

A photograph of a dense forest of Rimu trees. The trees have long, drooping branches covered in dark green, feathery leaves. The forest floor is visible at the bottom, showing various plants and shrubs.

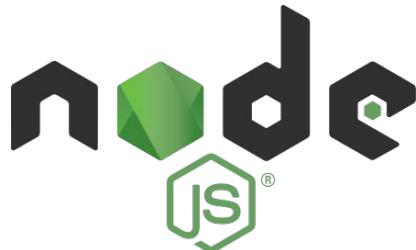
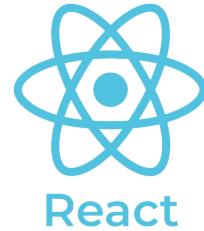
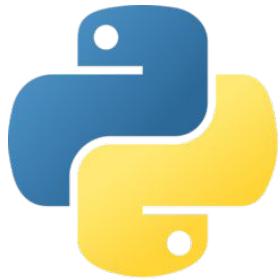
Open Source Sustainability

Richard Littauer - <http://richard.social>

Who is this Richard Littauer, anyway

- PhD student in CompSci focusing on building better tooling for community science data of birds
- Organizer of **CURI OSS**
- Organizer of **SustainOSS**
- Organizer of **Open Sustain Technology**
- Former Executive Director of Gnome
- Ashthagn a kazudi

Open source:



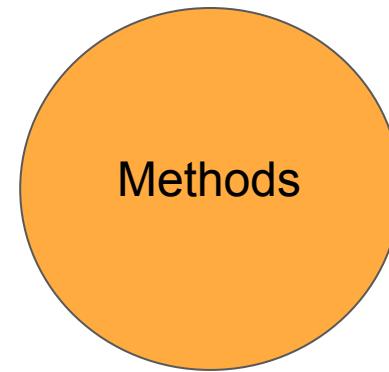
left-pad

```
1 module.exports = leftpad;
2
3 function leftpad (str, len, ch) {
4   str = String(str);
5
6   var i = -1;
7
8   ch || (ch = ' ');
9   len = len - str.length;
10
11   while (++i < len) {
12     str = ch + str;
13   }
14
15   return str;
16 }
17 }
```

Open source:



or



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How much open source?

GitHub

150+ million

Developers

4+ million

Organizations

420+ million

Repositories

90%

Fortune 100

How much open source?

11.4 million

Packages

262 million

Repositories

22 billion

Dependencies

1.7 million

Maintainers

The world's most comprehensive and accurate dataset about
open source production and use, **for free**



The Value of Open Source Software

By: Manuel Hoffmann, [Frank Nagle](#) and Yanuo Zhou

Format: Print | **Language:** English | **Pages:** 42

Email Print Share

ABSTRACT

The value of a non-pecuniary (free) product is inherently difficult to assess. A pervasive example is open source software (OSS), a global public good that plays a vital role in the economy and is foundational for most technology we use today. However, it is difficult to measure the value of OSS due to its non-pecuniary nature and lack of centralized usage tracking. Therefore, OSS remains largely unaccounted for in economic measures. Although prior studies have estimated the supply-side costs to recreate this software, a lack of data has hampered estimating the much larger demand-side (usage) value created by OSS. Therefore, unique global data allows us to first estimate the supply-side value. We then calculate the demand-side value for widely-used OSS, finding that firms would be willing to pay \$8.8 trillion.

The top six programs—Linux, Apache, MySQL, Python, PHP, and Java—account for 96% of the demand-side value. Further, 96% of the demand-side value is created by only 5% of OSS developers.

ABOUT THE AUTHOR



Frank Nagle

Strategy

→ [More Publications](#)

MORE FROM THE AUTHORS

JANUARY 2025 FACULTY RESEARCH

AGENTS.INC: PATHWAYS TO GROWTH AT AN AI STARTUP

By: [Frank Nagle](#) and Susan Pinckney

NOVEMBER 2024 FACULTY RESEARCH

FEDEX CYBERATTACK (B): REFLECTIONS AND LESSONS

By: [Hise Gibson](#), [Frank Nagle](#), Alicia Dadlani and Martha Hostetter

NOVEMBER 2024 FACULTY RESEARCH

FEDEX CYBERATTACK (A): NAVIGATING THE NOTPETYA STORM

By: [Hise Gibson](#), [Frank Nagle](#), Alicia Dadlani and Martha Hostetter

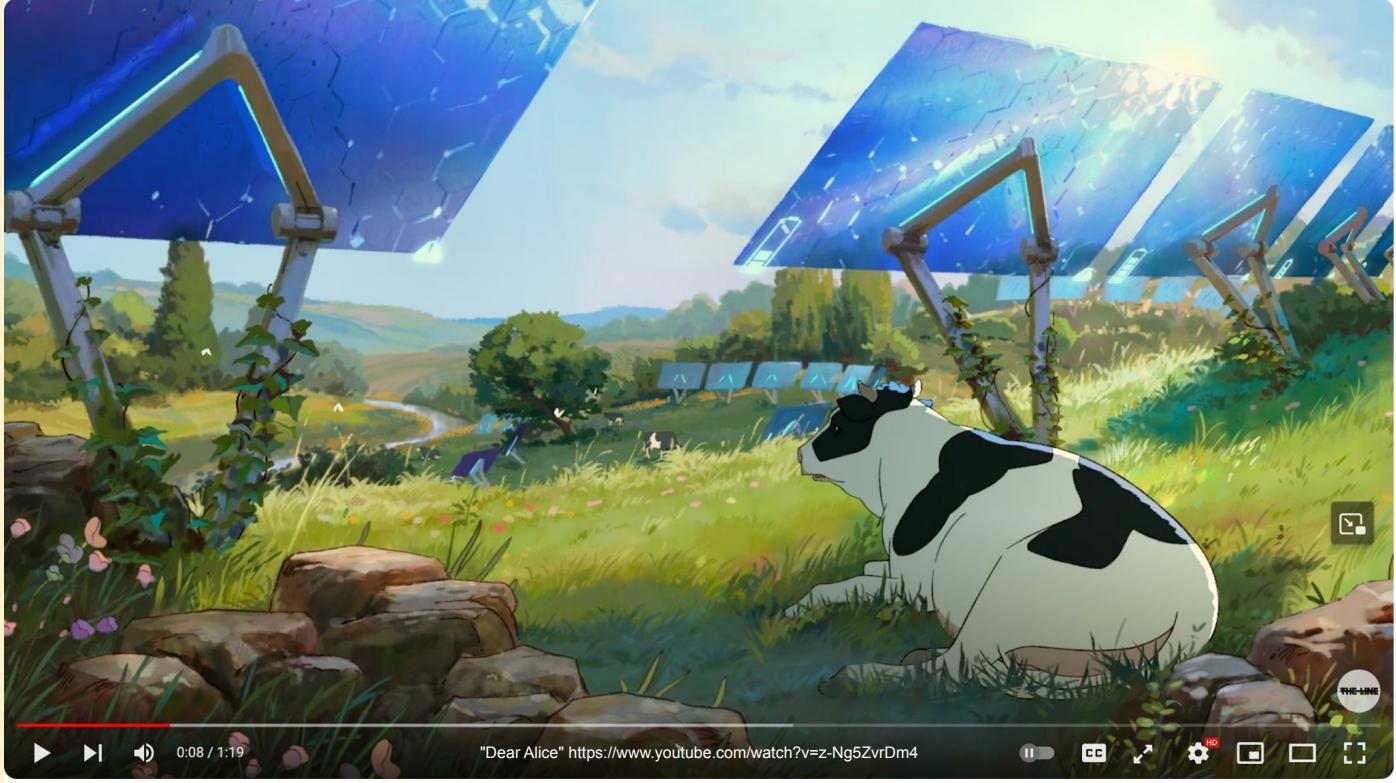
Why would you produce Open Source?

- Collaborate with others
- More eyes = less bugs
- Improve your CV
- Status and clout
- More adoption
- "Feels good"
- Security (never roll your own)

Why would you **NOT** use Open Source?

- Extractive use cases
- Poor expectation setting for users
- Too transparent (medical, indigenous rights)
- Too much work building community
- Business logic could be proprietary
- Security (never roll your own)

What is Sustainability?



<https://www.behance.net/gallery/127556565/Book-Cover-A-MONK-AND-ROBOT-BOOK>

"Dear Alice" <https://www.youtube.com/watch?v=z-Ng5ZvrDm4>



Where sustainability applies in FOSS:

- Projects
- Developers
- Communities
- Businesses
- Academia
- Ecosystems
- Environment



Ramps <https://www.inaturalist.org/observations/208351861>

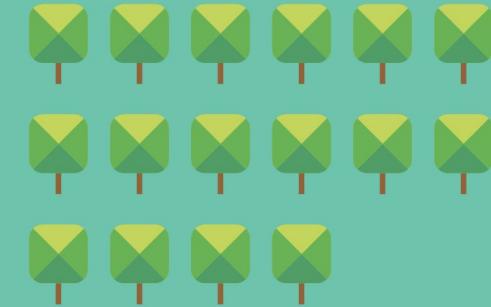
Sustain: FOSS Projects

- Growth
- Diversity
- Funding

Sustain: FOSS Projects

- Growth
 - More in than out
 - Pathways to maintainership
 - Product management and design planning
 - Goal: capturing market share of attention

New Seeds Planted in 2022



Barton County Library (MO, US)

Brimfield Public Library System (MA, US)

Central Skagit (WA, US)

Duplin County Library (NC, US)

Field Memorial Library (MA, US)

Gibsonville Public Library (NC, US)

Paige Memorial Library (MA, US)

Porter County Public Library System (IN, US)

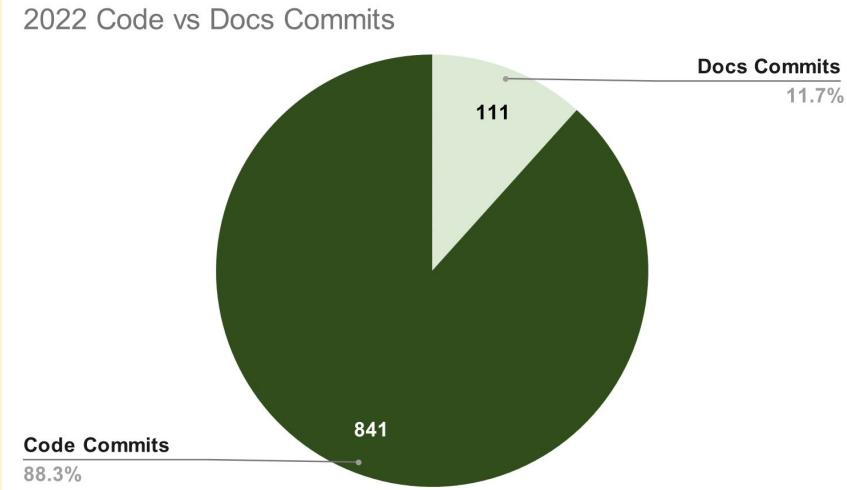
Ralls County Library (MO, US)

Reynolds County Library (MO, US)

St. Thomas Public Library (ON, CA)

Sustain: FOSS Projects

- Diversity
 - Welcoming community spaces
 - CoCs
 - Documentation
 - Moderation
 - Mentoring



<https://evergreen-ils.org/wp-content/uploads/2023/12/Annual%20Report%202022.pdf>

Sustain: FOSS Projects

- Funding
 - Funding for the project costs
 - Funding for the core maintainers
 - Lifestyle funding
 - Funding for all contributors
 - Non-fiscal sponsorships

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Sustain: FOSS Projects

- You can sell stuff:

Oxide PRODUCT ▾ RESOURCES ▾ COMPANY ▾ CAREERS 9 PODCASTS ▾ BLOG

CONTACT US TRY IT NOW

Blog: Oxide and Lawrence Livermore National Laboratory >

The cloud you own

On-demand elastic resources. On-prem economics and governance. Together for the very first time.

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Learn more



Sustain: FOSS Developers

- Satisfaction
- Career trajectories
- Mentoring
- Funds and recognition
- Avoiding burnout



Sustain: FOSS Communities

- Generally the same, but at scale



Sustain: FOSS Businesses and Corporate

- Focus: a bottom line
- Not pushing OSS onto your employee's private time
- Having advocates and marketing inside the company for open source
- Risk
- OSPOs
- "Collaboration"

**TALK OPENLY
DEVELOP OPENLY**

For open source practitioners committed to
Open Source Program Offices (OSPO).

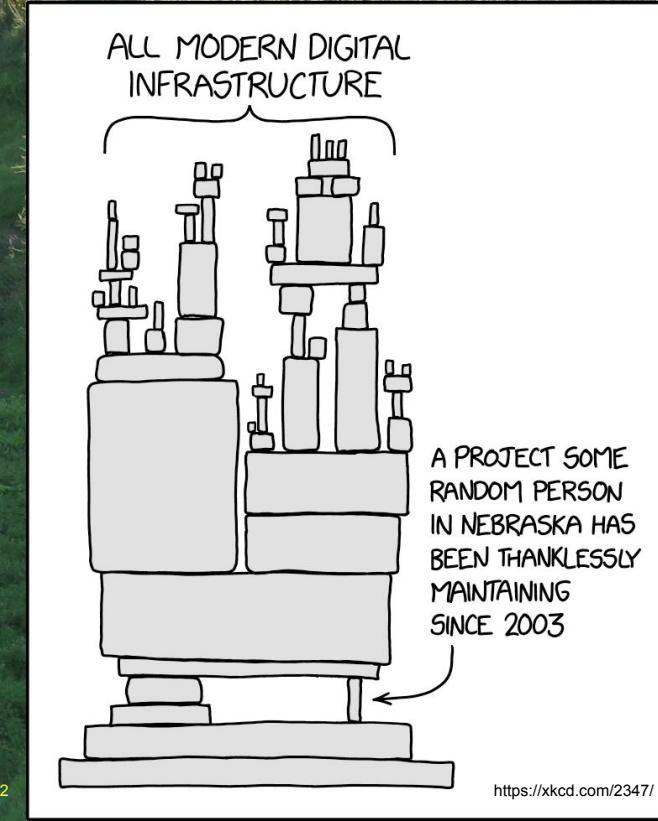
Sustain: FOSS Academia

- Not quite the same as industry or most open source
- Reproducibility
- Citations and altmetrics
- The project- or funding-based cycles of OSS in academia
- The student-graduation cycle of academia
- Where support comes from in the institution

Sustain: FOSS Ecosystem

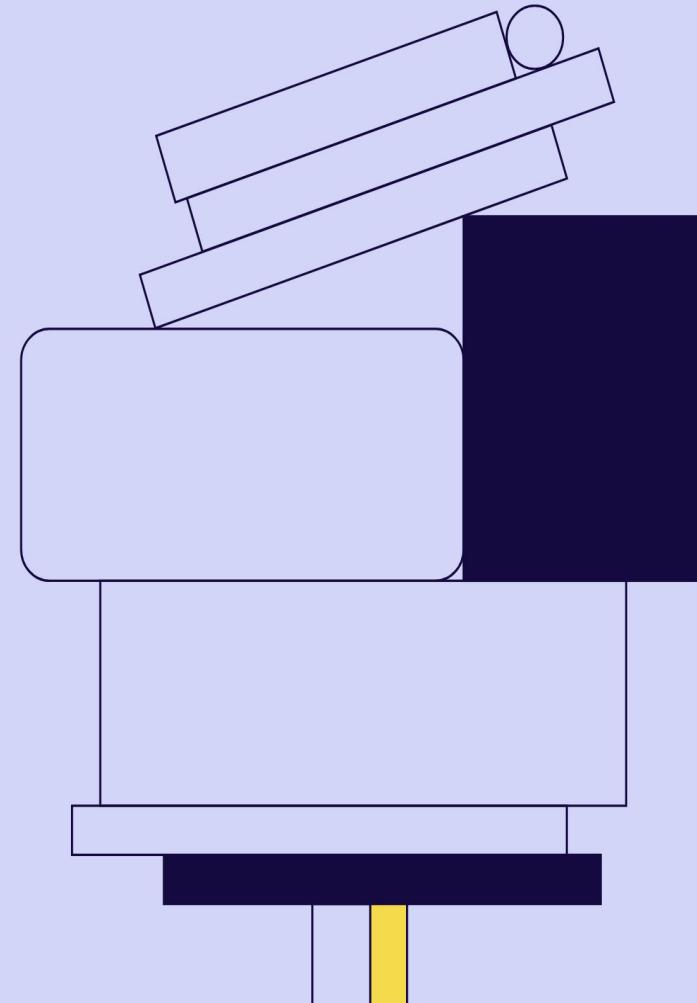
- Funding maintainers for their work
- Security and supply chains
- The "digital commons"

Gorse <https://www.inaturalist.org/observations/65500592>

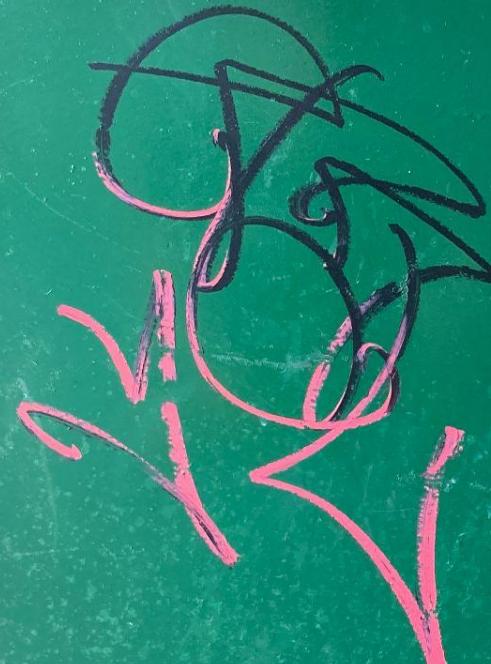


Sustain: FOSS Ecosystem

- Legal sustainability and licenses
 - Stopping proliferation
 - Open washing
 - Patent issues
- AI + open source
- Taxation and infrastructural funding
- The CRA and their ilk



Sustain: FOSS Ecosystem



Who will
STOP
Chat
GPT

Sustain: FOSS & Environment

- Open source hardware
- Carbon-neutral data storage centers
- Reducing server costs
- Not using cryptocurrencies
- Avoiding the Conference trap

Sustain: FOSS & Environment

- Tech for environmental activists
- Tech for environmental studies
- Use of tech for the planet as a whole



Open Sustain Technology

- OpenSustain.tech
- ClimateTriage.com
- OpenClimate.fund
- OSS for Climate Podcast



Orange square	Climate Change
Dark blue square	Renewable Energy
Teal square	Energy Systems
Light green square	Atmosphere
Purple square	Biosphere
Dark green square	Sustainable Development
Gold square	Hydrosphere
Blue square	Consumption
Indigo square	Industrial Ecology
Red square	Energy Storage
Grey square	Natural Resources
Orange square	Emissions
Dark blue square	Cryosphere

Fund Open Source in
Climate & Sustainability

1 NO
POVERTY



2 ZERO
HUNGER



3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



7 AFFORDABLE AND
CLEAN ENERGY



8 DECENT WORK AND
ECONOMIC GROWTH



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE ACTION



14 LIFE
BELOW WATER



15 LIFE
ON LAND



16 PEACE, JUSTICE
AND STRONG
INSTITUTIONS



17 PARTNERSHIPS
FOR THE GOALS



**SUSTAINABLE
DEVELOPMENT
GOALS**

UN OPEN SOURCE PRINCIPLES



Open by default

Making Open Source the standard approach for projects



Contribute back

Encouraging active participation in the Open Source ecosystem



Secure by design

Making security a priority in all software projects



Foster inclusive participation and community building

Encouraging active participation in the Open Source ecosystem



Design for reusability

Designing projects to be interoperable across platforms and ecosystems



Provide documentation

Providing thorough documentation for end-users, integrators and developers



RISE

(recognize, incentivize, support and empower)



Sustain and scale

Supporting the development



Linux
Professional
Institute



UN Headquarters, NYC | 16–20 June 2025



Open Research

- How can we build more collaborative practices in the sciences?
 - PLOS Computational Biology (in review): <https://arxiv.org/abs/2505.06484>
- How can we better map and show the value of OSS to the environmental movement?
 - OpenForum Aacademy Symposium (in prep): <https://symposium.openforumeurope.org/>
- What are "open practices"?
 - Nature Human Behavior (in review):
<https://papers.ssrn.com/sol3/Delivery.cfm?abstractid=4821969>
- How can we use OSS tooling to protect our taonga manu?
 - My thesis work

Thank you

- <https://burntfen.com>
- <http://richard.social>

