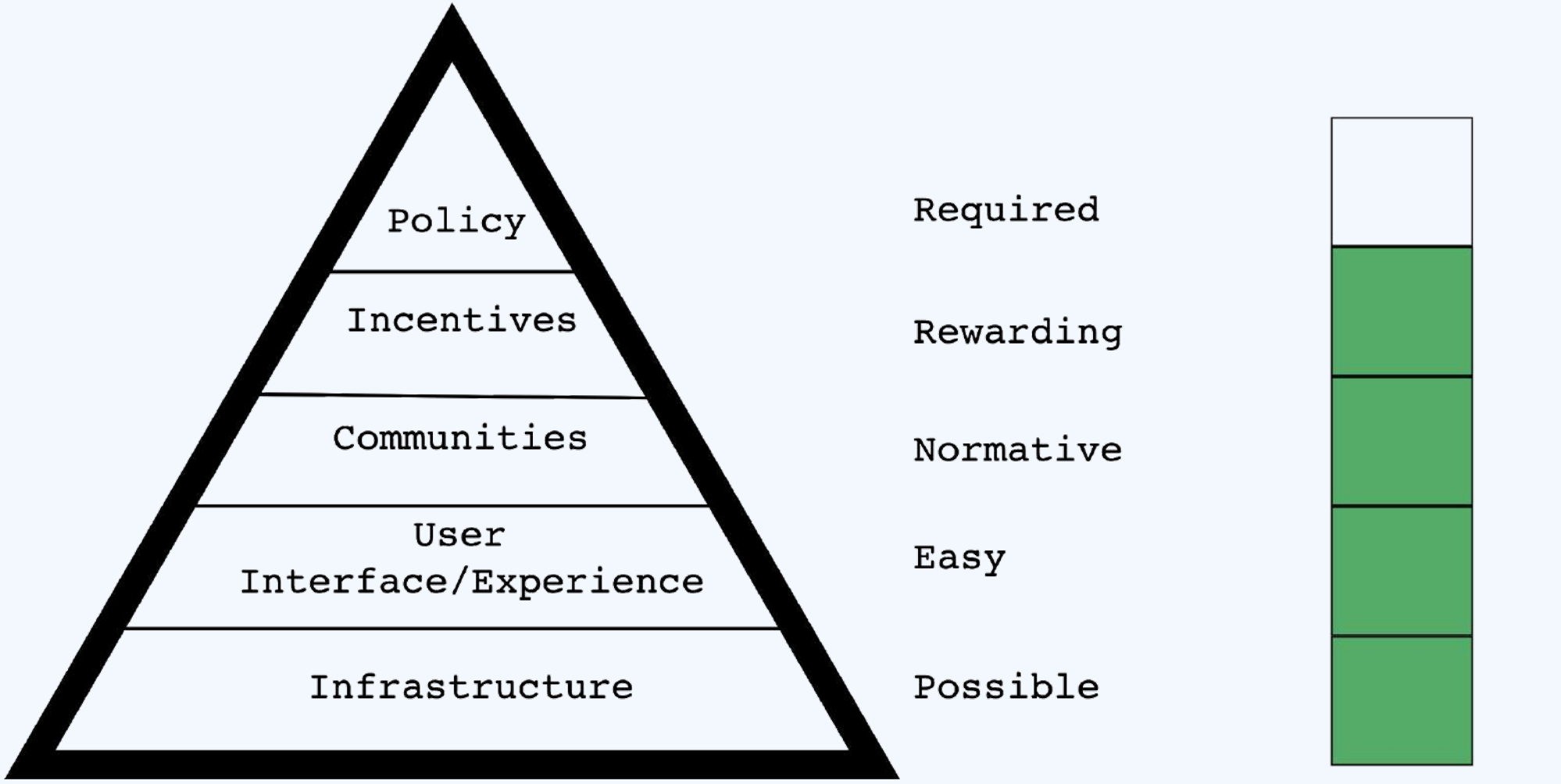
Collaborate

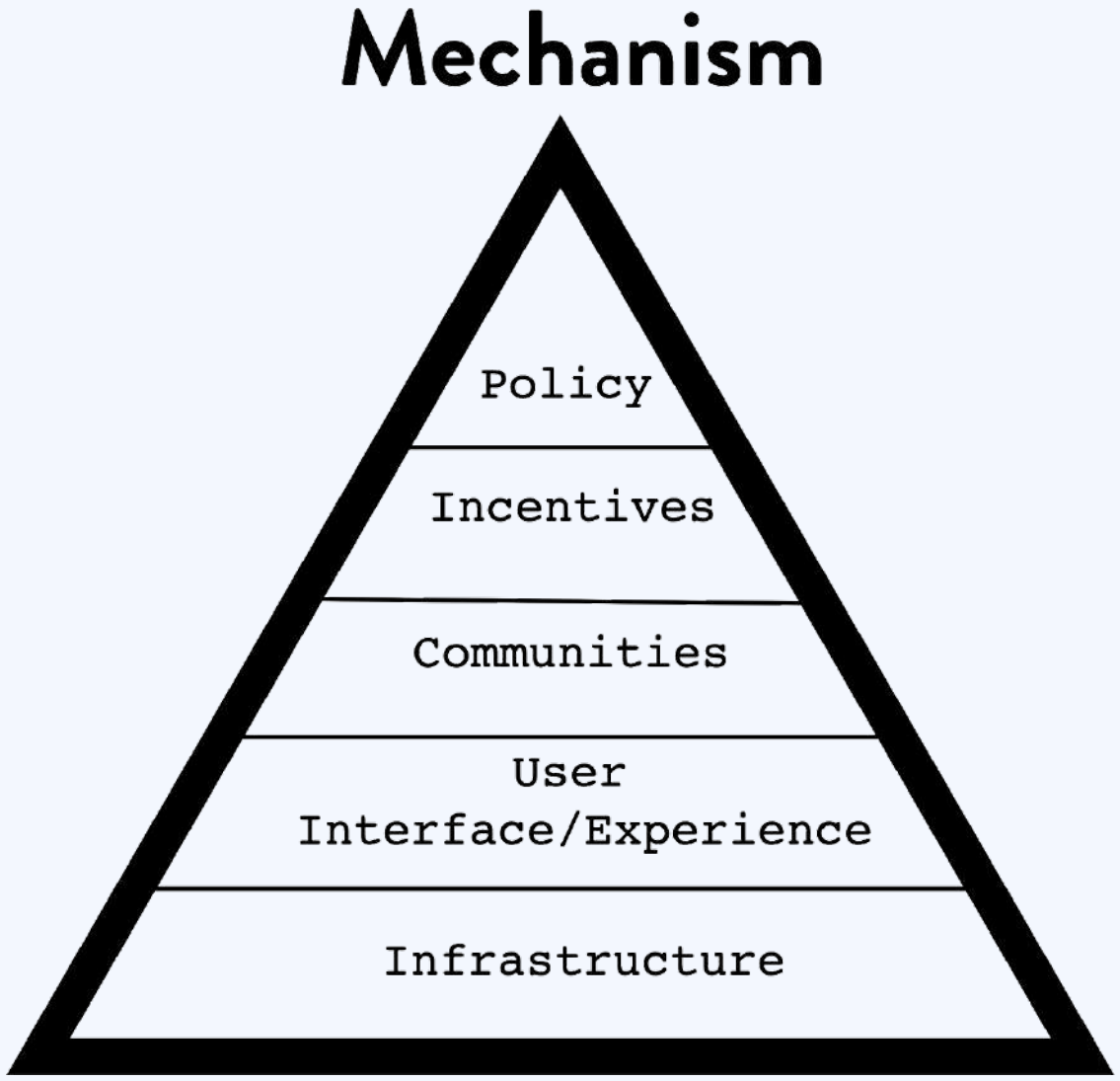


Co-Create

The Center for Scientific Collaboration & Community Engagement

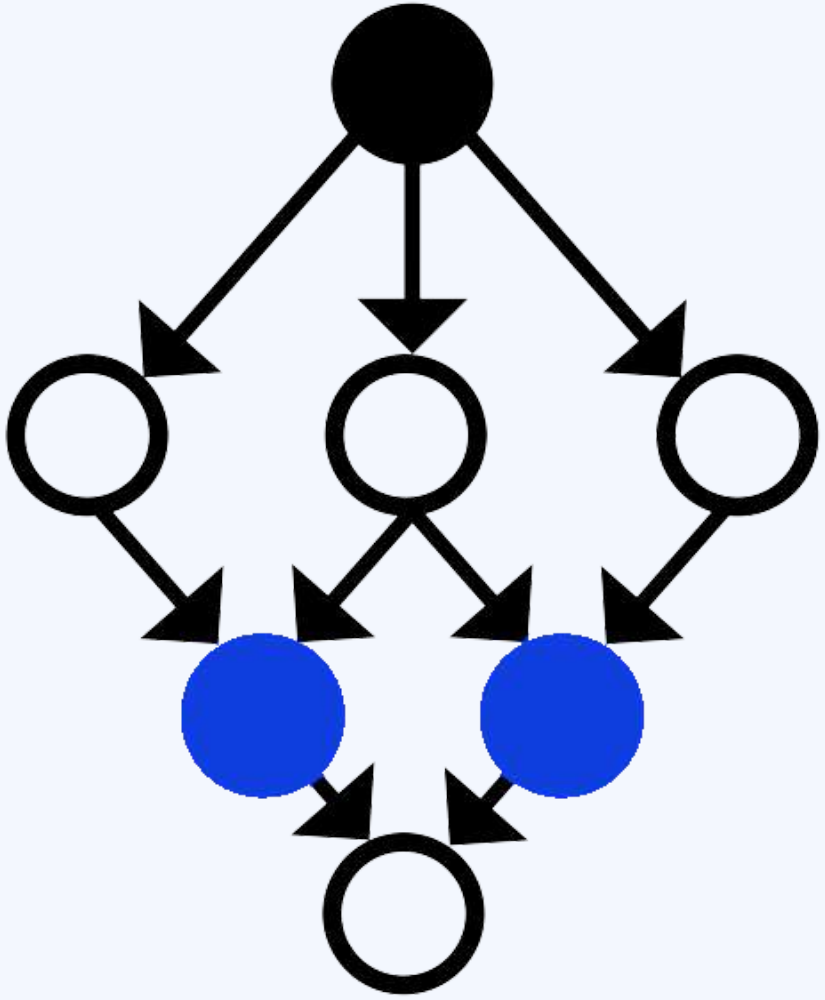
Theory of Change





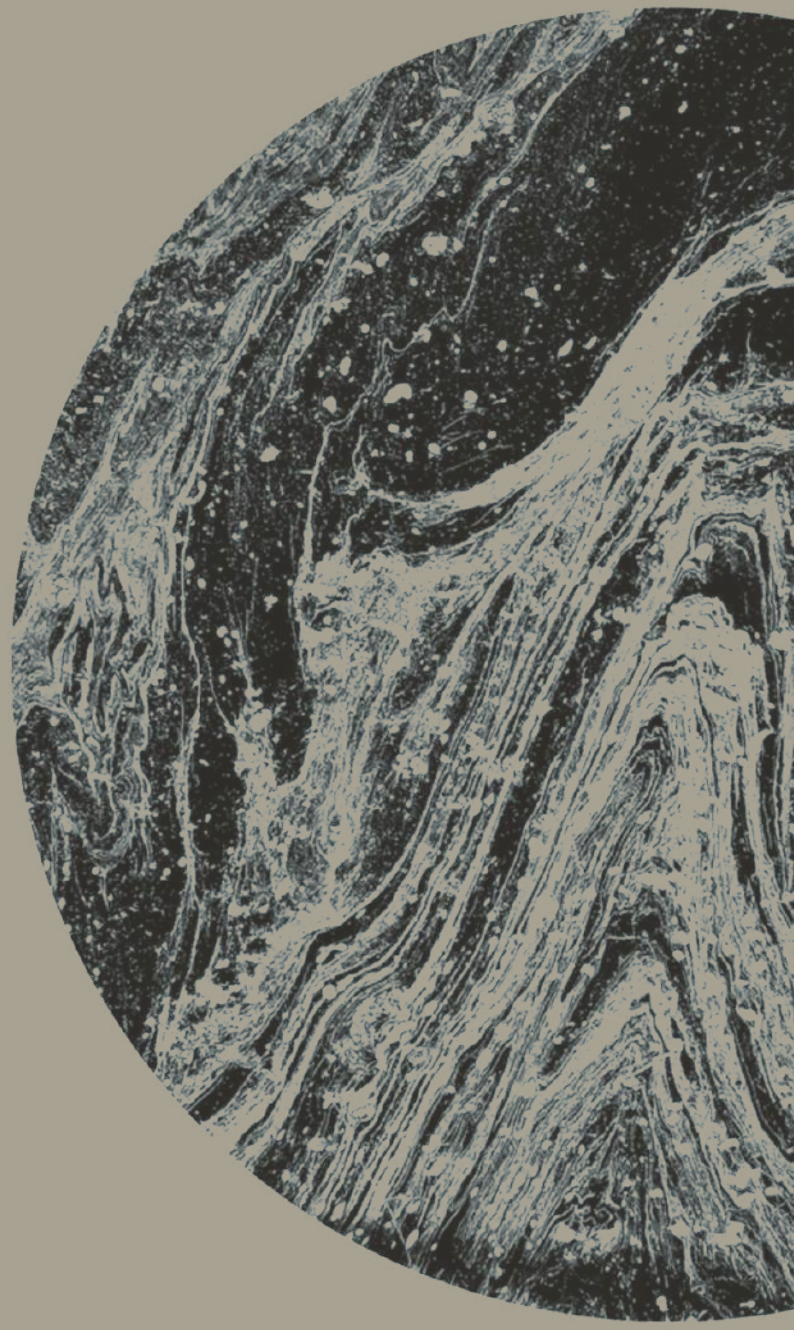
- OSPOs & Open Source Policy
- Credit e.g. JOSS
- COPs emerged
- UX became better
- Open source was hard

Think about your stack as an OPSO



02

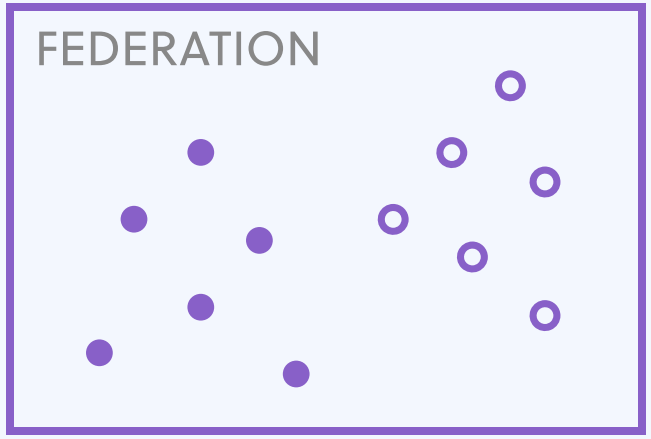
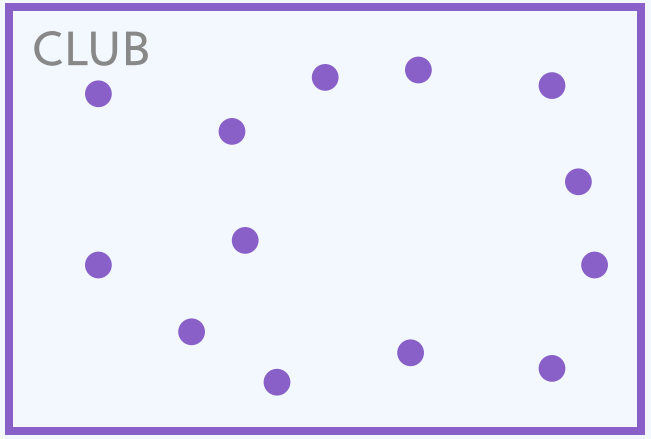
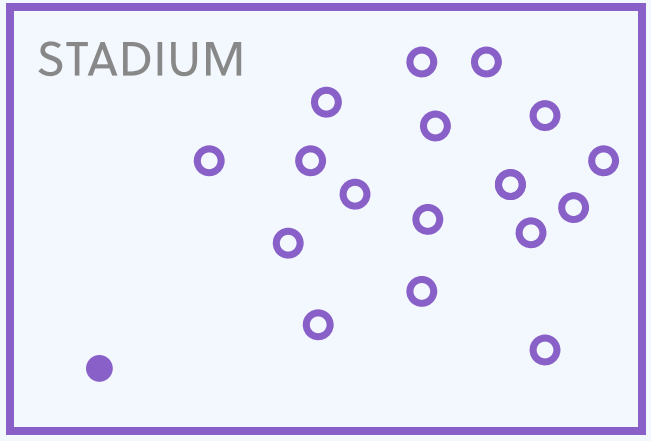
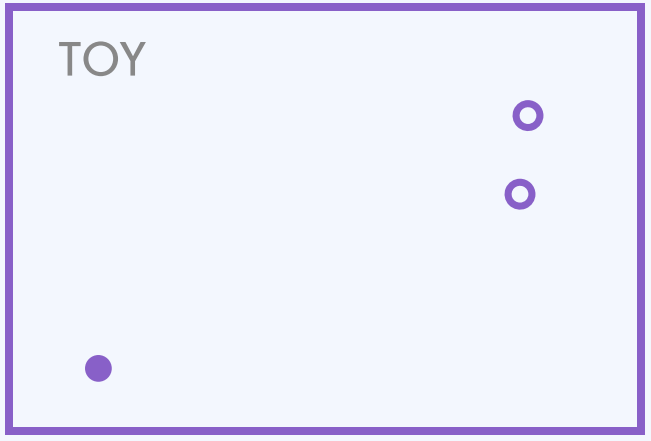
Challenges to sustainability



What does success look like for an open source project?

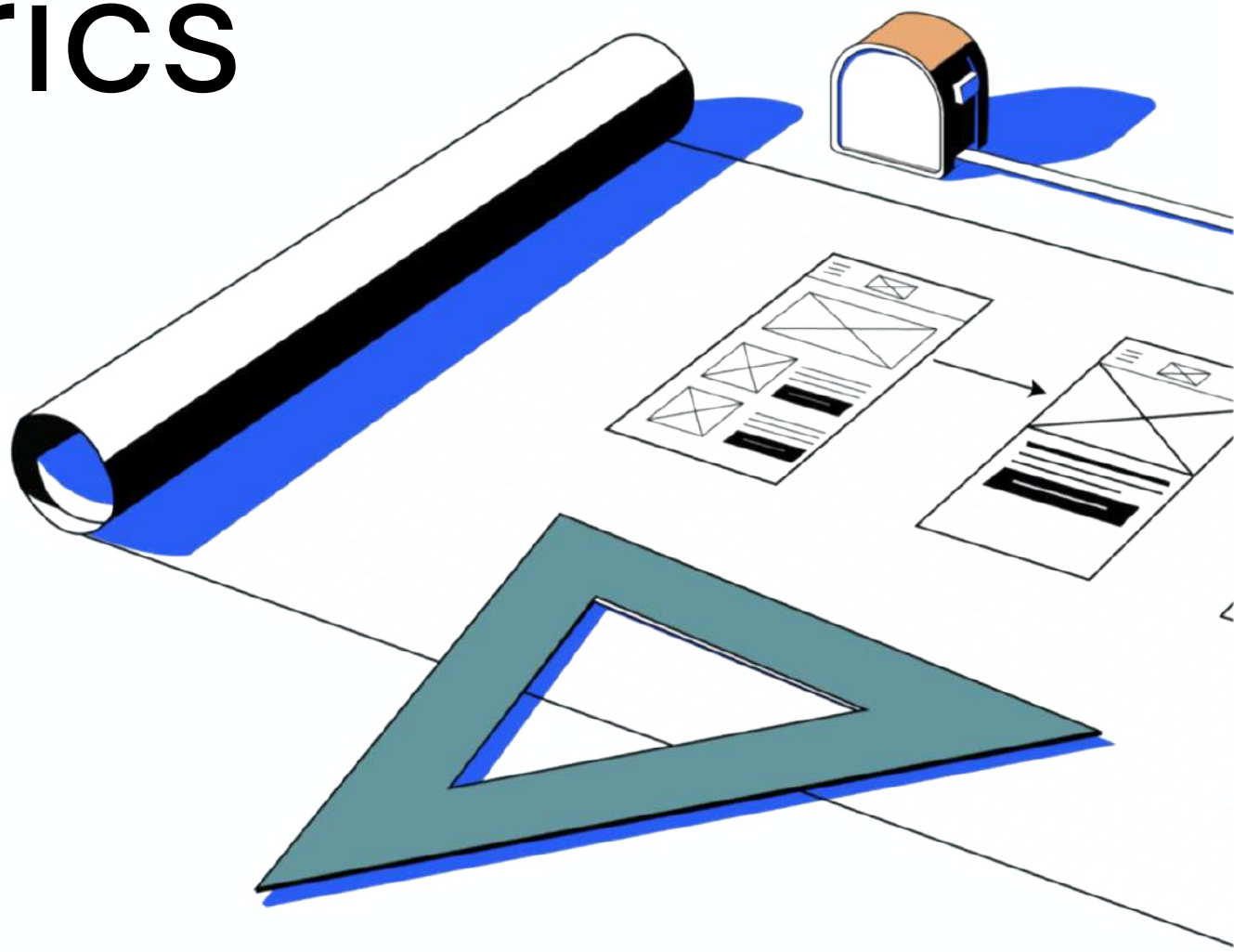
It depends

Do you support a **user community**, **developer community**, or **both**?

	High user growth	Low user growth
High contributor growth		
Low contributor growth		

From: The Making and Maintenance of Open Source Software

CHAOSS Metrics



CHAOSS.community

CHAOSS Metrics

Success

Contributors, Users, Developers, Diversity, Growth and social diversity, openness index...

Sustainability

Quality model, Development base, size of niche, financial resources, resilience, relationships among people

Risk

Bus factor, Truck factor, Elephant factor...

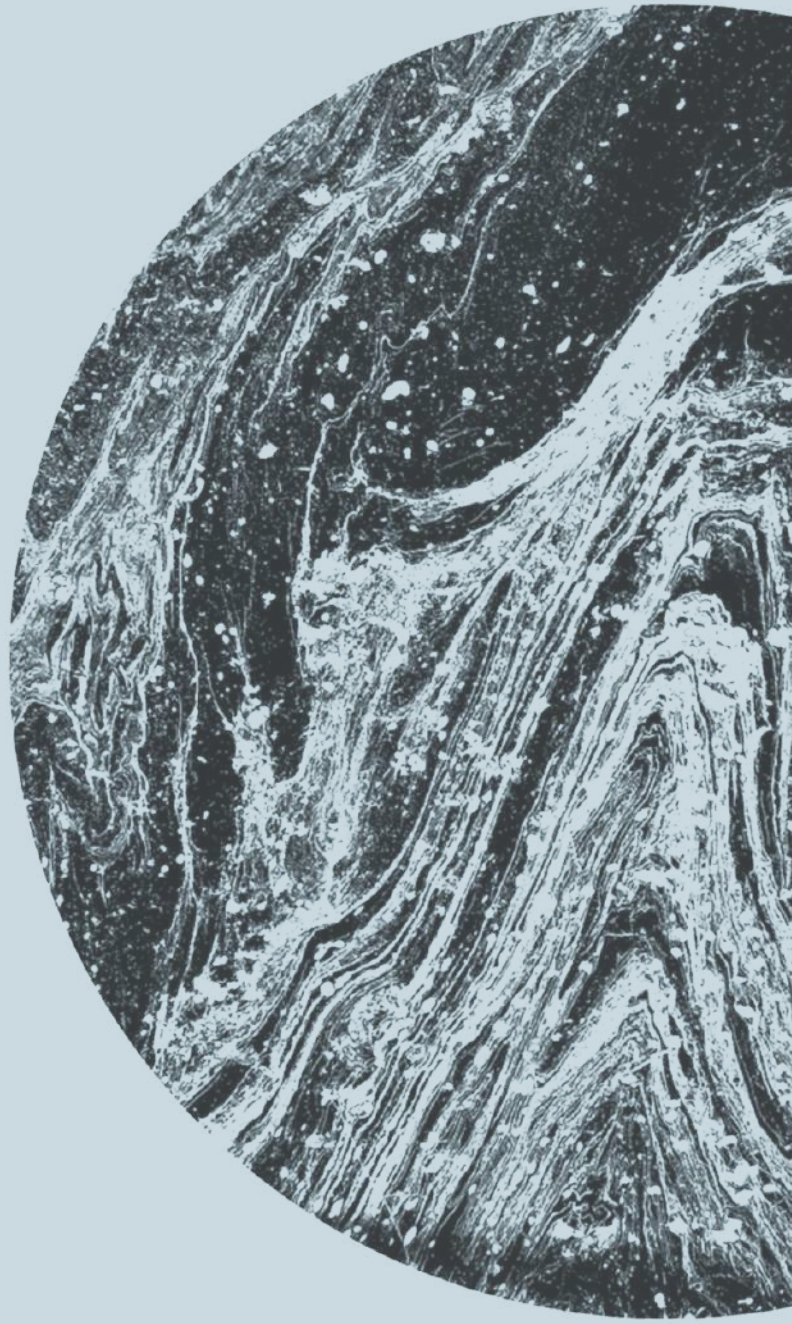
Health

Social health, Gender bias, Positive experience, Robustness, Productivity

Open Source Community Health: Analytical Metrics and Their Corresponding Narratives

03

Enabling Open Source Ecosystems (OSE)



Governance

Having a robust process around decision making and managing social collaboration

Organizational Management

The need to establish a managing organization from which to guide their growth

Community Management

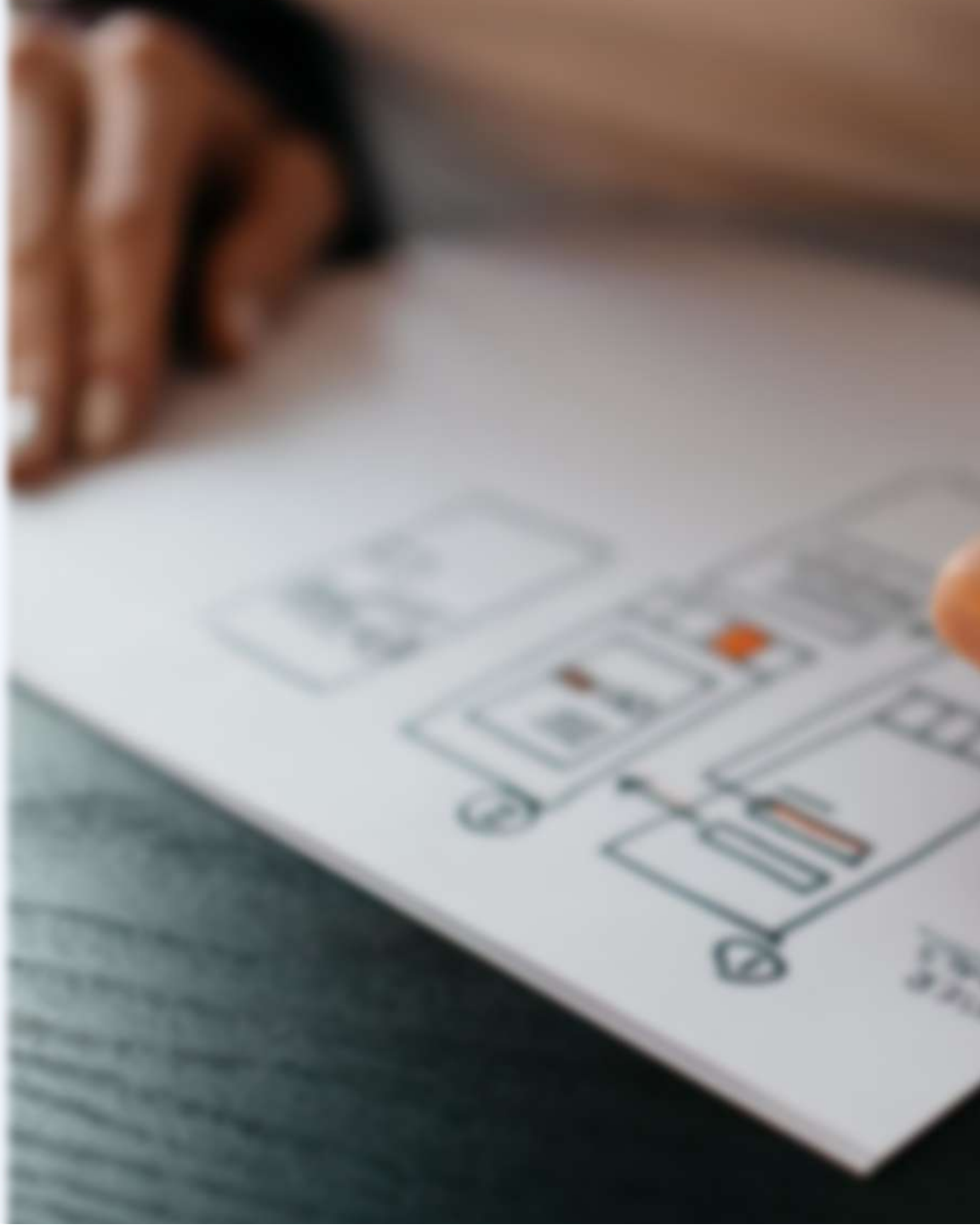
Processes around building relationships within & across communities

Systems Health Considerations

Issues around OSS security & vulnerabilities, potential harm to communities

Business perspectives

Having a clear picture around invisible infrastructure costs and resources (funding and otherwise)



Various factors enable open-source projects to become sustainable OSEs

ROpenSci

URSSI

POSE

Pathways for Enabling Open Source Ecosystems

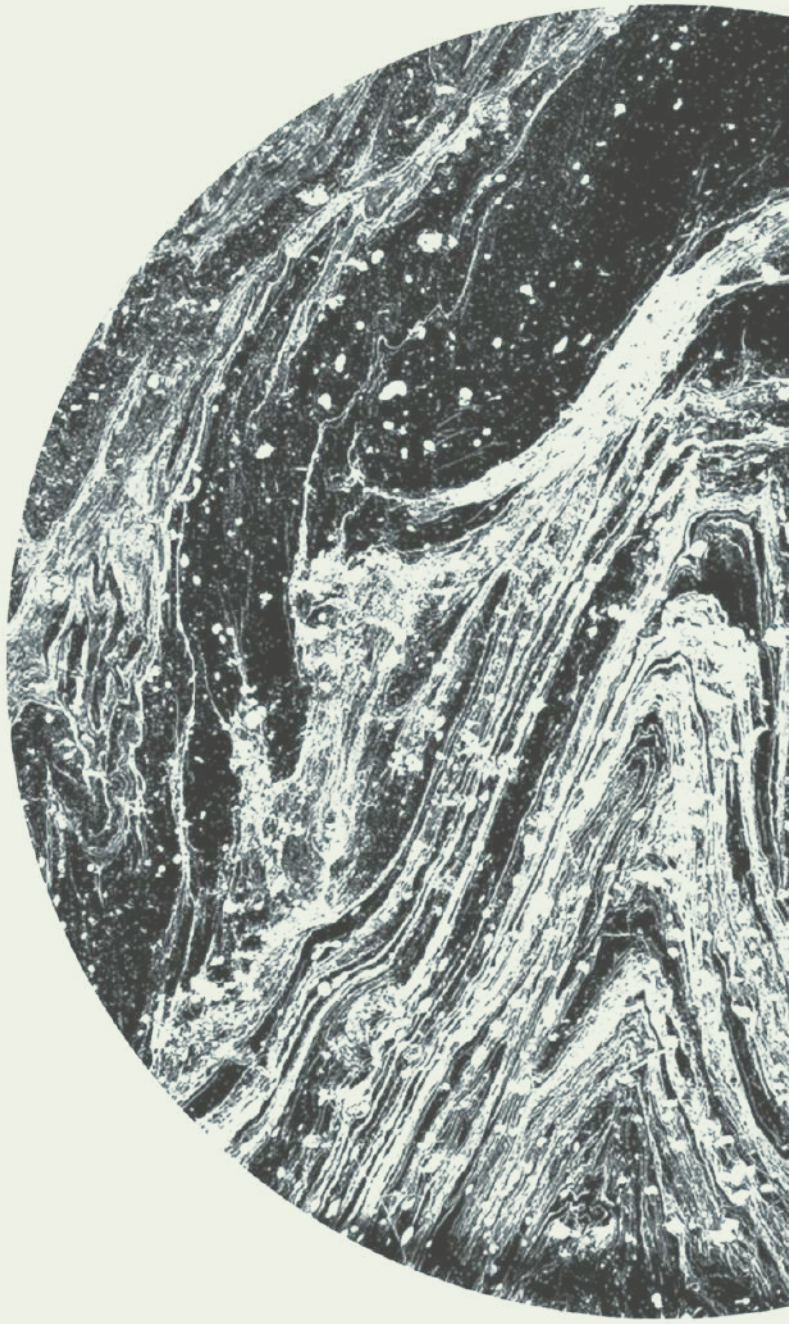
Modest **federation supporting software development** in environmental sciences and statistics

Virtual **institute to support best practices** & community for research software development

Training to **enable open source ecosystems** to become more sustainable

04

Some takeaways



SCALING

Scaling impact of our open source activities was hard

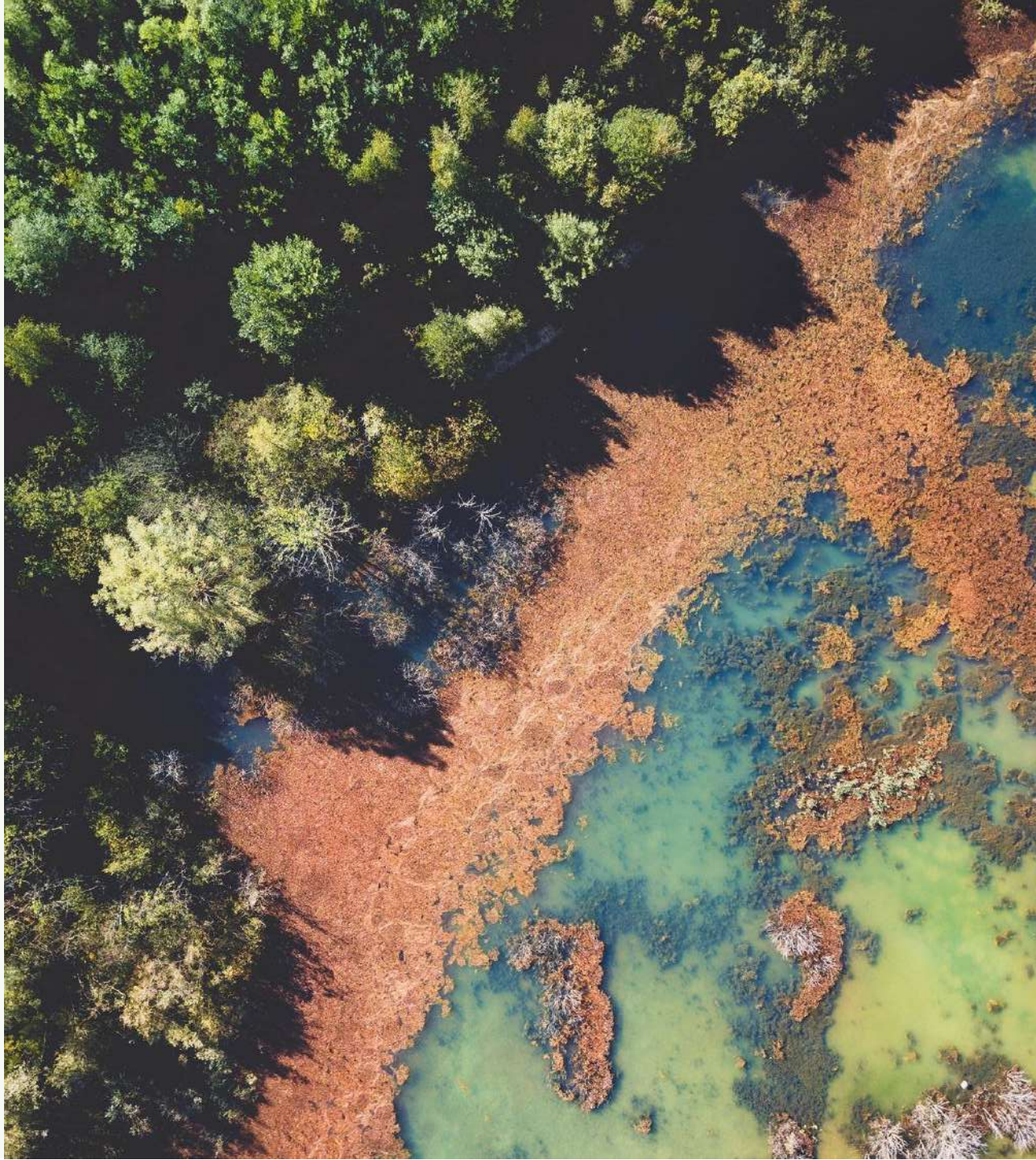
ii Co-creation

Supporting the community in co-creating tools was the way forward

iii

Ecosystem level support

Support your OSS developers in creating sustainable ecosystems



Challenges, solutions, & recommendations

01 CHALLENGES

Scaling of our activities was hard

02 SOLUTIONS

Enabling the community to co-create

03 RECOMMENDATIONS

Build a community of practice and enable OSS ecosystems to thrive

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