Building and Supporting Open Source Communities Through Metrics: Reviewing OpenInfra Community Metrics

Georg Link, PhD

OpenInfra Days 2025

Community Activity Indicates Health

Thrive ?

Abandon ?

The community activity today is a leading indicator for the software project's future.

Meet Georg Link

Open Source Strategist

- Business focus
- 20+ years in open source
- Co-Founder of CHAOSS
- Community Builder

“My mission is to improve the health and sustainability of open source.”

Agenda

- Why we need OSS Communities more than ever
- What metrics we can use to understand communities
- How to overcome technical and organizational challenges
- Exploration of OpenInfra’s community metrics

Why we need OSS Communities more than ever

94%

of organizations **use open source software** in products or services

Source: TODO Group Survey 2024

- Heartbleed incident
- Struts/Equifax debacle
- Log4j vulnerability
- XZ Utils scare

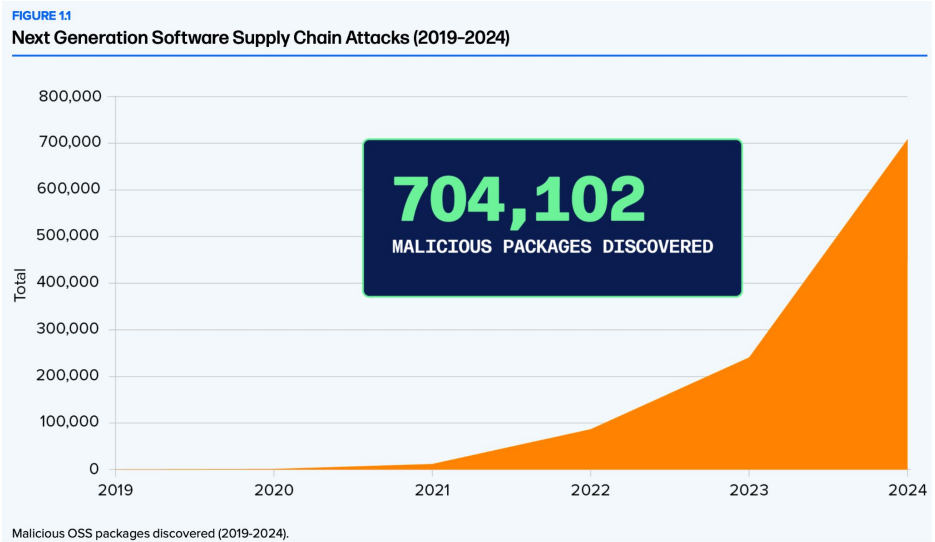
Research Found the SolarWinds Cyber Attack Cost Affected Companies in Key Sectors 11% of Total Annual Revenue on Average

Results indicate cyber-related information sharing is increasing, signaling a positive response to national-and industry-level calls to action

By Business Wire

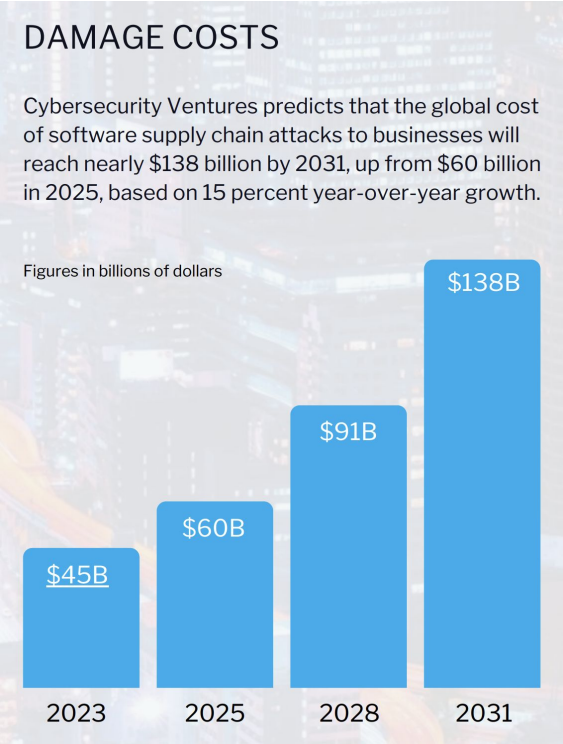
Jun 28, 2021

Software Supply Chain Attacks are on the Rise

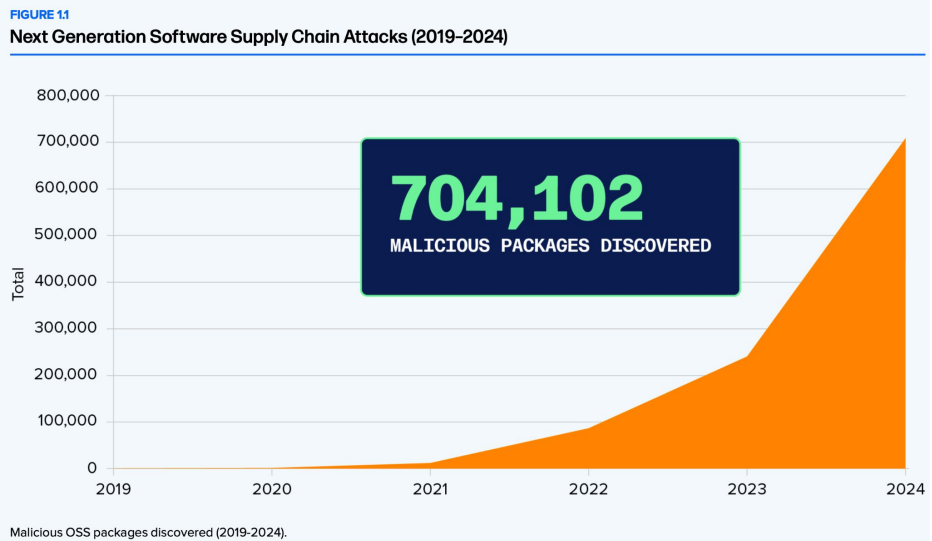


https://www.sonatype.com/state-of-the-software-supply-chain

Software Supply Chain Attacks are on the Rise



https://go.snyk.io/2023-supply-chain-attacks-report.html



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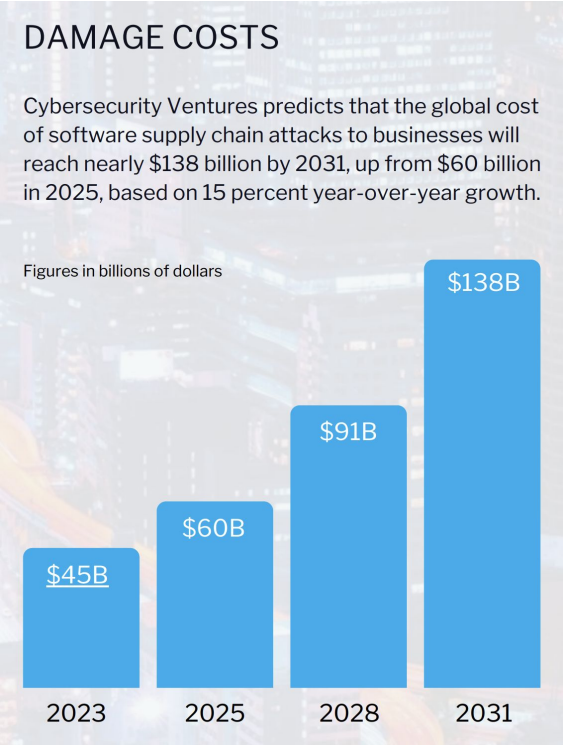
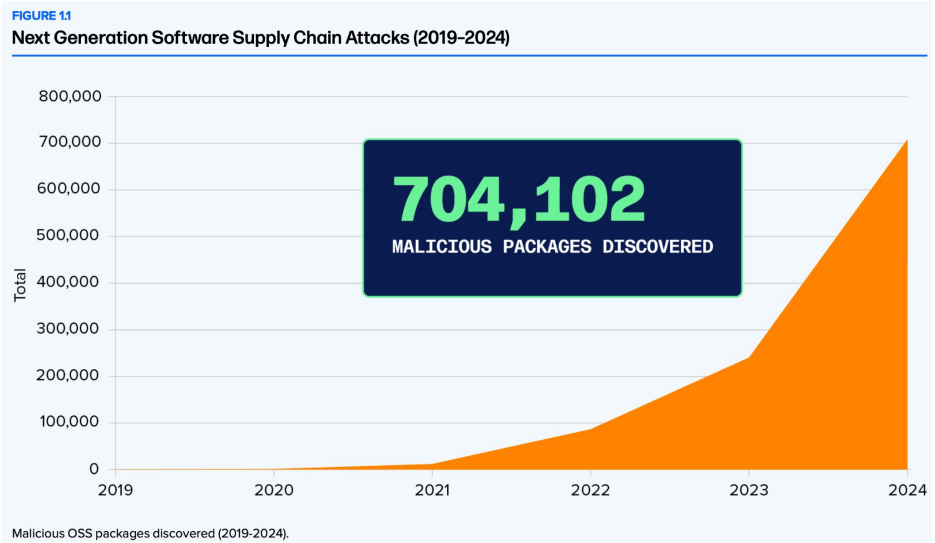


https://go.snyk.io/2023-supply-chain-attacks-report.html

Gartner predicts that by 2025, **45 percent** of organizations worldwide will have experienced attacks on their software supply chains, a three-fold increase from 2021.
(Gartner, Mar 7, 2022)



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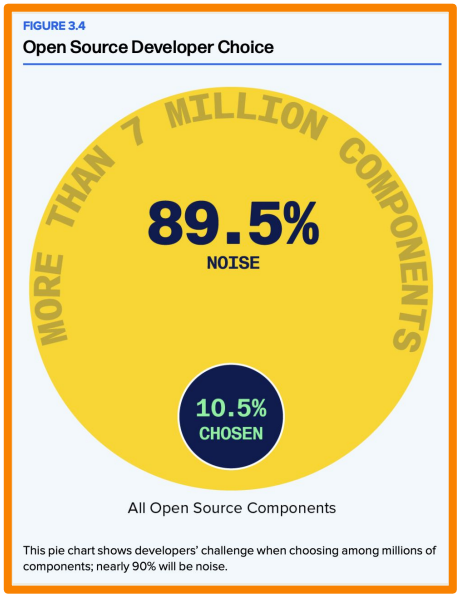
Dilemma: Maintenance and Sustainability



https://www.sonatype.com/state-of-the-software-supply-chain

Sonatype 9th State of Software Supply Chain report:

"Consider this: last year, we revealed that a staggering **85% of projects in Maven Central** — the largest public repository for Java open source components — **are inactive.** In other words, developers are faced with a perplexing array of choices, with only a fraction of them leading to active, well-maintained projects."

Community Activity Indicates Health

Thrive ?

Abandon ?

The community activity today is a leading indicator for the software project's future.

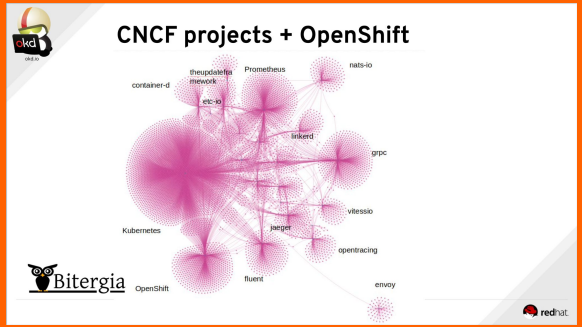
What metrics we can use to understand communities

Not all open source projects have or require communities.

The **Mozilla Foundation** released a report in 2019 on the **different types** of **open source projects**

Bitergia

- More than 15 years of experience
- Maintains the open source GrimoireLab metrics tools
- Official Metrics Partner of OpenInfra and Intersect foundations
- Co-founded the CHAOSS project in 2017



Metrics community

CHAOSS

80+ Metrics

17 Metrics-Models

4 Guides

CHAOSS

- Community
- Health
- Analytics
- Open
- Source
- Software

CHAOSS

Who is CHAOSS for?

- **Open source contributors** want to know where they should place their efforts and know that they are making an impact.
- **Open source communities** want to attract new members, ensure consistent quality, and reward valuable members.
- **Open source companies** want to know which communities and software to engage with, communicate the impact the organization has on the community, and evaluate the work of their employees within open source.
- **Open source foundations** want to identify and respond to community needs, evaluate the impact of their work, and promote communities.

CHAOSS

Why Create CHAOSS?

The CHAOSS community is developing metrics, metrics models, and methodologies implemented in software for expressing open source project health and sustainability to:

- Improve transparency
- Educate maintainers
- Create healthier communities for contributors
- Provide visibility for the four stakeholders

CHAOSS

Mission

Metrics

Implementation agnostic community development metrics

Software

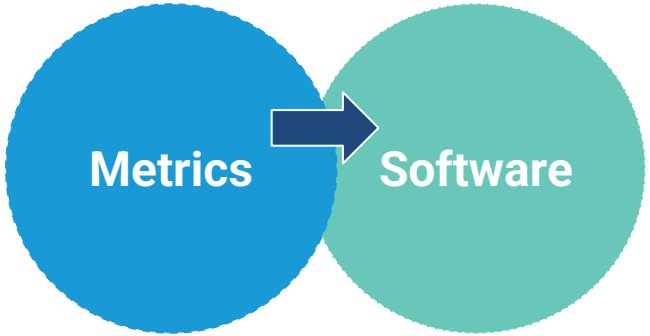
Integrated FOSS tools for software development analytics

CHAOSS Origins and Contributions

New Member and OSPO Expectations Now

CHAOSS

Project Structure



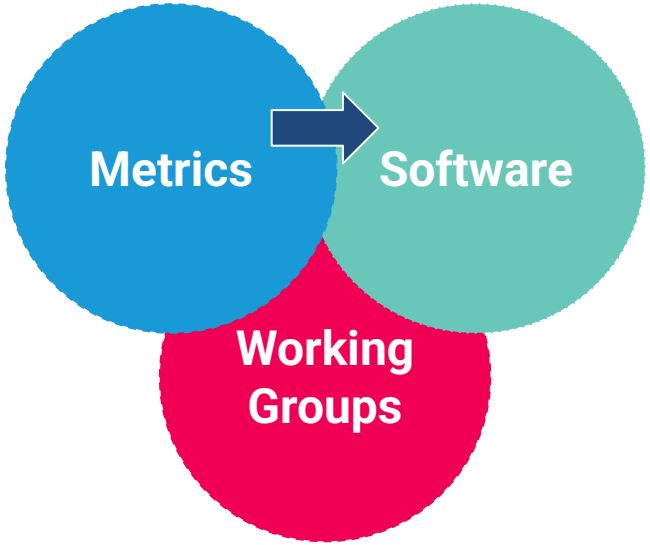
CHAOSS

Project Structure

GRIMOIRE LAB

augur

- Risk
- DEI (Diversity, Equity and Inclusion)
- Common
- Metrics Models



CHAOSS

Working Groups

- Focus on one particular health & sustainability category
- Recommend and define specific metrics in that category
- Recommend and define specific methods for collecting data related to the metrics
- Can also be operational for CHAOSS (Website, Design, etc)

CHAOSS

Working Groups

Metrics WGs:

- Metrics Development
- Metrics-Model
- Diversity, Equity, and Inclusion

Context WGs

- OSPO
- Science/Research
- University/Academic
- Data Science
- UN SDGs
- Funding Impact Measurement

Operations WGs:

- Communications
- CHAOSScon
- DEI Badging
- Website
- CHAOSScast

CHAOSS

Project Structure

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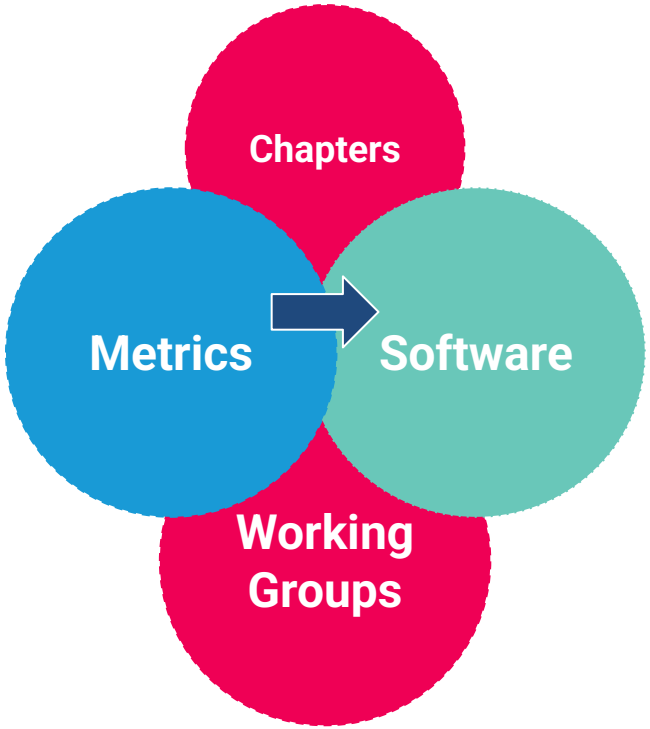
GRIMOIRE LAB



CHAOSS

Chapters

- CHAOSS Africa
- CHAOSS Asia-Pacific
- CHAOSS LATAM
- CHAOSS Eastern Europe

CHAOSS

Metrics Models

- Collaboration Development Index
- Development Responsiveness
- DEI Event Badging
- Safety
- Community Activity
- Community Service and Support
- Project Engagement
- Funding
- Project Awareness
- Starter Project Health
- Community Safety

CHAOSS

Getting started with Practitioner Guides

- Contributor Sustainability
- Organizational Participation
- Responsiveness
- Security

https://chaoss.community/practitioner-guide-introduction/

Metrics

Real-World-Examples

Global and Inclusive Community

Building a global and inclusive community requires accommodating timezones, languages, cultures, and other differences.

Global and Inclusive Community

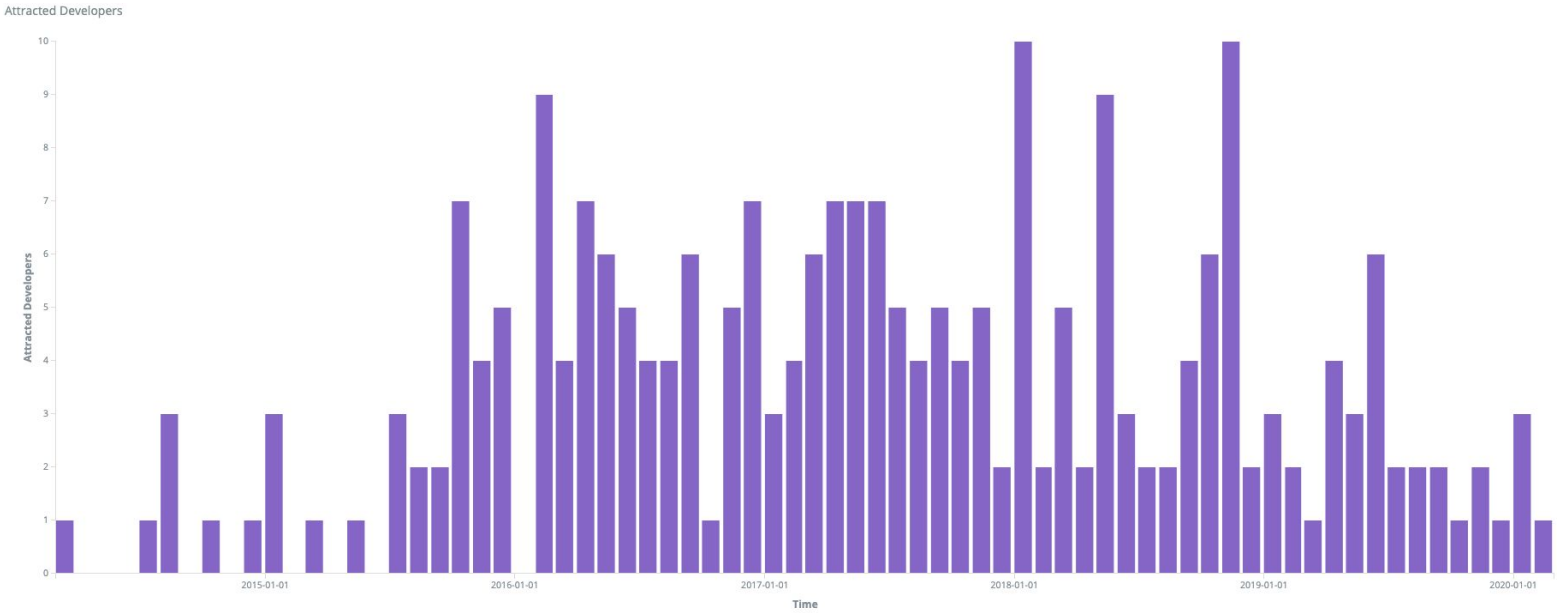
1. WordPress translation community has it **fully translated into 56 languages**, and partially translated in dozens more.
2. In 2017, WordPress communities around the world organized **128 WordCamp events**, in **48 countries**, and sold **39,625 tickets**.
3. In 2017, Local WordPress communities organized **4,379 meetups** in **73 countries**.
4. There are dozens of WordPress groups on Facebook, with WPBeginner Engage being the largest WordPress **Facebook group with 90,000+ members**.

https://www.wpbeginner.com/beginners-guide/ultimate-list-of-wordpress-stats-facts-and-other-research/

New Contributors & Contributions

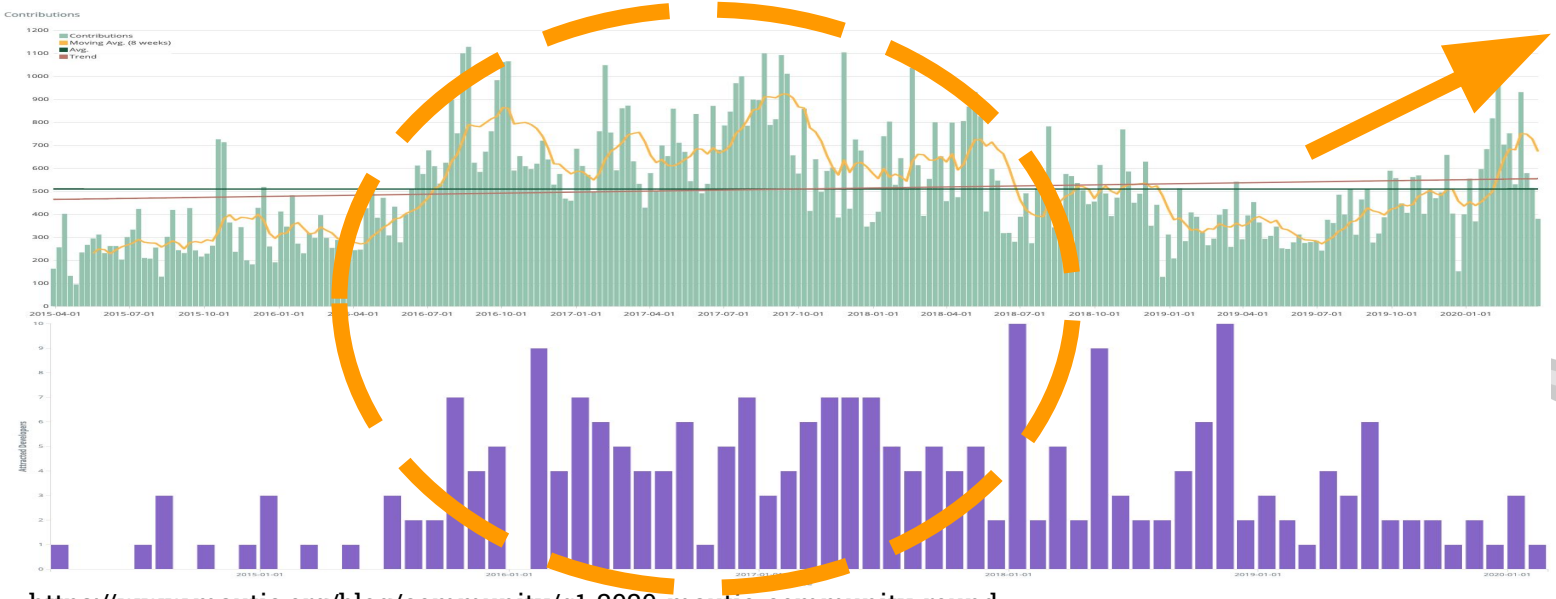
An increase or decline in new contributors and contributions can be an early indicator of community health.

New Contributors



https://www.mautic.org/blog/community/q1-2020-mautic-community-round

Growth in overall contributions



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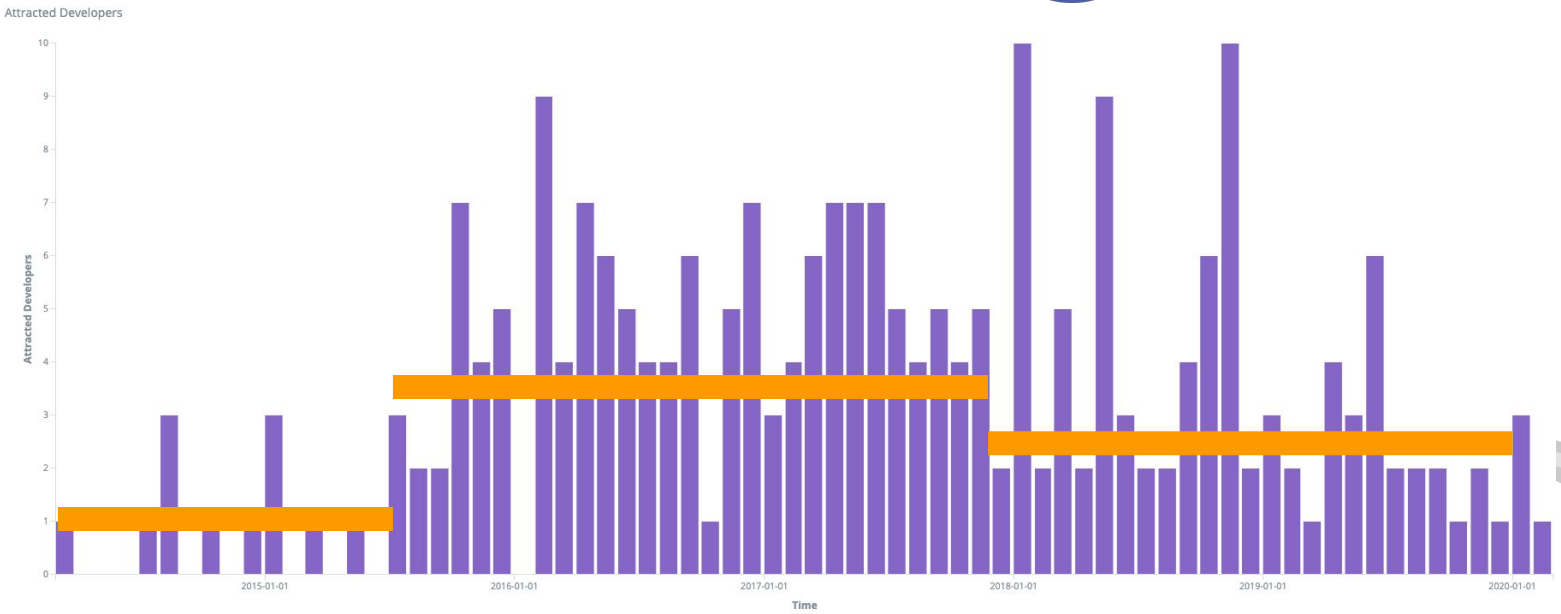
New Contributors



https://www.mautic.org/blog/community/q1-2020-mautic-community-round

Foundation for community growth

Report Conclusion:

Q1 2020 has been a busy one in the Mautic Community. A lot of positive steps have been taken to **establish a solid foundation for growth**.

Teams are becoming more proactive and **processes are being established** which helps the community to function more effectively.

We have seen, **as a result, a significant increase in engagement** and have welcomed new contributors to the project as a result.

https://www.mautic.org/blog/community/q1-2020-mautic-community-round

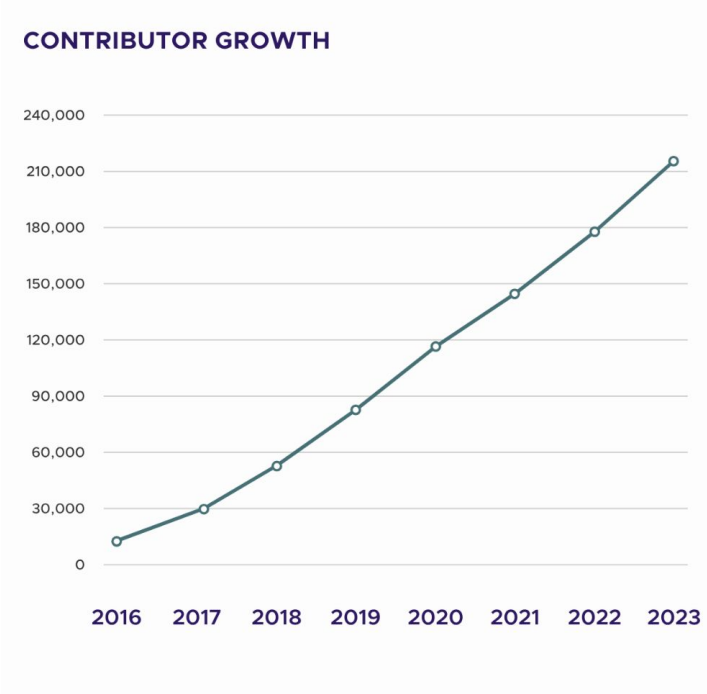
Ecosystem Growth

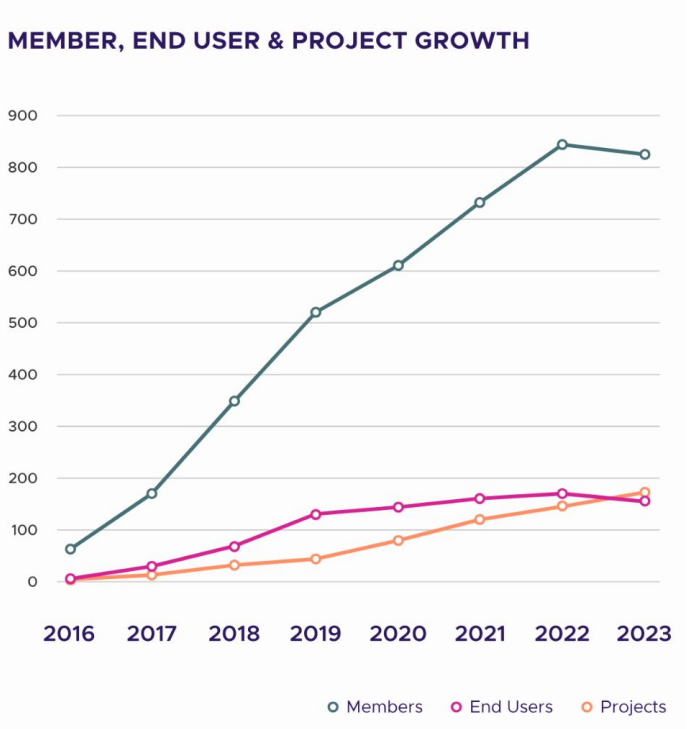
An ecosystem of projects grows by attracting more

- Project
- Contributors
- Members
- Users

Ecosystem Growth

CLOUD NATIVE COMPUTING FOUNDATION



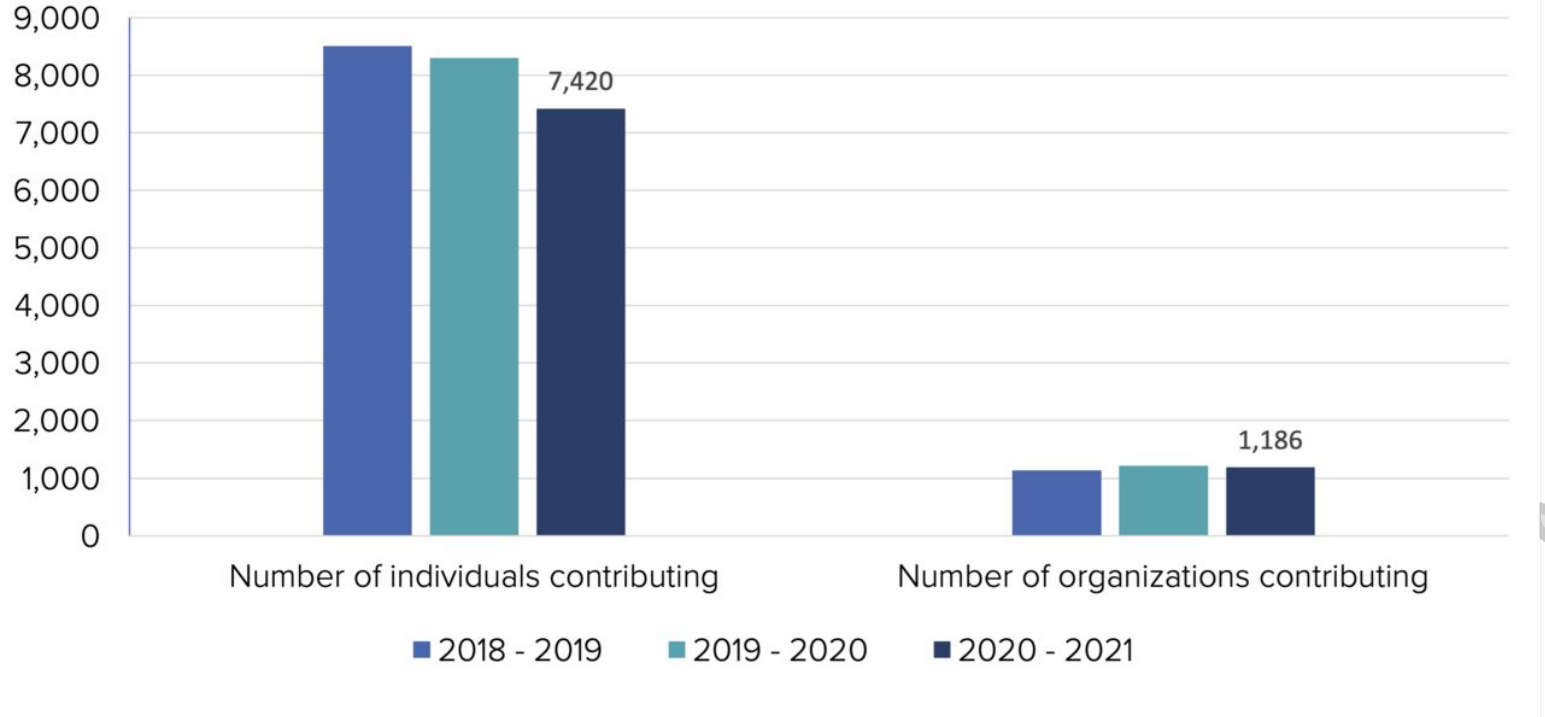


https://www.cncf.io/reports/cncf-annual-report-2023/#momentum

Organizational Diversity

Organizational diversity expresses how many different organizations are involved in a project.

Organizational Diversity



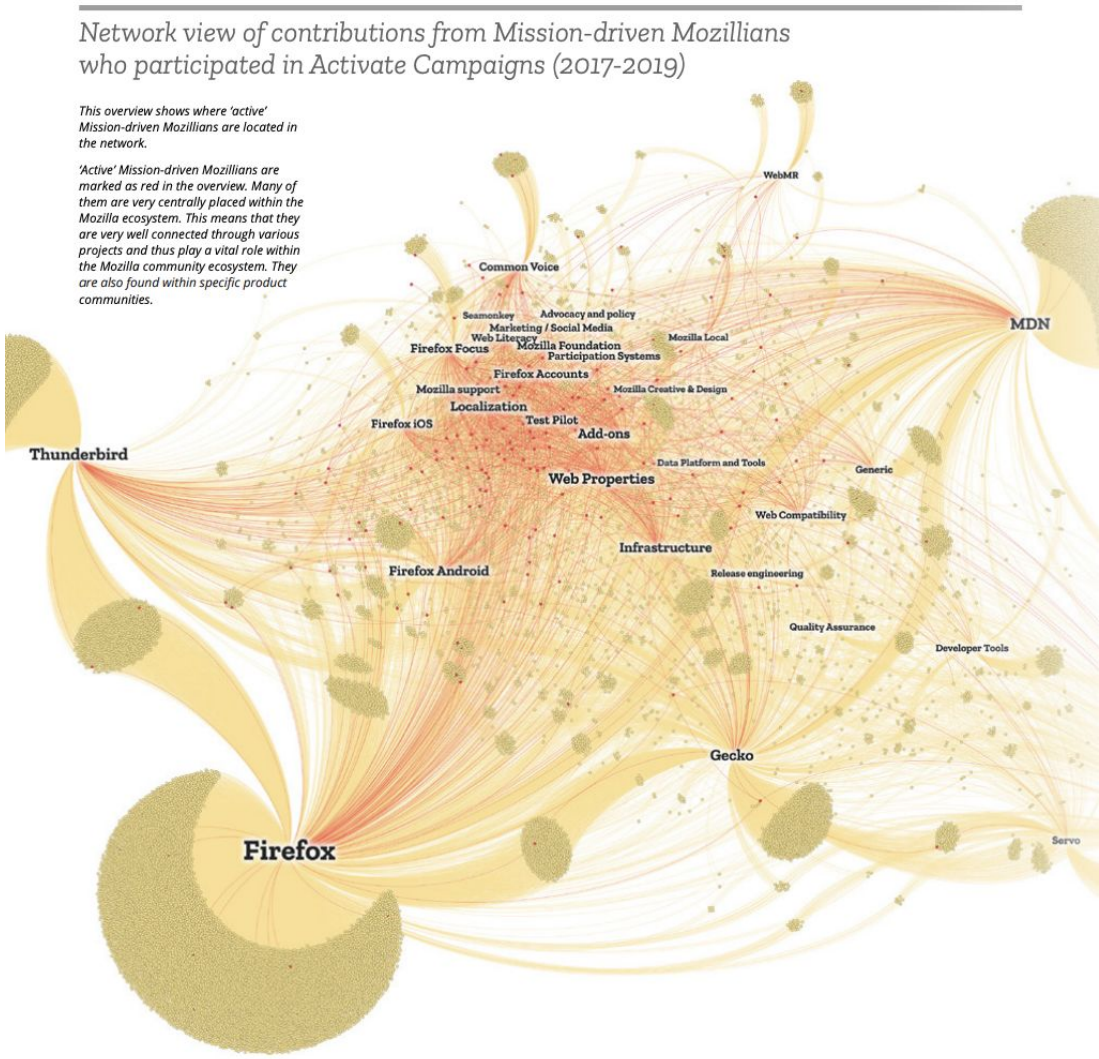
https://dri.es/who-sponsors-drupal-development-2020

Event Impact

Projects use events to energize and activate contributors.

Event Impact

moz://a



https://report.mozilla.community/

How to overcome technical and organizational challenges

Organizational Challenges

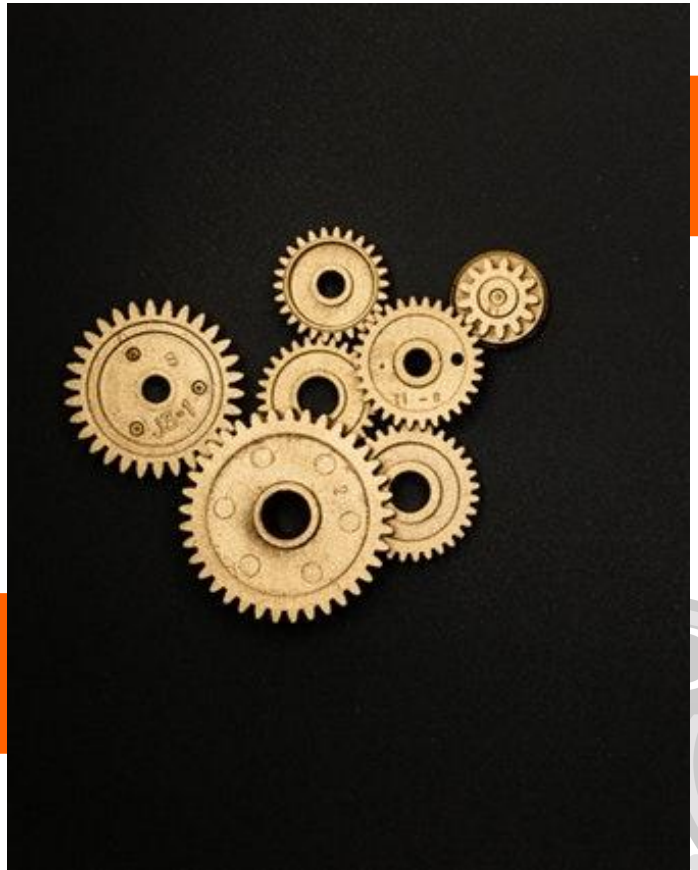
- ➔ Deciding on the right metrics
- ➔ Knowing what to do about metrics
- ➔ Knowing what is good and bad
- ➔ PII* concerns

*Personally identifiable information (PII) uses data to confirm an individual's identity.

Technical Challenges

Where is the data?

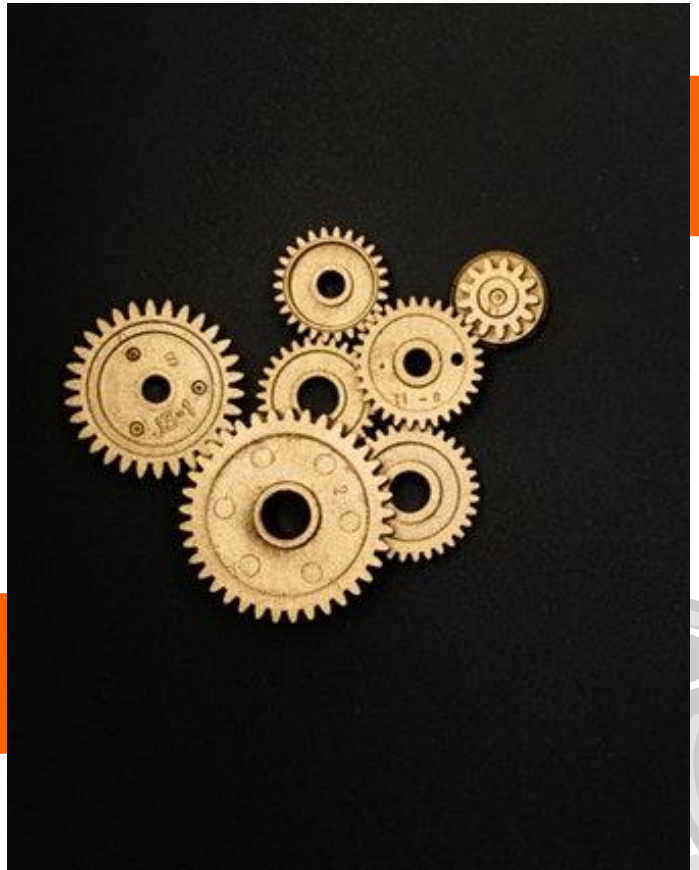
- ➔ Git
- ➔ GitHub
- ➔ GitLab
- ➔ BitBucket
- ➔ Jira
- ➔ Gerrit
- ➔ Confluence
- ➔ ...



Technical Challenges

Where is the community?

- ➔ Wiki
- ➔ Discourse
- ➔ Mailing List
- ➔ IRC
- ➔ Slack
- ➔ Meetup.com
- ➔ StackOverflow
- ➔ …



How to get the data

Raw data:

- Get data from data sources

Enriched data:

- Unify data
- Manage identities
- Calculate metrics

Useful data:

- Visualize, report

Raw data

- Easiest step
- Query logs
- Use APIs

Challenge: Changing APIs and data formats

Enriched data

➔ **Unify data**

- Date formats
- Level of detail
- Metadata about different contributions
- Convert everything into the desired database structure

➔ Manage identities

➔ Calculate metrics

Enriched data

➔ Unify data

➔ **Manage identities**

- Who is who in the community
- Who do contributors work for (now and before)
- Different usernames and email
- Assigning contributions to the correct person

➔ Calculate metrics

Enriched data

- ➔ Unify data
- ➔ Manage identities
- ➔ **Calculate metrics**
  - Primary metrics - summarizing original data
  - Secondary metrics
    - Calculation from different data fields
    - Combining data from different data sources
    - Value judgements on data - e.g., quality models

Useful data

- ➔ Who is the data user?
- ➔ How should the data be presented?
- ➔ What visualizations are most meaningful?
- ➔ What story does the data tell?

Technical Solutions

OSS Solutions

- CHAOSS GrimoireLab
- CHAOSS Augur
- Apache Kibble
- CNCF Dev Analytics

Exploration of OpenInfra's community metrics

OpenInfra and Bitergia partner in providing metrics to OpenInfra projects

“Bitergia is the internationally-recognized team of experts in open source metrics. It really makes sense for the OpenInfra Foundation to partner more closely with them as we look towards supporting the next decade of open infrastructure projects. Through this partnership, all OpenInfra projects will have access to pertinent and standard community metrics and insights.”

– Thierry Carrez,
GM of the OpenInfra Foundation

“OpenInfra has been long-standing partner. We have been working together on project sustainability and diversity equity and inclusion. I’m super excited that we will work more closely with OpenInfra it grows its projects and foundation.”

– Georg Link,
Director of Sales at Bitergia

Community Dashboards

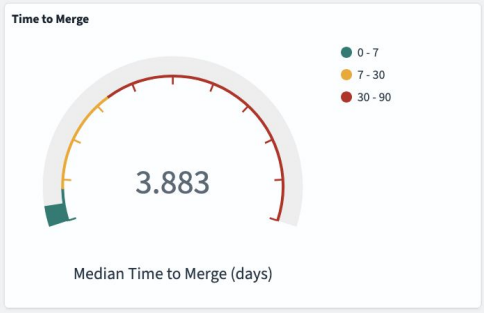
OpenStack	https://openstack.biterg.io
Kata Containers	https://katacontainers.biterg.io
StarlingX	https://starlingx.biterg.io
Zuul	https://zuul.biterg.io

Change Requests

Change requests are intended to be reviewed by other developers, who may suggest improvements.

- **Pull Request (GitHub)**
- **Merge Request (GitLab)**
- **Changeset (Gerrit)**

Change Request Duration



https://starlingx.biterg.io/

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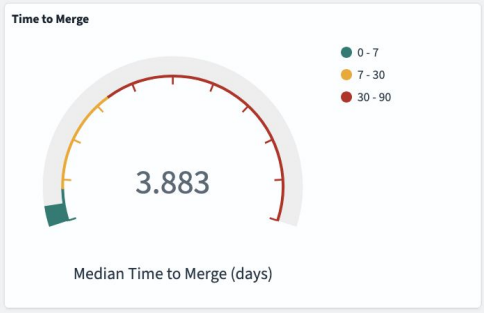

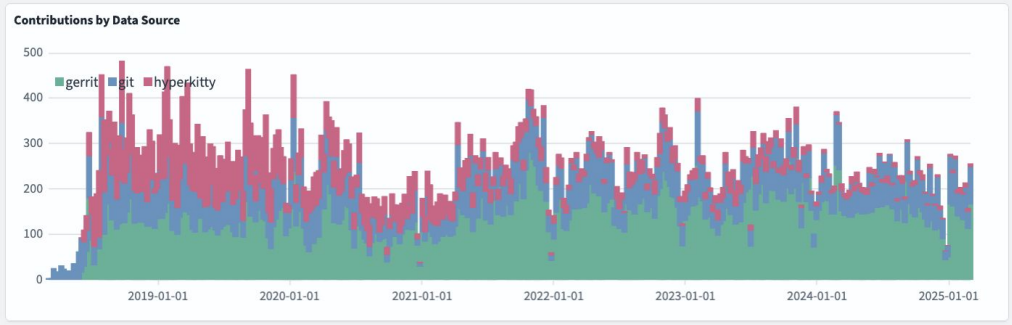

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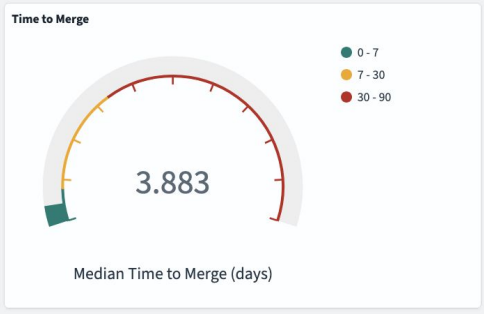

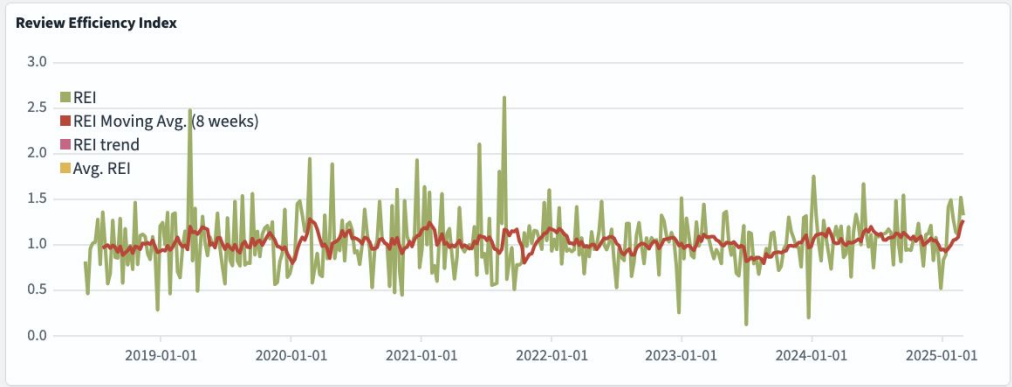

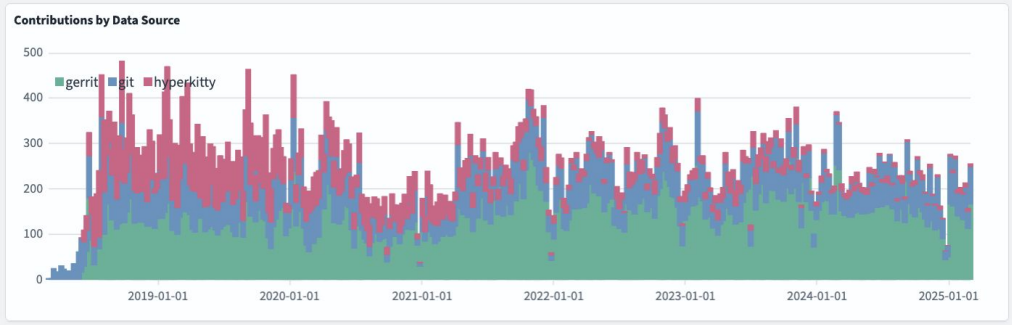

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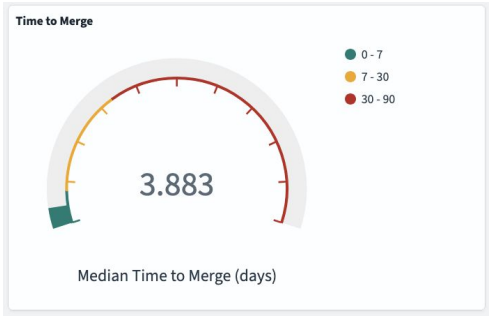

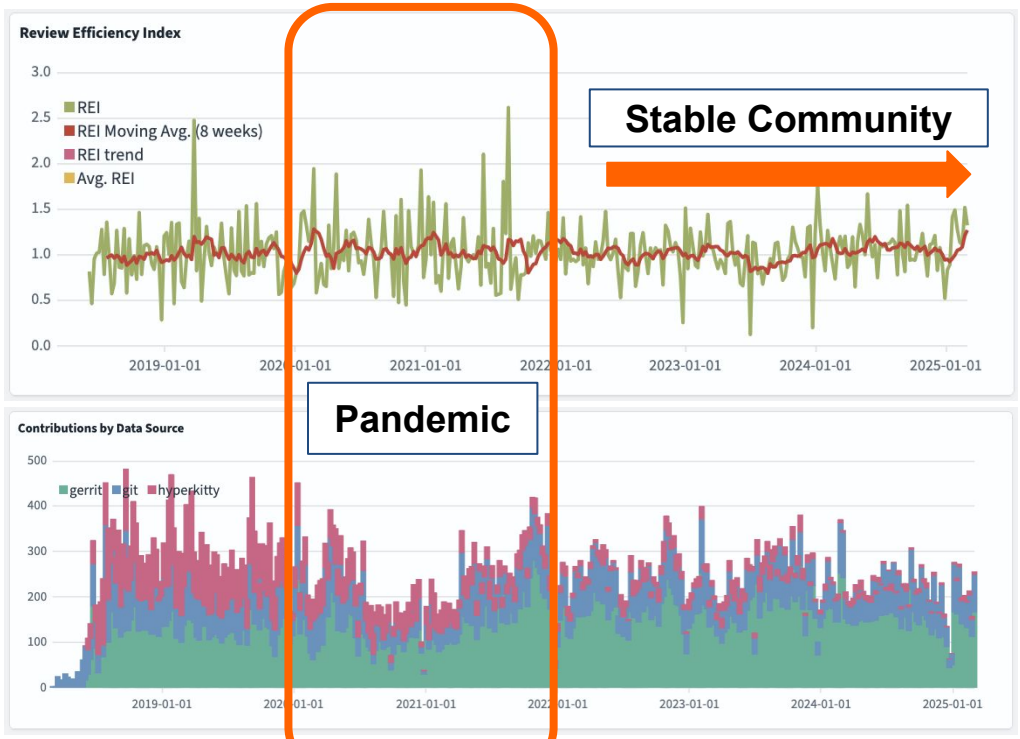

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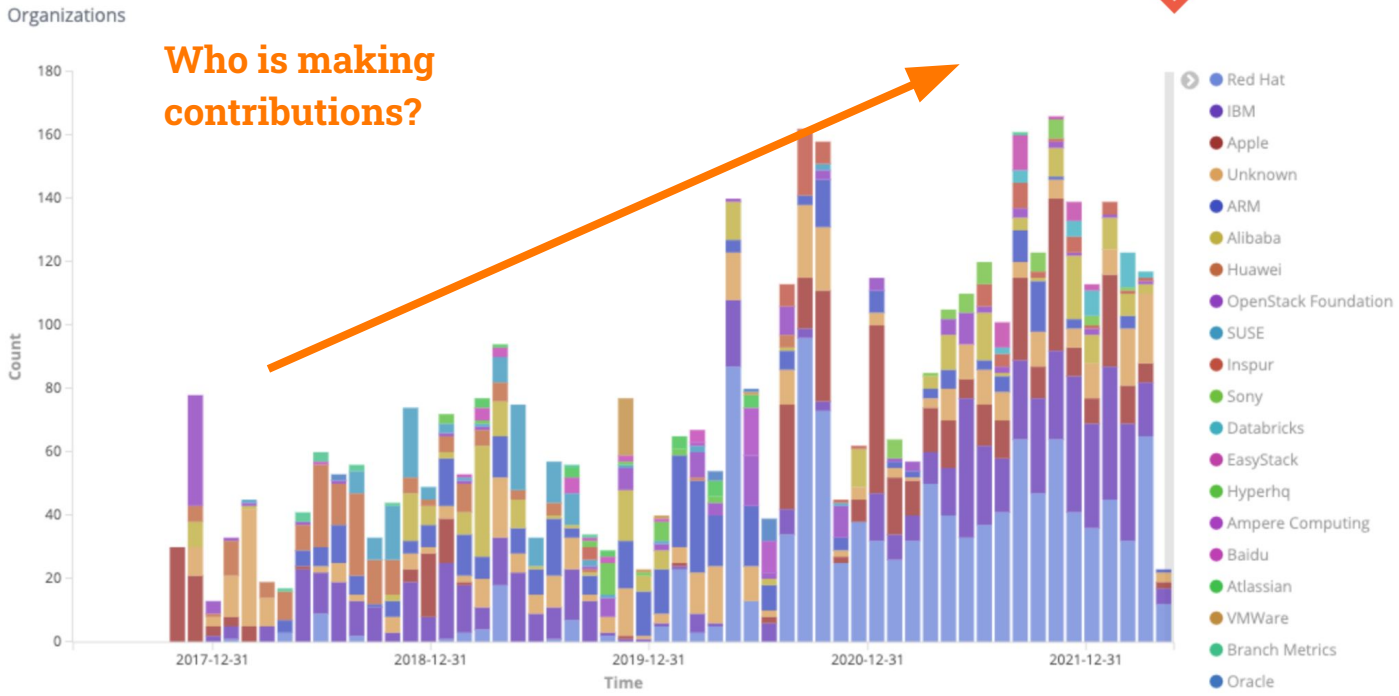
Organizational Diversity

Organizational diversity expresses how many different organizations are involved in a project.

Contributions by Organizations



https://katacontainers.biterg.io/

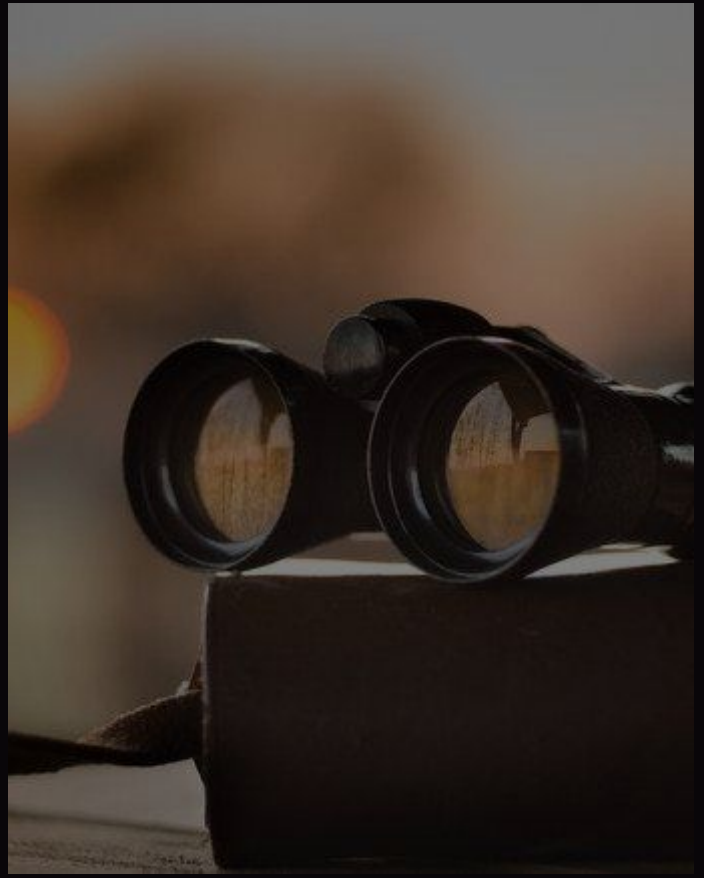
* Chart from 2022

Lessons Learned

Lessons learned

Summary

- ➔ Use metrics
- ➔ Track metrics early
- ➔ Start with easy to get metrics
- ➔ Present metrics in context
- ➔ Be transparent with the community



Thank you and please reach out!

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Pasadena, CA, USA
March 6, 2025