



INSIGHTS REPORT

September 2024

The State of Cardano in Eight Charts

This Bitergia Insights report dissects the Cardano open source ecosystem into distinct elements, including the organizational landscape, technical leadership, key players, maintenance challenges, and other elements.

This analysis focuses on a subset of the existing community, examining the sustainability of Cardano's core projects, the Cardano Wallet project, the GovTool project, the Catalyst project, and the Cardano Improvement Proposals repository.

While, historically, Input Output (IOHK) has been the leading contributing company in the ecosystem, a remarkable shift is occurring in the leadership of core projects, moving from being led by this single company to having at least two leading organizations per project. This trend, particularly obvious since the fourth quarter of 2023, indicates a positive shift towards shared governance and, thus, improving long-term sustainability.

Although the overall activity trends have remained similar during the 12 months from August 2023 to July 2024, there was a substantial increase in the number of code reviews compared to the previous 12-month period. This suggests a higher degree of collaboration and a higher involvement in code quality. These factors, combined with a steady level of participation, ensure short-term sustainability.

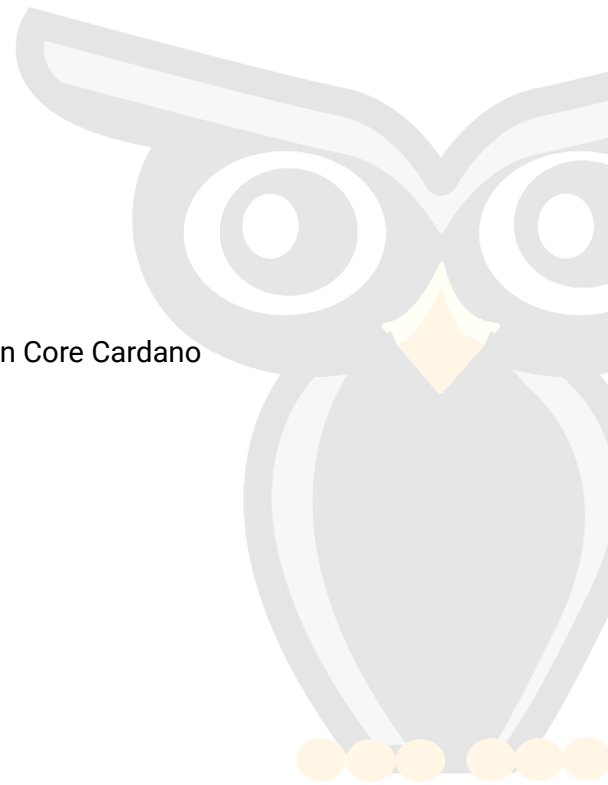
Another challenge for achieving a healthy ecosystem is the proper maintenance of its projects. These projects have positives and negatives in this respect. On one side, the community is effectively managing code reviews, with very positive results. On the other side, there is an increasing backlog of issues. However, the backlog growth remains within acceptable levels, suggesting that the community can manage the current volume of issues and keep an eye on the projects that may require more maintenance efforts.



We used Bitergia Analytics to analyze the Cardano ecosystem. The report covers the following topics:

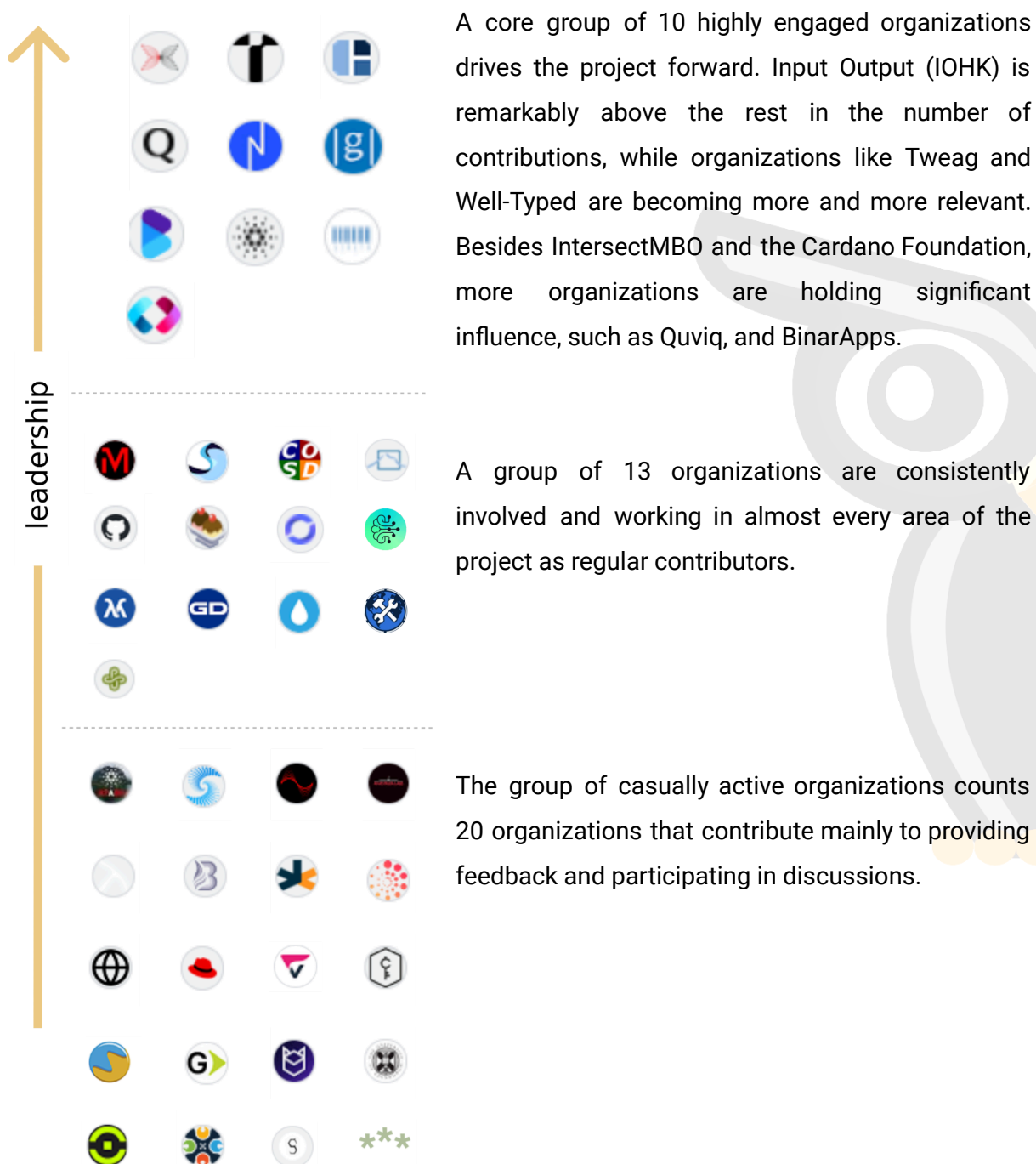
1. Organizational Landscape
2. Collaboration Dynamics
3. Technical Leadership Transition
4. Activity Trends
5. Contributor Stability
6. Newcomers Joining the Community
7. Sustainability: The Impact of Tweag Contributions in Core Cardano
8. Maintenance Challenges

Let's go into the details.



ORGANIZATIONS LANDSCAPE

43 organizations have contributed to the Cardano ecosystem¹ during the last 12 months on GitHub, from August 2023 to July 2024. The contributions we counted for this report include source code contributions (commits), issues, pull requests, and comments on issues and pull requests.



¹ The complete list of organizations is available in the [Appendix](#).

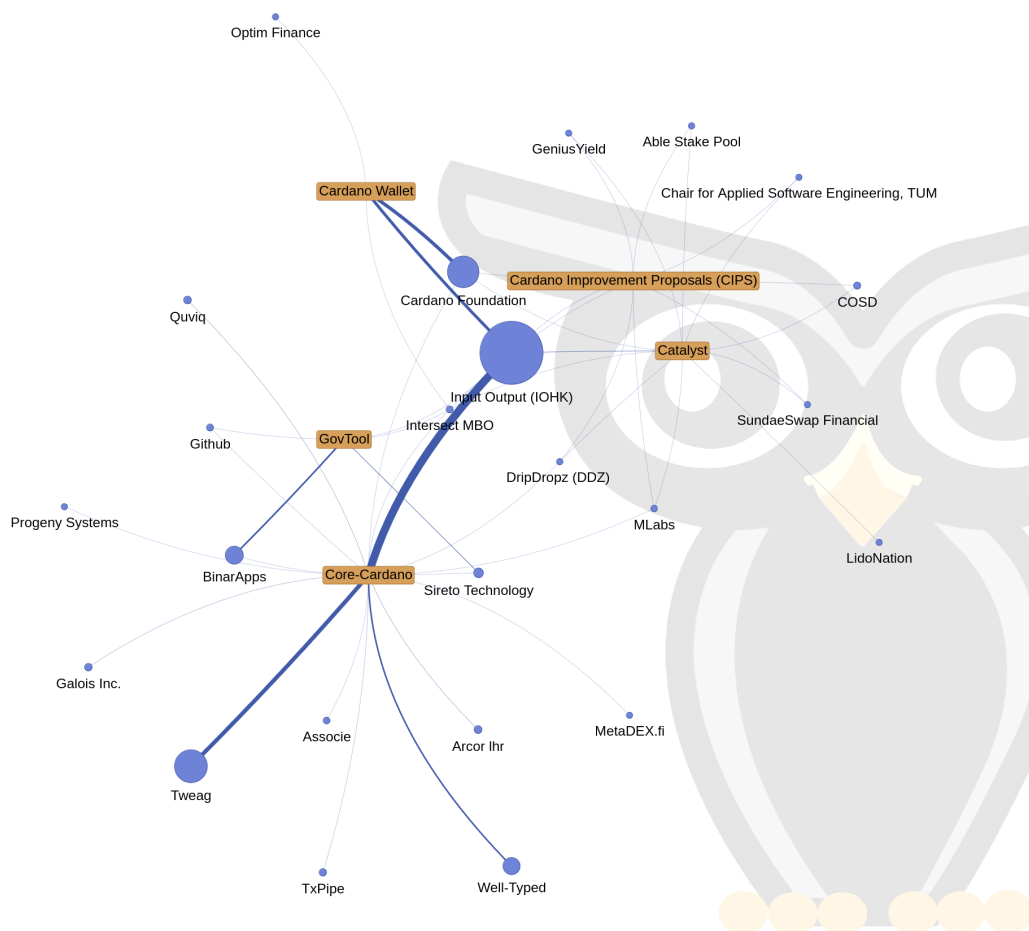


COLLABORATION DYNAMICS

During the last 12 months, **22 organizations contributed source code** to the repositories in the Cardano ecosystem. Most of the big players are contributing more to the Core-Cardano, while a much smaller set is contributing to the Catalyst, Cardano Wallet, and Intersect's internal repositories.

The figure shows the connections between organizations (blue dots) contributing code to projects (yellow labels). The size of the dots and the links represent the amount of contributions.

10 of these organizations actively contributed to the Cardano Improvement Proposals (CIPS), while Input Output (IOHK) submitted the majority of the contributions, participating in all projects, bridging the community, and being the *de facto* leader in development.



Source: [Bitergia Dashboard](#) (requires login)



Tweag and Well-Typed have increased their presence and importance in the code contributions, focusing on the core repositories. Regarding the Catalyst repositories, the contributing organizations have a similar level of activity, and at least four organizations are acting as bridges between these repositories and the ones in the Core-Cardano category.



TECHNICAL LEADERSHIP TRANSITION

Most of the organizations significantly increased their number of total contributions to the Cardano ecosystem compared to the previous year. 10 organizations are highlighted as the most relevant during the last 12 months.

12-Month Engagement Evolution

	—
	++
	+
	++
	++
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	++
	++
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	++

The table is sorted by the total number of contributions and shows the evolution of contributions: Well-Typed, Tweag, and BinarApps are the organizations with the biggest growth. In the case of Tweag, there was a prominent increase since 2023 Q4.

Another highlight is the journey of BinarApps and Sireto Technology, going from a low-activity level in the previous period to becoming part of the top 10 contributing organizations in all the areas of the GovTool project: code contributions, submitted issues, and pull requests (PRs), including general comments and code reviews.

== Similar relative contributions, compared to previous period.

+ Slight relative increase, compared to previous period.

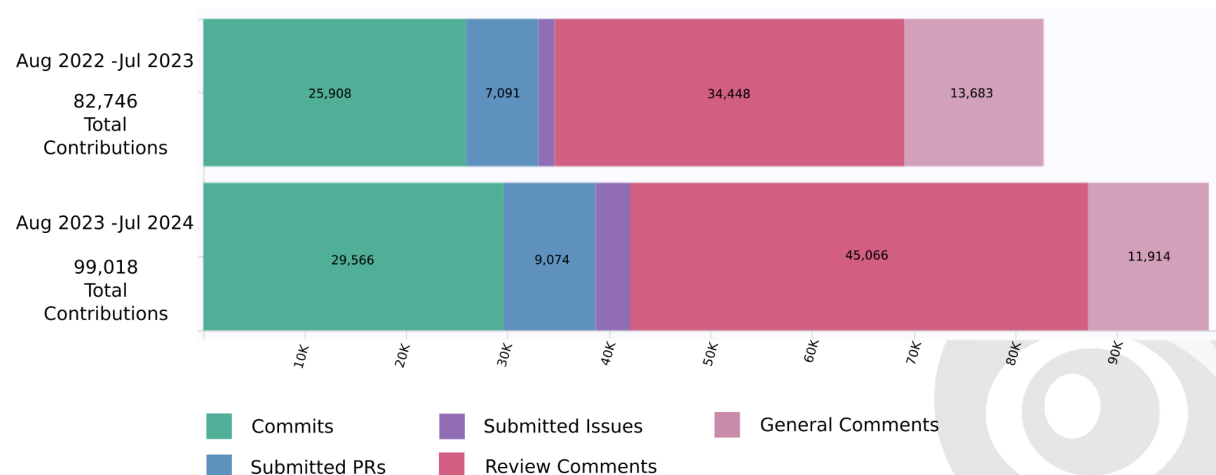
++ Significant relative increase, compared to previous period.

— Slight relative decrease, compared to previous period.



ACTIVITY TRENDS

The **analysis of contributions shows an increasing level of activity** in most of the contribution types, with a higher number of code submissions (commits) and also keeping a consistent rate of code reviews per pull request on average. This distribution confirms the **contributions are becoming more diverse**, rather than focusing on a single type.

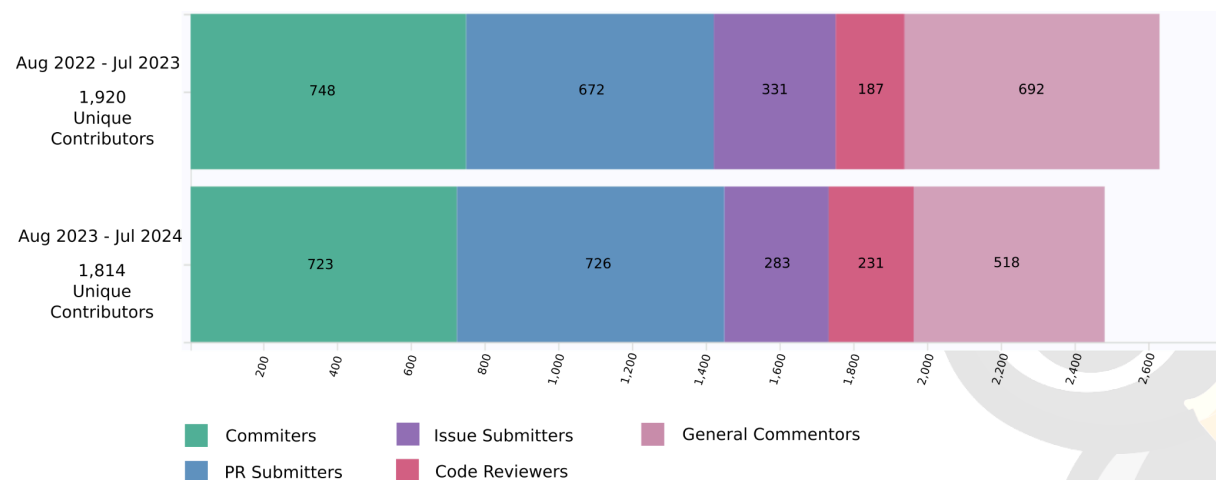


A closer look at the 25% growth in the number of code reviews shows that this increase in contributions came mostly from organizations in the top ten, specifically Tweag and Well-Typed. Here, Input Output (IOHK) continues to be the top contributor producing a similar amount of code reviews compared to the previous 12-month period.



CONTRIBUTOR STABILITY

The Cardano ecosystem had **a similar number of individual contributors** engaged across issues, pull requests (PRs), code reviews, and commits in the last 12 months compared to the previous period. While the code submitters remained at similar levels, there were more people submitting issues and fewer people posting general comments on issues and pull requests.

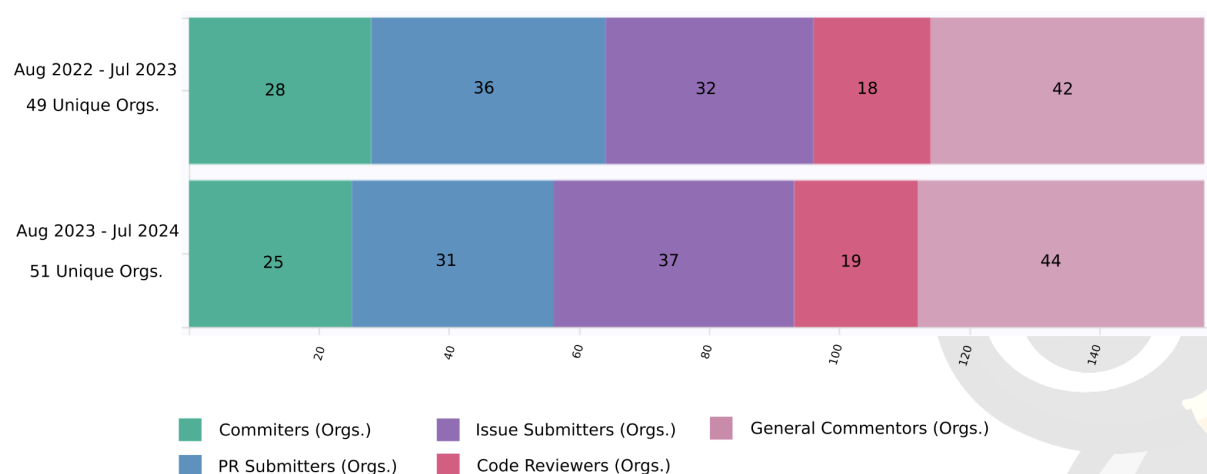


Overall, the slight decrease in the number of contributors is not affecting the stability of the projects, as they received more contributions than in the previous period, which points to an increase in the engagement of the current contributors. These results are consistent throughout all of the project categories that were analyzed.



NEWCOMERS JOINING THE COMMUNITY

The Cardano ecosystem had an **increasing number of organizations** engaged across submitted issues, general comments, and comments in reviews in the last 12 months compared to the previous period. This trend is even clearer when observing the detail when filtering the data by the Core-Cardano repositories. Having organizational diversity makes the community more resilient to changes over time and reduces the degree of dependency on the main contributing organizations.



The overall number of active organizations remained very similar, with an increase of two organizations. Nonetheless, there was a change in the type of contributions these organizations are producing: there are more organizations creating issues, submitting code reviews, and posting general comments, compared to the number of organizations producing code and submitting pull requests.



THE IMPACT OF TWEAG CONTRIBUTIONS IN CORE-CARDANO

We see a **positive shift in the distribution of the code contributions** when observing the top repositories from the Core-Cardano category. While Input Output (IOHK) led most of the activity, during the last 12 months **Tweag has become the second highest code contributor**, with a significant percentage of the total participation. The activity from the rest of the organizations is still low, compared to these two top contributing organizations.

Repository	Percentage Participation of Input Output in the last 12 months	Percentage Participation of Tweag in the last 12 months	Organizations Participating in the last 12 months
cardano-ledger	76%*	16%	8+
cardano-node	78%*	12%	5+
cardano-api	78%*	20%	4+
cardano-cli	63%	34%	4+
ouroboros-consensus	52%	40%	4+
ouroboros-network	45%	32%	4+

* IOHK still leads the charge and has begun enabling more diversified contributions fulfilling the mission for the age of Voltaire².

By grouping the Git contributions by organization, we can identify the organizations leading the development in each repository. Projects led by more than one organization will be more resilient to any strategic changes of the organizations involved.

² Age of Voltaire, CIP-1694 - <https://www.1694.io/>



MAINTENANCE CHALLENGES

The community was able to address all code reviews (pull requests) during the last 12 months. With a closer look at the results from the project groups, the picture is also consistent when computed individually for each repository. However, the community experienced an **increasing backlog of open issues**.

Project Group	Last 12 months PR Backlog Growth	Last 12 months Issues Backlog Growth
Core Cardano	<0.1%	+23%
Catalyst	-0.5%	+29%*
Cardano Improvement Proposals (CIPS)	+2%	+10%
Cardano Wallet	<0.1%	+21%
GovTool	-2%	+38%*

* Growth exceeds 25% year-over-year

The analysis of the growth of the backlog for pull requests (PRs) and issues measures the effectiveness of a team's backlog management process. This metric gives insight into whether the team can digest all the work created or if the number of items to work on (the backlog) is growing.

In terms of issue management, the repositories show an increasing backlog, but the situation still looks under control.

- In the case of Catalyst, the repository needing the most attention is *Catalyst Voices*, with a 35% growth in backlog issues.
- Analyzing the results from Core-Cardano projects, the values were unevenly distributed. While repositories like *Cardano Ledger*, *Ouroboros Network*, and *Ouroboros Consensus* have had very positive results (less than 15% growth), there are some repositories like *Plutus* and *Cardano Node Tests*, that need to pay attention to their backlog before it becomes harder to manage, as they keep growing and receiving more contributions.



APPENDIX: LIST OF ORGANIZATIONS

The organizations appearing in the [Organizations Landscape section](#) are classified according to their activity in the analyzed group of projects from the Cardano Ecosystem, from August 2023 to July 2024.

Organizations in the Core Contributors Group

The organizations in this group are top-ten contributors to the subset of projects in this analysis, taking into account source code contributions (commits), issues, pull requests, and comments on issues and pull requests.

- Input Output (IOHK)
- Tweag
- Cardano Foundation
- Well-Typed
- BinarApps
- Intersect MBO
- Quviq
- Sireto Technology
- Galois
- TxPipe

Organizations in the Regular Contributors Group

The 13 organizations in this group are the next contributors outside the top ten, considering the same type of contributions as the Core Contributors group.

- MLabs
- LidoNation
- GitHub
- DripDropz (DDZ)
- SundaeSwap Financial
- Progeny Systems
- MetaDEX.fi
- Able Stake Pool
- COSD
- Optim Finance
- TUM Chair for Applied Software Engineering
- GeniusYield
- Portland State University



Organizations in the Casual Contributors Group

The 20 organizations in this group are considered Casual Contributors because they submitted to the projects non-code contributions: issues, pull requests, and comments on issues and pull requests.

- ATADA SPO
- Strica
- Harmonic Labs
- Anastasia Labs
- Generation Lambda
- Butane
- dcSpark
- Emurgo
- Red Hat
- Liqwid Labs
- Crypto Finance Group
- Paradoxical Sphere
- Globant
- Blockdaemon
- X Stake Pool
- AIDEV
- Vacuumlabs
- GimbaLabs
- NuFi
- University of Edinburgh



APPENDIX: LIST OF REPOSITORIES

This report shows data from code contributions (commits), issues, pull requests, general comments, and review comments extracted from the GitHub repositories in the project categories listed below.

Core-Cardano

This group category is composed of the following internal repositories:

- [intersectmbo/antaeus](#)
- [intersectmbo/cardaminal](#)
- [intersectmbo/cardano-haskell-packages](#)
- [intersectmbo/cardano-base](#)
- [intersectmbo/cardano-world](#)
- [intersectmbo/libsodium](#)
- [intersectmbo/cardano-crypto](#)
- [intersectmbo/cardano-node](#)
- [intersectmbo/cardano-cli](#)
- [intersectmbo/cardano-api](#)
- [intersectmbo/cardano-node-tests](#)
- [intersectmbo/ouroboros-consensus](#)
- [intersectmbo/cardano-db-sync](#)
- [intersectmbo/lsm-tree](#)
- [intersectmbo/cardano-updates](#)
- [intersectmbo/cardano-test-plans](#)
- [intersectmbo/cardano-prelude](#)
- [intersectmbo/cardano-node-emulator](#)
- [intersectmbo/essential-cardano](#)
- [intersectmbo/cardano-haskell-package-repo](#)
- [intersectmbo/cardano-ledger](#)
- [intersectmbo/formal-ledger-specifications](#)
- [intersectmbo/ouroboros-network](#)
- [intersectmbo/Win32-network](#)
- [intersectmbo/plutus](#)
- [intersectmbo/plutus-apps](#)
- [intersectmbo/plutus-tx-template](#)
- [intersectmbo/plutus-cli-demo](#)
- [intersectmbo/cardano-addresses](#)
- [intersectmbo/bech32](#)
- [intersectmbo/cardano-coin-selection](#)
- [intersectmbo/cardano-launcher](#)
- [intersectmbo/cardano-transactions](#)

GovTool

This group category is composed of the following internal repositories:

- [intersectmbo/govtool](#)
- [intersectmbo/governance-tools-documentation](#)

Cardano Wallet

This group category is composed of the following external repositories:

- [cardano-foundation/cardano-wallet](#)
- [cardano-foundation/cardano-token-registry](#)
- [cardano-foundation/cardano-graphql](#)
- [cardano-foundation/cf-cardano-ballot](#)



Cardano Improvement Proposals (CIPS)

This group category is composed of the following external repository:

- [cardano-foundation/CIPs](https://github.com/cardano-foundation/CIPs)

Catalyst

This group category is composed of the following external repositories:

- [input-output-hk/catalyst-core](https://github.com/input-output-hk/catalyst-core)
- [input-output-hk/catalyst-voices](https://github.com/input-output-hk/catalyst-voices)
- [input-output-hk/catalyst-ci](https://github.com/input-output-hk/catalyst-ci)
- [input-output-hk/catalyst-daedalus](https://github.com/input-output-hk/catalyst-daedalus)
- [input-output-hk/catalyst-engineering](https://github.com/input-output-hk/catalyst-engineering)
- [input-output-hk/catalyst-standards](https://github.com/input-output-hk/catalyst-standards)
- [input-output-hk/catalyst-docs](https://github.com/input-output-hk/catalyst-docs)

