Monthly Maturity Report: September 2024

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Organization:
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Cardano Ecosystem

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

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SUMMARY:

In September 2024, the Cardano open-source ecosystem maintained steady development momentum while continuing a trend toward **consolidated, infrastructure-focused contributions**. Compared to August, total commit volume held stable, but the number of active repositories and pull requests slightly increased, indicating **broader distribution of effort**. IOHK remained the primary driver of activity, contributing nearly 880 commits and sustaining its leadership in code volume and ecosystem coverage. Meanwhile, Well-Typed significantly ramped up its engagement, nearly doubling its contributions. Issue submission volume surged, especially across previously quieter repositories, suggesting **growing testing, usage, and community interaction**. However, resolution times remain long, highlighting a need for improved triage and support mechanisms. Overall, September reflects **a healthy but maturing development cycle**, marked by focused progress and incremental expansion of participation.

General Observations

Organizational Contributions:

- **Input Output (IOHK):** Led once again with 879 contributions, up 3.3% from August. IOHK also added 2.7 million lines of code and modified over 5,900 files, confirming its central role in core system upgrades and maintenance.
- **Well-Typed:** Increased its contributions from 81 to 151, marking an 86% jump. This sharp rise signals deeper involvement, possibly in system tooling, testing, or formal verification.
- **Tweag:** Activity declined significantly, from 136 to 28 contributions, possibly indicating a completed delivery cycle or a pause in involvement.
- **Intersect MBO and Plank:** Contributed in September after showing no activity in August, suggesting renewed or shifting engagement.

Geographical Distribution of Commits:

- **UTC +2 (Central Europe):** Remained dominant with 542 commits — an increase from 497 — continuing to serve as the ecosystem's primary development hub.

- **UTC -6 and -4 (North America):** Both saw increases, suggesting higher engagement from contributors in these time zones. UTC -6 rose from 64 to 113 commits, while UTC -4 climbed from 70 to 85.

- **UTC 0 (Greenwich Mean Time):** Dropped steeply from 188 to 60 commits (−68%), indicating reduced activity in this previously strong region.

Project-Specific Insights:

- **Ouroboros Consensus & Cardano CLI:** Saw major spikes in activity. Cardano CLI commits more than doubled, and estimated modified files rose over 400%, suggesting tooling innovation or command-line enhancements.

- **Cardano Node:** Remained the top repository by commits (176), with over 1,000 estimated modified files — a sign of sustained core development.

- **Plutus:** Activity declined across both issues and modified files, indicating a stabilization phase or post-release lull.

- **Cardano Ledger:** Saw a 22% increase in issues and continued to receive steady development attention, maintaining its strategic importance.

- **Issue resolution times** remained long across top projects (averaging 83 days), though **DB Sync notably improved**, dropping from 82 to 47 days.

Repository Activity:

- Pull request submissions increased slightly (402 → 419), and more repositories received PRs (17 → 20), suggesting **wider distribution of contributions** across the ecosystem.

- The contributor base remained consistent, with 64 PR submitters in September (up from 62), indicating **healthy engagement and stability** among core contributors.

- Focused development continued around a few major projects (node, ledger, consensus), but the **expansion in issue submissions across 30 projects** (up from 10) indicates increasing usage and visibility across the broader ecosystem.

Conclusion

The September 2024 report highlights a maturing and strategically aligned open-source ecosystem. While contributions and activity remained largely stable, the **breadth of project engagement expanded**, especially in issues and pull requests. IOHK and Well-Typed led the way in meaningful contributions, while other players returned to the fold or shifted focus. As Cardano advances into deeper infrastructure work, maintaining contributor momentum, reducing issue resolution times, and diversifying organizational participation will be critical to sustaining velocity and reinforcing ecosystem resilience.

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:

September 2024 – 1,090 commits made by 71 authors in 21 repositories.

In September 2024, GitHub activity across Cardano open-source projects showed a **slight dip in total commits**, dropping from 1,113 in August to 1,090. However, the **number of active authors increased modestly**, from 68 to 71, suggesting **stable contributor engagement**. Notably, the **number of active repositories rose** from 19 to 21, indicating that development efforts expanded across more projects despite the small drop in commit volume.

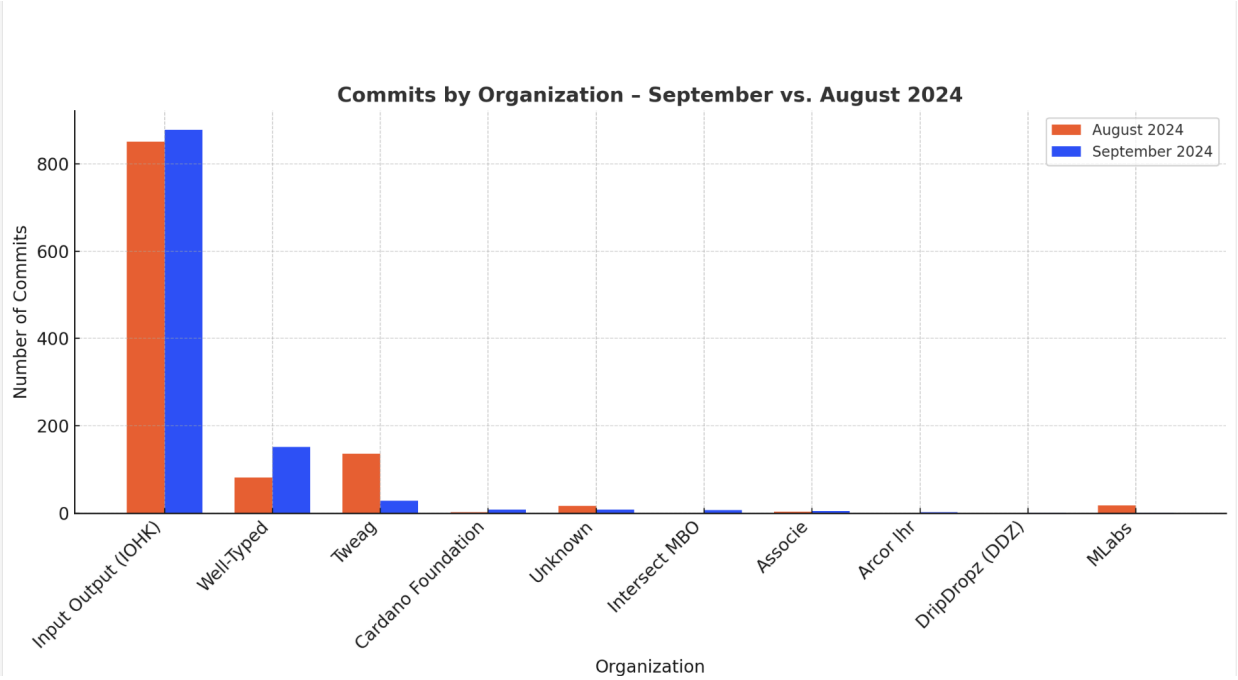
Month	Commits	Authors	Active Repositories
August 2024	1,113	68	19
September 2024	1,090	71	21

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 – September 2024

Organization	Commits (Sept)	Commits (Aug)	Change (%)	Authors	Touched Files	Added Lines	Removed Lines
Input Output (IOHK)	749	851	-12.0%	45	5,936	2,694,832	1,186,829
Well-Typed	87	81	+7.4%	7	426	13,209	6,387
Tweag	67	136	-50.7%	4	190	2,276	1,315
Intersect MBO	45	0	N/A	4	459	18,568	1,460
Plank	43	0	N/A	1	84	1,472	216
Cardano Foundation	27	0	N/A	3	130	4,383	1,412
Unknown	23	16	+43.8%	3	51	1,365	2,153



Observations:

1. **Input Output (IOHK)** remained the top contributor, though commits fell by 12%. Despite the decline, IOHK still accounted for the **bulk of code volume**, with nearly **2.7 million lines added** — sustaining its strategic leadership role.

2. **Well-Typed** continued steady contributions with a slight uptick in commits and files modified, suggesting consistent ongoing engagement in maintenance or tooling.

3. **Tweag** saw a significant decline, dropping from 136 to 67 commits (**-50.7%**), indicating a pause or transition in their development cycle.

4. **Intersect MBO, Plank, and Cardano Foundation** reappeared in the data after inactivity in August, each contributing to new or revived areas of development.

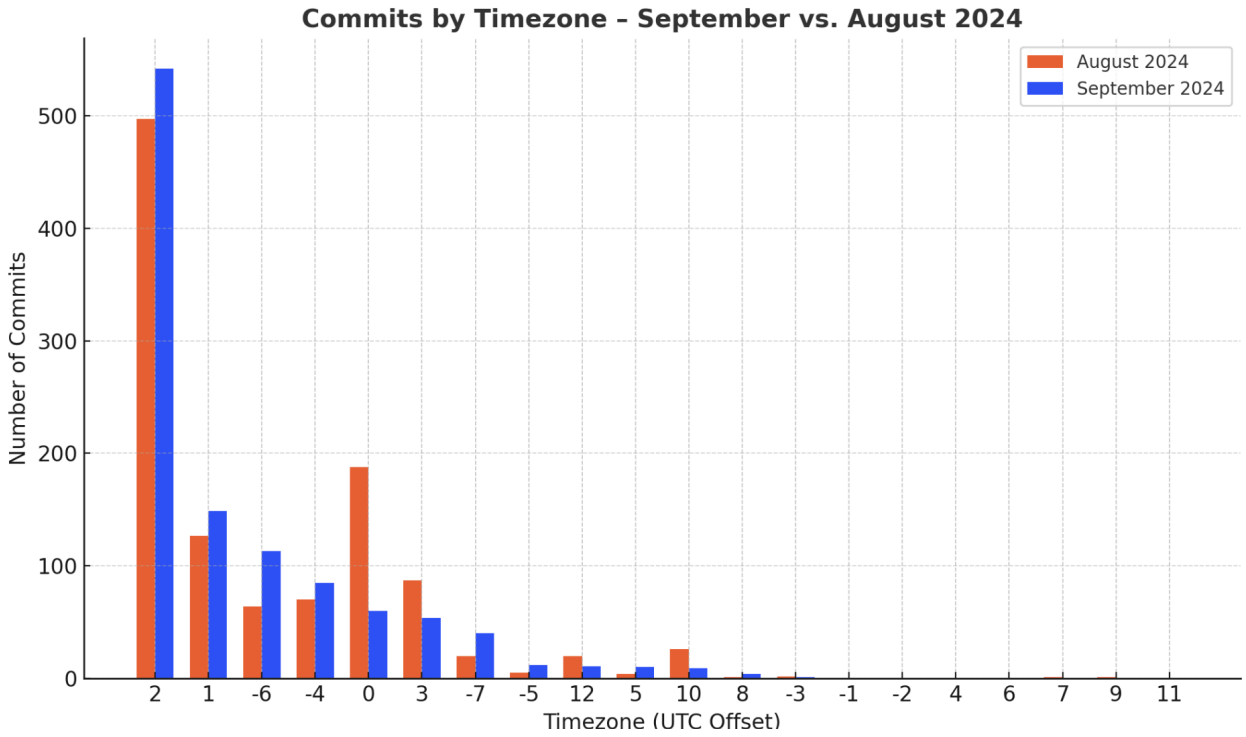
5. The **Unknown** category grew slightly in activity, but also showed a notable increase in removed lines, suggesting cleanup or pruning activity from unidentified contributors.

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.

September 2024 – Commit activity remained geographically diverse, but with a few key shifts. UTC +2 continued to dominate, contributing **542 commits**, up 9.1% from August. Notably, commit volume increased significantly in **UTC -6** (Central US) and **UTC -4** (Atlantic), suggesting increased activity from North and Central American contributors. Conversely, UTC 0 (Greenwich Mean Time) dropped sharply, falling by 68%.

Timezone (UTC ±)	Commits (Aug)	Commits (Sept)	Change (%)
+2	497	542	+9.1%
+1	127	149	+17.3%
-6	64	113	+76.6%
-4	70	85	+21.4%
0	188	60	-68.1%



Observations:

UTC +2 remains the ecosystem's activity hub, with over 500 commits for a second consecutive month, likely reflecting sustained European engagement.

Central and Atlantic Time Zones (UTC -6 and -4) both saw large increases, pointing to growing contributor activity in the Americas.

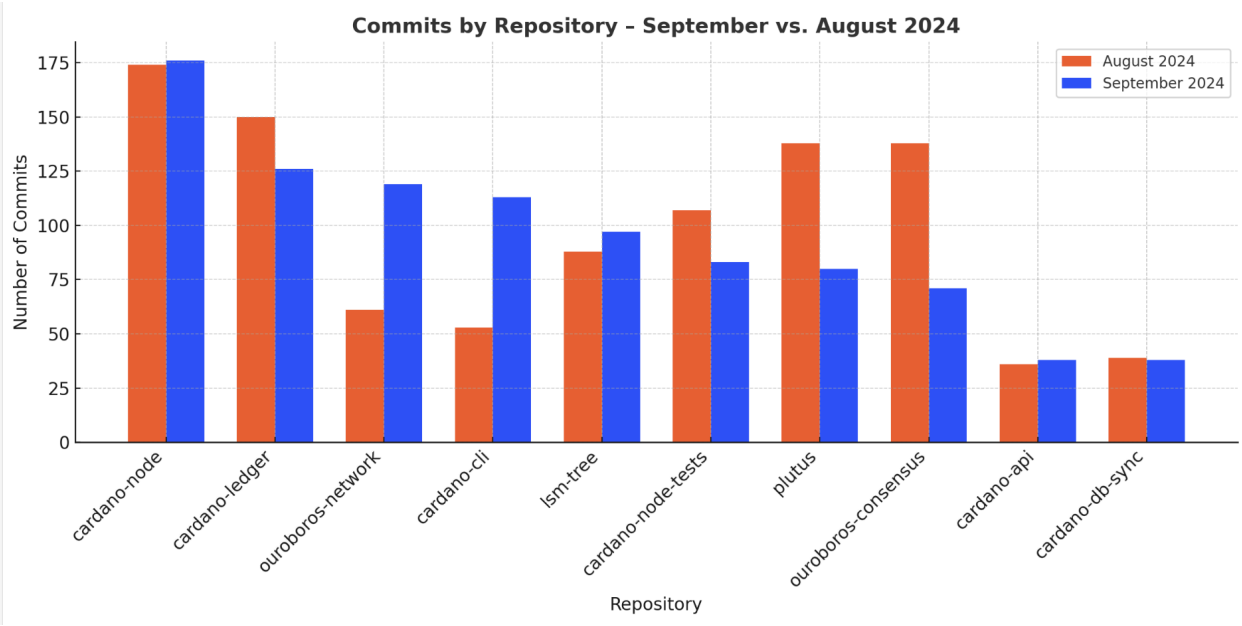
UTC 0 dropped significantly, from 188 to 60 commits, suggesting either a temporary pullback or shift in contributor presence from that region.

1.c) Per Repository Activity

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

Top Repositories – September 2024

Repository	Commits (Sept)	Commits (Aug)	Change (%)
cardano-node	176	174	+1.1%
cardano-ledger	126	150	-16.0%
ouroboros-network	119	61	+95.1%
cardano-cli	113	53	+113.2%
lsm-tree	97	88	+10.2%



Observations:

1. **cardano-node** remained the top repository by volume, with a stable contribution level (176 commits), reflecting its ongoing role as the ecosystem's most active codebase.

2. **cardano-cli** and **ouroboros-network** both nearly doubled their commit volumes, signaling renewed development emphasis — potentially due to tooling, testing, or node interface improvements.

3. **cardano-ledger** experienced a 16% drop in activity, indicating a potential stabilization or reprioritization in its development timeline.

4. The **lsm-tree** repository also showed consistent engagement, likely tied to deeper infrastructure or performance work.

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2. Areas of Code

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

Summary

September 2024 – 8,148 files modified by 71 authors, with 643K lines of code added and 971K removed.

Compared to August, there was a **sharp contraction in activity** across all metrics. Modified files dropped by **88.7%**, authors by nearly **70%**, and added lines of code by **over 92%**. This signals a period of **codebase stabilization**, likely following the surge of development seen in August, and suggests a shift toward cleanup, integration, or optimization phases.

Metric	August 2024	September 2024	Change
Modified Files	72,180	8,148	-88.7%
Authors	236	71	-69.9%
Lines Added	8,713,466	643,093	-92.6%
Lines Removed	4,253,909	971,208	-77.2%

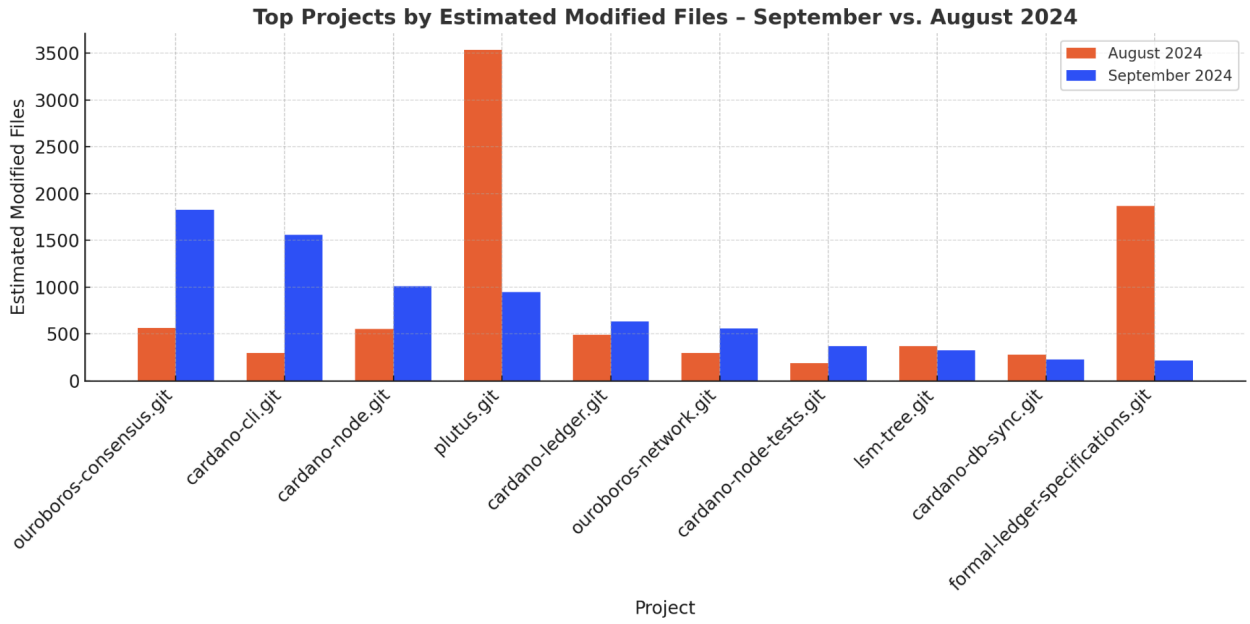
Observations:

- After August's massive expansion, September reflects a correction phase, with dramatically reduced code churn and contributor activity.
- The drop in lines added and removed suggests a focus on testing, refactoring, or low-code-impact reviews — rather than new feature development.
- With author count down by ~70%, this may also indicate the tail end of a delivery cycle or reallocation of resources internally.

2.a) Projects

Top Projects – September 2024 (Estimated Modified Files)

Project	Sept Est. Files	Aug Est. Files	Change (%)
ouroboros-consensus	1,827	565	+223.4%
cardano-cli	1,559	294	+430.3%
cardano-node	1,009	552	+82.8%
plutus	948	3,539	-73.2%
cardano-ledger	634	491	+29.1%



Observations:

1. **ouroboros-consensus** experienced a 3x increase in file-level activity, indicating deep refactors or active development around consensus protocols.

2. **cardano-cli** led all repositories in terms of relative growth (+430%), pointing to significant CLI-based tooling improvements or interface expansions.

3. **cardano-node** maintained strong engagement, showing a steady growth in file impact and remaining a consistent backbone of core development.

4. **plutus** saw a substantial decline, with modified files dropping by 73%, likely due to code

stabilization or winding down of recent activity.

5. **cardano-ledger** activity ticked up modestly, maintaining its role as a stable but evolving component in the ecosystem.

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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

September 2024 – 144 issues submitted by 59 contributors across 30 projects.

Issue submissions rose significantly in September, climbing **39.8%** from August. The number of active submitters also increased slightly, while the average time issues remained open held steady at ~83 days. Most notably, the number of projects receiving issues **tripled**, indicating broader ecosystem engagement and usage feedback across more repositories.

Metric	August 2024	September 2024	Change
Total Issues Submitted	103	144	+39.8%
Unique Submitters	53	59	+11.3%
Avg. Time Open (Days)	85.6	83.4	-2.6%
Distinct Projects	10	30	+200.0%

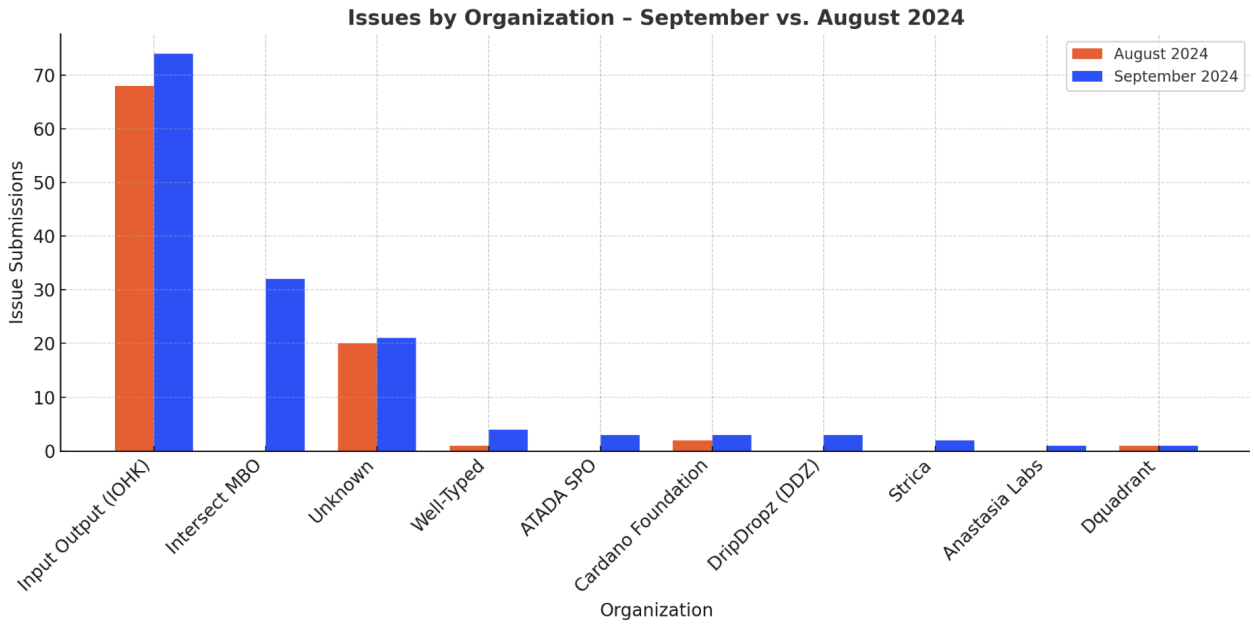
Observations:

- The ecosystem saw a notable **expansion in feedback and QA activity**, with issue submissions reaching their highest level in recent months.
- **Time-to-resolution remained consistent**, suggesting teams are managing increased volume without significant backlogs.
- The jump from 10 to 30 affected repositories points to **wider adoption or scrutiny**, especially for previously less-targeted projects.

3.a) Organizations

Top Organizations – September 2024

Organization	Issues (Sept)	Issues (Aug)	Change (%)	Median Open (Sept)	Median Open (Aug)
Input Output (IOHK)	74	68	+8.8%	82.3 days	90.2 days
Intersect MBO	32	0	N/A	97.6 days	—
Unknown	21	20	+5.0%	77.4 days	78.0 days
Well-Typed	4	1	+300.0%	82.6 days	7.7 days
ATADA SPO	3	0	N/A	81.6 days	—



Observations:

1. **Input Output (IOHK)** remains the lead source of issue submissions, with a slight uptick in both volume and a slight reduction in resolution time, suggesting stable QA engagement.

2. **Intersect MBO** entered the landscape with 32 new issues — second only to IOHK — but

with the **highest average open time** (97.6 days), pointing to potential backlog or slower triage.

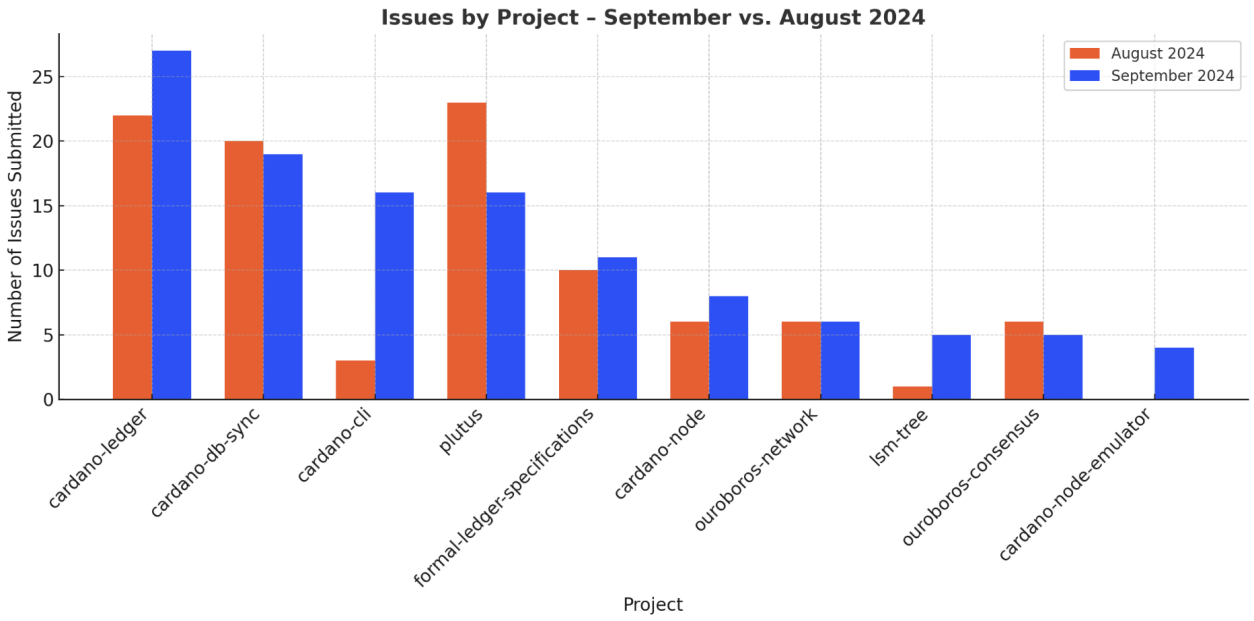
3. **Unknown contributors** remained consistent and community-driven, contributing 21 issues in September with nearly identical resolution times.

4. **Well-Typed and ATADA SPO** re-entered issue submission activity, although in lower volumes, contributing to wider organizational distribution.

3.b) Projects

Top Projects – September 2024

Project	Issues (Sept)	Issues (Aug)	Change (%)	Median Open (Sept)	Median Open (Aug)
cardano-ledger	27	22	+22.7%	73.9 days	72.5 days
cardano-db-sync	19	20	-5.0%	47.3 days	81.9 days
cardano-cli	16	3	+433.3%	98.6 days	72.1 days
plutus	16	23	-30.4%	75.4 days	106.2 days
formal-ledger-specifications	11	10	+10.0%	52.3 days	54.5 days



Observations:

1. **cardano-ledger** remained the top project in issue volume, with a moderate increase and a steady resolution time, suggesting sustained attention on ledger functionality or bugs.

2. **cardano-cli** saw the sharpest rise, jumping from 3 to 16 issues (**+433%**), reflecting **renewed usage or testing** of CLI tooling. Median open time also increased, potentially indicating triage delays.

3. **plutus** dropped from 23 to 16 issues, with a corresponding decrease in open time — this may point to improved handling of issue resolution or a stabilization phase.

4. **cardano-db-sync** remained steady in submissions, but **dramatically improved** median resolution time (from 81.9 to 47.3 days), a strong sign of improved responsiveness.

4. Pull Requests

September 2024 – 419 pull requests submitted by 64 contributors across 20 repositories.

Pull request activity **grew modestly** across all key metrics. Total submissions increased by 4.2%, and the number of contributors rose slightly from 62 to 64. Notably, the number of repositories receiving PRs increased by nearly 18%, indicating **broader distribution of active development efforts** across the ecosystem.

Metric	August 2024	September 2024	Change
Total PRs	402	419	+4.2%
Unique Submitters	62	64	+3.2%
Repositories Touched	17	20	+17.6%

Observations:

1. PR activity continues to trend positively, reflecting **stable delivery momentum** across multiple codebases.

2. The increase in touched repositories signals a **healthy diversification** of contributions beyond a handful of core projects.

3. Contributor participation remains steady, suggesting ongoing collaboration from both internal and external teams.

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5. Analysis of Contributions by Organization

Top Organizations – September 2024

Organization	Contributions (Sept)	Contributions (Aug)	Change (%)	Authors (Sept)	Authors (Aug)
Input Output (IOHK)	879	851	+3.3%	51	49
Well-Typed	151	81	+86.4%	7	6
Tweag	28	136	-79.4%	2	4
Cardano Foundation	8	2	+300.0%	1	1
Unknown	8	16	-50.0%	4	5

Observations:

1. **Input Output (IOHK)** maintained its leading position with a slight increase in contributions and a stable number of active authors, reflecting sustained development leadership.

2. **Well-Typed** nearly doubled its contributions, signaling **increased team activity or deeper engagement** across repositories.

3. **Tweag's contributions fell sharply** (−79%), potentially indicating a project shift, handoff, or reduced participation for the month.

4. **Cardano Foundation** showed increased presence, albeit at a small scale, with its contributions quadrupling — potentially linked to targeted fixes or oversight activity.

5. The **Unknown** contributor group halved its submissions, possibly due to improved attribution or drop-off in external drive-by participation.

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.