Monthly Maturity Report: November 2024

Prepared by:
Christian Taylor
Head of Open Source Office, Intersect
&
Terence “Tex” McCutcheon
Open Source Program Manager, Intersect

Date:
December 1, 2024

Organization:
Open Source Committee
Intersect Member Based Organization
Cardano Ecosystem

Review Process	Approval
1st Pass: Tex M, OSO PM	✅**Approved**
2nd Pass: Christian T, Head of OSO	✅**Approved**

INTERSECT™

Summary

In **November 2024**, the Cardano open-source ecosystem experienced a phase of **deep, focused development**, marked by reduced surface-level activity but significant growth in code volume. While total commits, pull requests, and issues all declined, **file-level and line-level churn increased sharply**, suggesting a pivot toward substantial refactoring or feature delivery. Key repositories like **Plutus**, **Cardano Ledger**, and **Ouroboros Consensus** saw major increases in modified files, while contributor distribution narrowed slightly. Organizationally, Input Output (IOHK) remained dominant, though community and external contributor participation grew in relative terms. Issue resolution times improved significantly, despite lower submission volume, indicating **better responsiveness** and **operational focus** across key teams.

General Observations

Organizational Contributions:

- **Input Output (IOHK):** Led again with 854 contributions (−6.5%), paired with a massive **500K+ lines added** and 261K removed — showing a **deep delivery push** across foundational components.
- **Well-Typed:** Increased contributions by nearly 60%, sustaining its role in tooling or compiler-related efforts.
- **Unknown contributors:** Rose from 5 to 22 contributions, suggesting expanded **community engagement or new unaffiliated developers**.
- **Tweag and Cardano Foundation:** Both saw sharp declines, signaling **possible cycle pauses or project completions**.

Geographical Distribution of Commits:

- **UTC +1 and UTC 0:** Accounted for 67% of all commit activity, with UTC +1 nearly doubling and UTC 0 more than doubling from October — indicating **European dominance** in contributor presence.
- **UTC -7 (Pacific U.S.):** Grew significantly (338%), suggesting **renewed activity in Western**

North America.

- **UTC -4 and -6:** Declined further, continuing a **drop in Central and Eastern U.S. development** presence.

Project-Specific Insights:

- **Plutus, Ledger, CLI, and Ouroboros:** All more than doubled their **estimated modified files**, showing **increased delivery velocity in high-priority projects**.
- **cardano-ledger.git:** Fell in commits (−30%) but doubled in file-level changes, implying **larger updates in fewer commits**.
- **lsm-tree.git and node-tests.git:** Surged in commit volume, suggesting **expansion of infrastructure and testing frameworks**.

Repository & Issue Activity:

- PRs fell slightly (437 → 401), while the number of contributors dropped more significantly (−20%) — indicating **focused, high-effort delivery by core teams**.
- Issue submissions dropped across the board (−17.3%), but **resolution times improved by 29%**, with notable gains in IOHK and Cardano Foundation response speed.
- **ouroboros-consensus** saw a 220% spike in issues, pointing to **intensive development and increased feedback loops**.

Conclusion

The **November 2024 report** reveals a period of **consolidation, technical depth, and concentrated delivery** in Cardano's open-source development. While fewer contributors and organizations were active, the scale and intensity of work increased dramatically across core systems. Faster issue resolution, broader community contributions, and concentrated pull request

activity suggest a **highly focused release or integration cycle**. Going forward, sustaining this momentum while expanding contributor diversity and maintaining engagement from ecosystem players will be key to Cardano's continued OSS maturity.

---

1. Github Overview

This section provides a comprehensive overview of activities and dynamics within the Github platform. It encompasses various metrics and statistics concerning the usage, engagement, and performance of projects and contributors.

Summary:

November 2024 – 1,082 commits were made by 69 authors across 19 repositories.

Compared to October, **commit volume declined by 10.4%**, while the number of contributing authors increased by nearly 8%, suggesting **more distributed participation with lower per-author output**. The number of active repositories fell to 19, indicating continued **focus on a narrowed set of strategic projects**.

Metric	October 2024	November 2024	Change
Commits	1,207	1,082	−10.4%
Authors	64	69	+7.8%
Active Repositories	21	19	−9.5%

Observations:

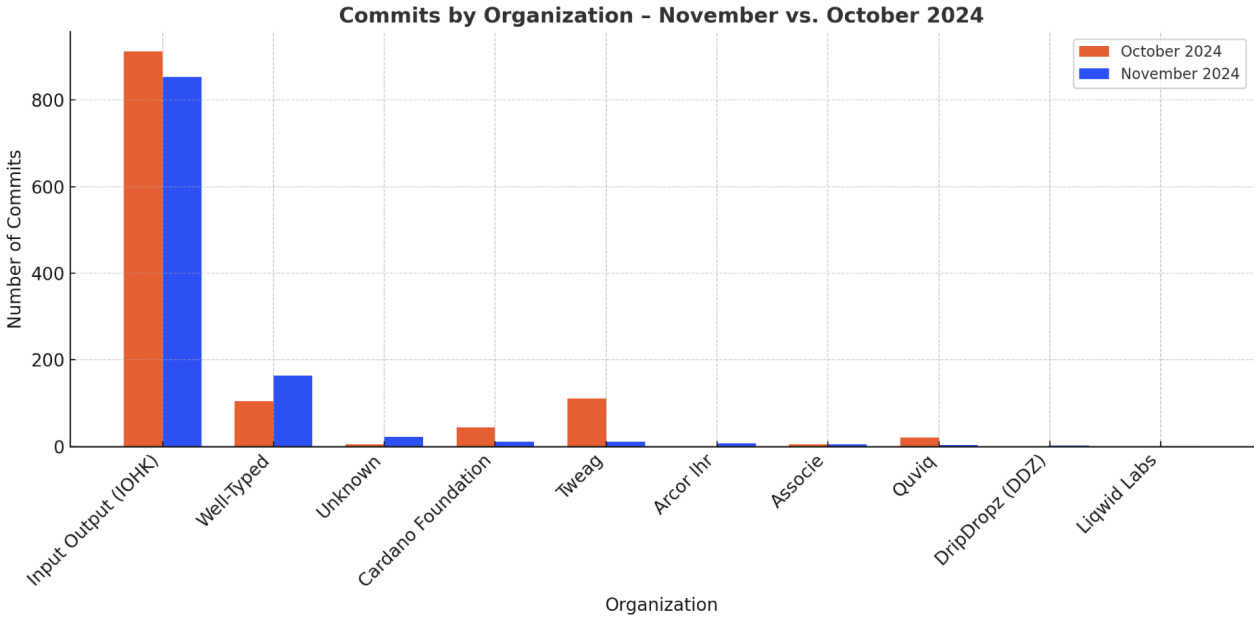
- Fewer commits overall, but more contributors — pointing to **expanded involvement from newer or less frequent participants**.
- The reduced number of active repositories reflects **continued focus on high-priority projects**, with fewer parallel tracks.
- This pattern is consistent with **feature freeze, review cycles, or transition between sprints/releases**

1.a) Organization Activity

Here is the data for how different organizations within the Cardano ecosystem were contributing to open-source projects during the current timeframe. Complete data available here in Bitergia.

Top Organizations – November 2024

Organization	Commits (Nov)	Commits (Oct)	Change (%)	Authors	Touched Files	Added Lines	Removed Lines
Input Output (IOHK)	854	913	−6.5%	51	7,807	492,942	261,326
Well-Typed	163	104	+56.7%	5	1,147	31,686	25,578
Unknown	22	5	+340.0%	4	61	1,830	890
Cardano Foundation	11	44	−75.0%	2	28	289	171
Tweag	11	111	−90.1%	1	87	475	371



Observations:

1. **Input Output (IOHK)** remained the most active contributor, though total commits dipped by 6.5%. However, code volume surged — with nearly **500,000 lines added and 260,000 removed**, pointing to **deep, structural changes** or **large-scale feature delivery**.

2. **Well-Typed** ramped up activity by 56.7%, indicating a **strategic engagement increase**, possibly focused on ecosystem tooling or documentation.

3. **Unknown contributors** showed a strong jump, suggesting **expanded community testing or new unaffiliated developers entering the ecosystem**.

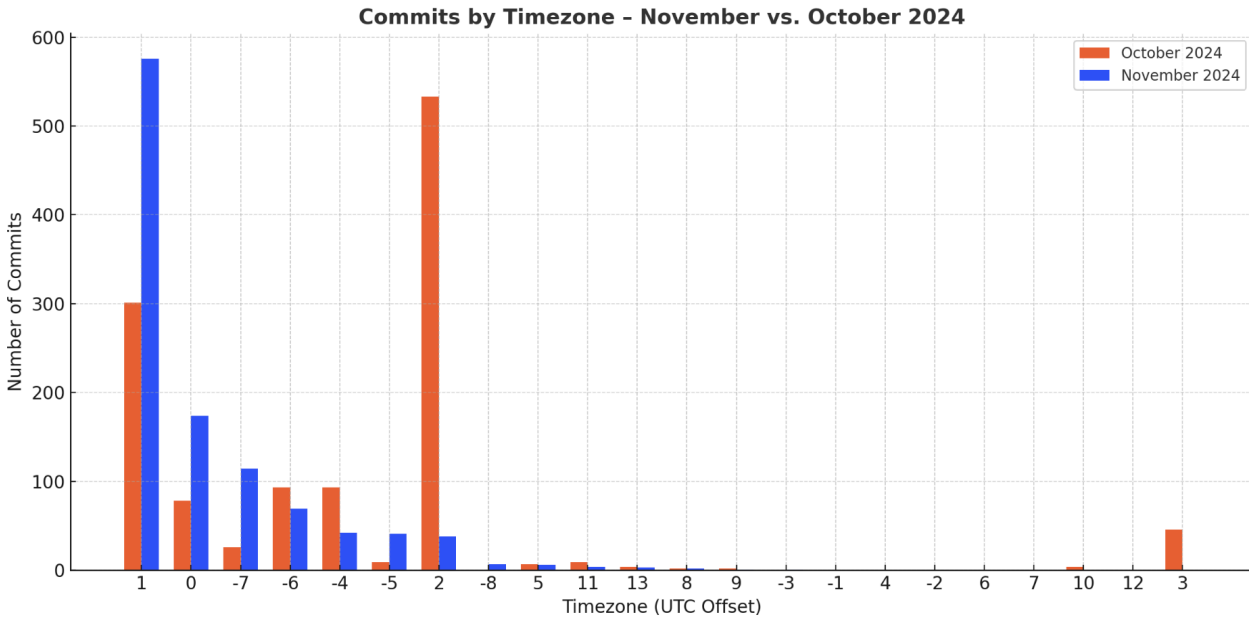
4. **Cardano Foundation** and **Tweag** both saw steep declines, indicating a **temporary retreat or completed project cycles**.

1.b) Commits by Timezone

Here is the data for commits per timezone. This view is important to understand how the contributors are spread geographically. Complete data available [here in Bitergia](#).

November 2024 – The most active timezones were UTC +1 and UTC 0, which together accounted for **67% of all commits**. UTC +1 saw a near-doubling of activity, and UTC -7 posted the largest relative gain. North American zones such as UTC -4 and -6 saw notable declines.

Timezone (UTC ±)	Commits (Oct)	Commits (Nov)	Change (%)
+1	301	576	+91.4%
0	78	174	+123.1%
−7	26	114	+338.5%
−6	93	69	−25.8%
−4	93	42	−54.8%



Observations:

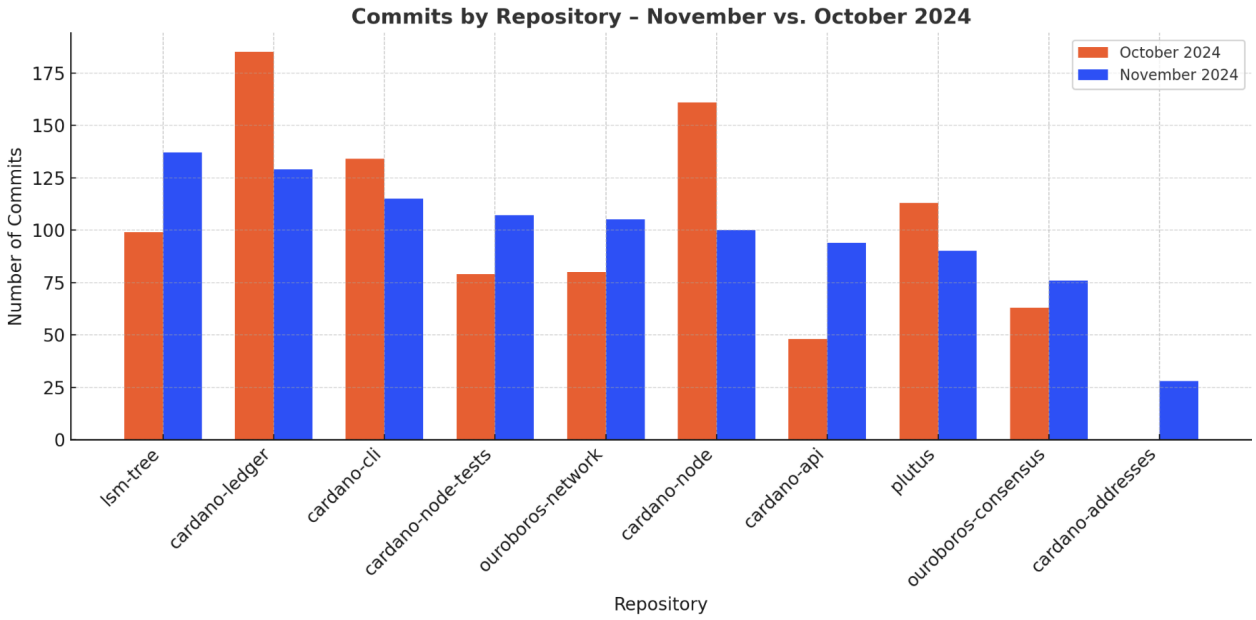
- **UTC +1 (Western Europe)** emerged as the most active region, with commit activity nearly doubling month-over-month.
- **UTC 0 (Greenwich Mean Time)** also more than doubled, showing increased output from UK- or GMT-based teams.
- **UTC -7** (likely western U.S.) saw the largest relative gain, though from a lower base, pointing to **renewed involvement from a smaller set of contributors**.
- **UTC -4 and -6** (Eastern/Central U.S.) dropped sharply, continuing a **trend of declining activity in North America** over recent months.

1.c) Per Repository Activity

This section shows activity for each repository in Cardano open-source. Complete data available here in Bitergia.

Top Repositories – November 2024

Repository	Commits (Nov)	Commits (Oct)	Change (%)
lsm-tree.git	137	99	+38.4%
cardano-ledger.git	129	185	−30.3%
cardano-cli.git	115	134	−14.2%
cardano-node-tests.git	107	79	+35.4%
ouroboros-network.git	105	80	+31.2%



Observations:

1. **lsm-tree.git** emerged as the top repository by commit volume, jumping 38% — signaling **heightened work on low-level storage infrastructure or database tooling**.
2. **cardano-ledger.git** saw the largest decline (−30%), potentially reflecting the conclusion of a high-change cycle from the prior month.
3. **cardano-node-tests.git** and **ouroboros-network.git** both grew over 30%, suggesting a focus on **testing systems and network protocol components**.
4. **cardano-cli.git** remained active despite a slight dip, maintaining its role as a **core tooling interface**.

---

2. Areas of Code

This category outlines the diverse areas and aspects of code development and management within the Github environment.

Summary

November 2024 – 9,396 files were modified by 69 authors, with over **533K lines of code added** and **297K removed**.

Compared to October, **all key metrics increased**, most significantly in code volume: lines added rose by over 250%, and lines removed doubled. This points to a **major development push**, likely involving new features, deep refactors, or infrastructure updates.

Metric	October 2024	November 2024	Change
Modified Files	8,652	9,396	+8.6%
Authors	64	69	+7.8%
Lines Added	151,453	533,499	+252.3%
Lines Removed	148,274	297,124	+100.4%

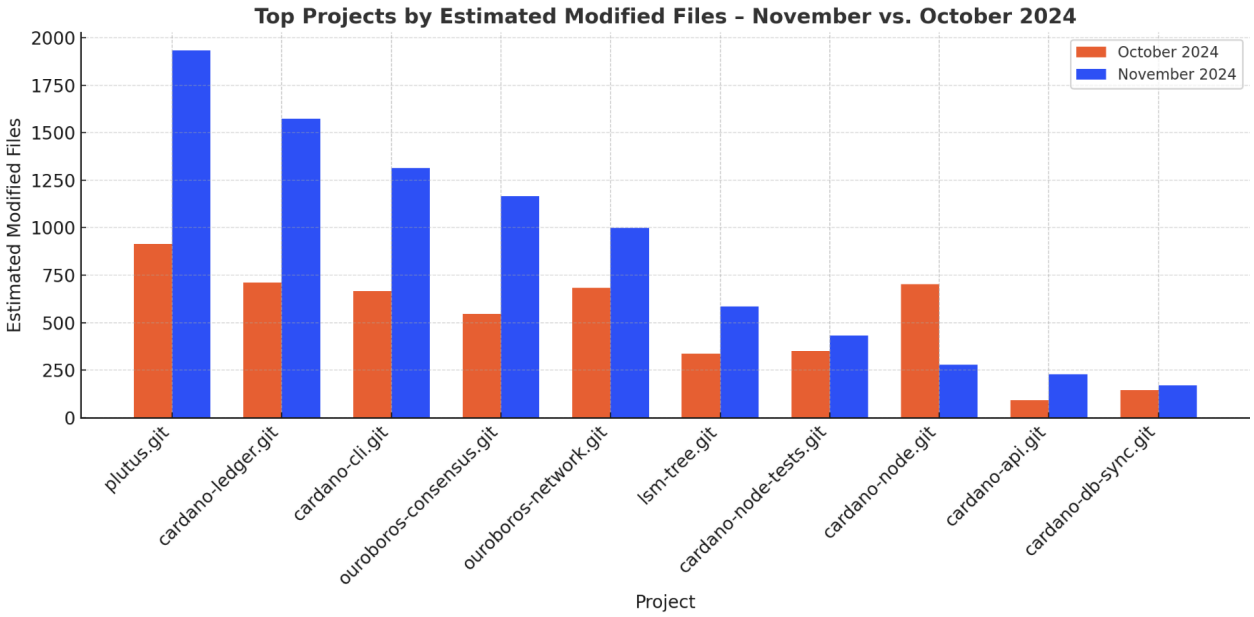
Observations:

- The **sharp increase in lines added and removed** confirms that November featured **substantial development effort**, possibly representing a milestone release or major system enhancement.
- The number of modified files also rose by 8.6%, further reinforcing the breadth of changes across multiple projects.
- The growth in authors (+7.8%) supports a **slightly broader participation base**, aligned with the rising scope of work.

2.a) Projects

Top Projects – November 2024 (Estimated Modified Files)

Project	Files (Nov)	Files (Oct)	Change (%)
plutus.git	1,932	914	+111.4%
cardano-ledger.git	1,574	710	+121.7%
cardano-cli.git	1,312	667	+96.7%
ouroboros-consensus.git	1,166	546	+113.6%
ouroboros-network.git	998	683	+46.1%



Observations:

1. **plutus.git** led all repositories in file modifications, with over 1,900 estimated file changes — signaling an intense period of **smart contract development or overhaul**.
2. **cardano-ledger.git** and **ouroboros-consensus.git** both more than doubled in estimated file changes, suggesting **deep protocol or consensus-level updates**.
3. **cardano-cli.git** also surged, indicating renewed attention to **developer-facing tooling and interfaces**.
4. The overall trend reflects a **strategic expansion in core infrastructure projects**, consistent with major roadmap progression.

---

3. Issues

This segment revolves around the identification, tracking, and resolution of issues within Github projects. It encompasses discussions on problem-solving methodologies, issue management practices, and related metrics.

Summary

November 2024 – 86 issues were submitted by 33 contributors across 10 repositories, with an average open time of **50.7 days**.

Compared to October, all tracked metrics declined: **submissions fell by 17%**, contributors dropped by 21%, and average open time **improved significantly**, falling by 29%. This suggests **less volume but faster triage and resolution**.

Metric	October 2024	November 2024	Change
Total Issues Submitted	104	86	−17.3%
Unique Submitters	42	33	−21.4%
Avg. Time Open (Days)	71.4	50.7	−29.0%
Distinct Projects	11	10	−9.1%

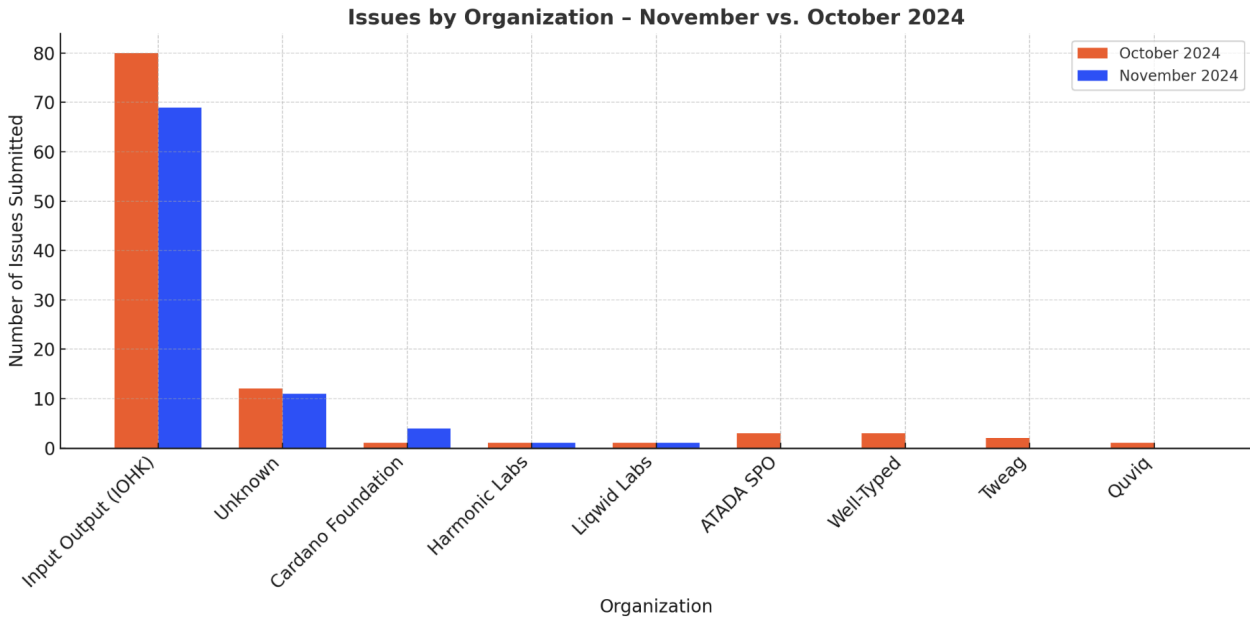
Observations:

- Fewer issues were created, reflecting **reduced testing cycles or temporary lull in QA-related feedback**.
- Fewer contributors also aligns with this trend, though activity was still distributed across 10 projects.
- The **drop in open time** suggests **faster resolution and improved responsiveness**, even with fewer submissions.

3.a) Organizations

Top Organizations – November 2024

Organization	Issues (Nov)	Issues (Oct)	Change (%)	Median Open (Nov)	Median Open (Oct)
Input Output (IOHK)	69	80	−13.8%	52.3 days	71.5 days
Unknown	11	12	−8.3%	51.3 days	66.9 days
Cardano Foundation	4	1	+300.0%	45.4 days	105.4 days
Harmonic Labs	1	1	+0.0%	0.02 days	94.3 days
Liqwid Labs	1	1	+0.0%	3.8 days	11.2 days



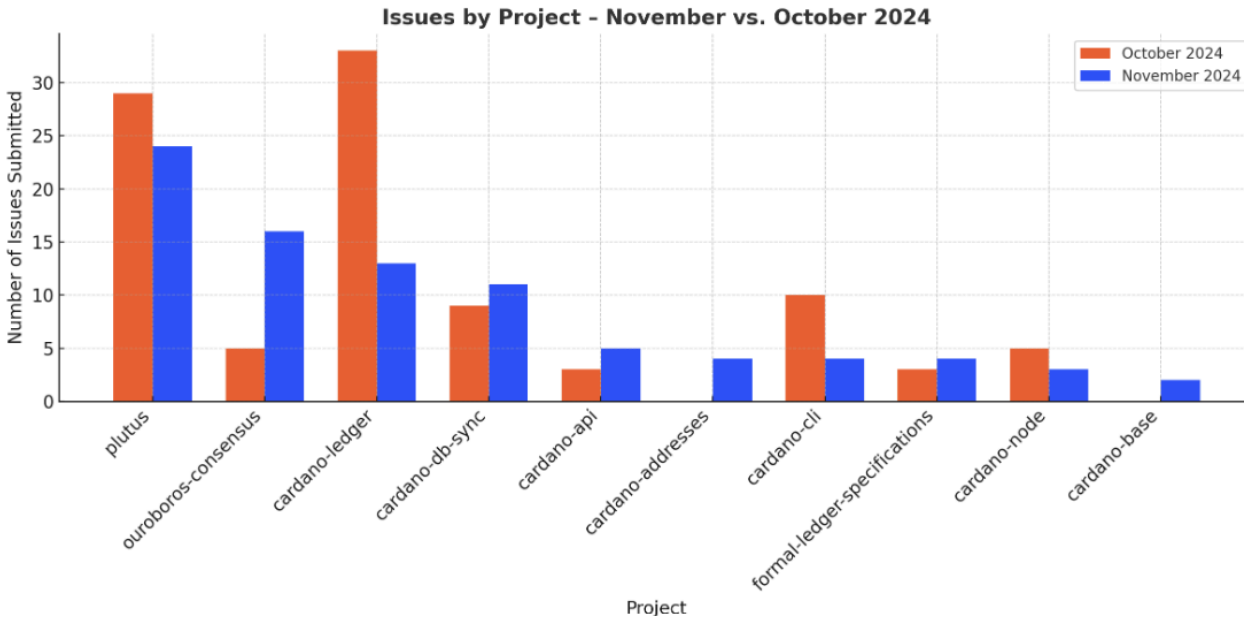
Observations:

1. **IOHK** remained the dominant source of issue submissions, though slightly reduced in volume (–13.8%). However, their **median open time improved by nearly 20 days**, showing **faster issue handling**.
2. **Unknown contributors** continued consistent engagement, likely reflecting external or unaffiliated community participation.
3. **Cardano Foundation** increased its submissions from 1 to 4, indicating a **renewed QA/testing presence** and significant reduction in average open duration.
4. **Harmonic Labs** and **Liqwid Labs** each maintained single-issue contributions, with Harmonic resolving their issue in under an hour — suggesting **responsive or trivial fixes**.

3.b) Projects

Top Projects – November 2024

Project	Issues (Nov)	Issues (Oct)	Change (%)	Median Open (Nov)	Median Open (Oct)
plutus	24	29	−17.2%	55.2 days	92.6 days
ouroboros-consensus	16	5	+220.0%	63.4 days	27.1 days
cardano-ledger	13	33	−60.6%	35.0 days	61.0 days
cardano-db-sync	11	9	+22.2%	50.7 days	55.4 days
cardano-api	5	3	+66.7%	44.5 days	80.2 days



Observations:

1. **plutus** remained the most reported-on project despite a drop in submissions (−17%), and showed a significant improvement in median open time — suggesting **better triage performance**.

2. **ouroboros-consensus** saw a 220% spike in issues, with median open time rising — indicating **greater complexity or slower throughput despite increased activity**.

3. **cardano-ledger** dropped sharply in issue submissions (−60.6%) and also improved median open time, suggesting **stabilization and more effective issue closure**.

4. **cardano-api** and **db-sync** both experienced modest increases in issues, with improved or stable handling times.

---

4. Pull Requests

November 2024 – 401 pull requests were submitted by 45 unique contributors across 20 repositories.

Compared to October, all metrics declined: **PR volume dropped 8.2%**, contributor count fell nearly 20%, and slightly fewer repositories received PRs. This suggests a period of **focused consolidation**, with delivery handled by a smaller group of core contributors.

Metric	October 2024	November 2024	Change
Total Pull Requests	437	401	−8.2%
Unique Submitters	56	45	−19.6%
Repositories Touched	21	20	−4.8%

Observations:

1. The **moderate decline in PRs** is consistent with earlier trends showing fewer commits and less surface-level repo activity.
2. The **20% drop in contributors** reinforces the idea that **fewer developers handled more intensive work** during the month.
3. Despite this, nearly the same number of repositories received PRs, suggesting a **broad but tightly managed delivery process**.

---

5. Analysis of Contributions by Organization

Top Organizations – November 2024

Organization	Contributions (Nov)	Contributions (Oct)	Change (%)	Authors (Nov)	Authors (Oct)
Input Output (IOHK)	854	913	−6.5%	51	49
Well-Typed	163	104	+56.7%	5	6
Unknown	22	5	+340.0%	4	3
Cardano Foundation	11	44	−75.0%	2	1
Tweag	11	111	−90.1%	1	1

Observations:

1. **IOHK** remained the ecosystem's primary contributor, delivering over 850 contributions with consistent author count, though its total output dipped by 6.5%.
2. **Well-Typed** increased its contributions by nearly 60%, suggesting a **surge in project involvement** from a small, focused team.
3. **Unknown contributors** more than quadrupled their contributions, pointing to **expanded unaffiliated or external engagement**.
4. **Cardano Foundation** experienced a sharp drop after a strong October, possibly reflecting project-based cycles or temporary reprioritization.
5. **Tweag** saw the steepest decline (−90%), marking a cooldown phase after intense October activity.

Glossary

Report Technical Definitions:

- **Repository(Repo):** In Git, a repository, often abbreviated as "repo," is a storage space where your project's files and their entire revision history are stored. It typically includes various files such as source code, documentation, images, and more. Repositories can be either local (on your computer) or remote (hosted on a server like GitHub, GitLab, Bitbucket, etc.).
- **Issue:** An issue is a feature request, bug report, task, or any other item that needs to be tracked within a project. In Git repositories hosted on platforms like GitHub or GitLab, issues are commonly used for discussing and tracking tasks or problems related to the

project. They can include labels, assignees, comments, and other metadata to facilitate collaboration and organization.

- **Pull Request (PR):** A pull request is a proposed change that a user wants to merge into a target branch of a repository. It's commonly used in distributed version control systems like Git to facilitate code review and collaboration. When a developer completes a feature or fixes a bug in a separate branch of the repository, they can initiate a pull request to merge their changes into the main branch or another designated branch. Pull requests often include a summary of the changes, discussions, reviews, and automated checks.
- **Contributor:** A contributor is anyone who participates in a project by making contributions such as code changes, documentation improvements, bug fixes, feature enhancements, etc. Contributors can be individuals or organizations, and their contributions can take various forms, from writing code to providing feedback, reporting issues, or reviewing pull requests.
- **Git:** Git is an open-source distributed version control system designed to handle everything from small to very large projects with speed and efficiency. It allows multiple developers to work on the same project simultaneously, coordinating their work through branching, merging, and version tracking. Git is widely used in software development for managing source code revisions and collaborating on projects.
- **GitHub:** GitHub is a web-based platform that provides hosting for Git repositories and offers collaboration features such as issue tracking, pull requests, code review, and project management tools. It's one of the most popular platforms for hosting Git repositories and facilitating collaboration among developers and teams. GitHub also provides additional features like wikis, continuous integration, and deployment services.
- **Commit:** In Git, a commit is a snapshot of the changes made to the files in a repository at a specific point in time. It represents a single revision or change set and includes a unique identifier (SHA-1 hash), a commit message describing the changes, and a pointer to the previous commit(s). Commits are fundamental to version control in Git, as they allow developers to track changes, revert to previous states, and collaborate on code changes.
- **Organization:** In Git and GitHub, an organization refers to a group or entity that can own repositories, manage access permissions, and collaborate on projects. Organizations are often used by companies, open-source projects, or groups of developers to centralize their repositories and manage their collective work. Organizations on GitHub can have multiple members with varying levels of access, allowing for collaborative development within a structured environment.
- **Project:** A project in the context of Git and GitHub typically refers to a specific software development endeavor or initiative. It encompasses all the related tasks, code, documentation, issues, and resources needed to achieve a particular goal. Projects are often organized within repositories on GitHub, where developers can collaborate, track progress, manage tasks, and share code. A project may involve multiple contributors working together to develop and maintain software, with each contributor contributing to different aspects of the project.
- **Community:** In the Git and GitHub ecosystem, a community refers to the collective group of developers, users, contributors, and other stakeholders who are involved in a particular project, organization, or open-source initiative. Communities are essential for fostering collaboration, sharing knowledge, providing support, and driving the growth and sustainability of projects. They often gather around shared interests, goals, or values, and may interact through various channels such as forums, mailing lists, chat platforms, and

social media. A strong and engaged community can contribute to the success and longevity of a project by providing feedback, contributing code, reporting issues, and supporting fellow members.