

Cardano  
Foundation

# Activity Report 2023

## Who we are

The Cardano Foundation is an independent, Swiss-based not-for-profit organization tasked with **advancing Cardano as a public digital infrastructure across a wide range of industries.**

### Our mission: bridging Cardano and the world

The Cardano Foundation works to progress Cardano as a public digital utility.

In order to achieve economic escape velocity for Cardano, on-chain activities must include a balanced mix of legacy and blockchain-native use cases. Scaling the **diversity, quality, and quantity of activities** on Cardano is therefore core to the Foundation's mission.

This goal faces a number of hurdles, from the cost and complexity of implementation and ownership to lack of comfort with blockchain. The Cardano Foundation addresses such gaps with targeted initiatives on operational resilience, education, and adoption.

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## 01 95+ colleagues

**working with institutions, businesses, regulators and policymakers to solve societal and enterprise challenges in new ways**

## 02 65+ countries

**propagating Cardano blocks**



## What we do

### Our work centres on three mutually reinforcing focus areas:



#### Operational resilience

Encompasses all efforts to improve Cardano's suitability and recognition as an infrastructure component of institutional-grade use cases. The Foundation bolsters the resilience, reliability, and durability of the Cardano infrastructure, plus works towards a broader understanding of blockchain and its associated opportunities and risks. We also collaborate with the community towards achieving functionally sound and representative governance.



#### Education

Contributes to information on and legal certainty for third generation blockchains. The Foundation promotes discussion and debate, supports research, and explains blockchain concepts to diverse stakeholders.



#### Adoption

Drives use of Cardano by businesses, organizations, and other institutions by creating the conditions for increased utility while also reducing the adoption and running costs through improved tooling. The Foundation contributes to the longevity of the Cardano development ecosystem, including by fostering open source.



[Read more](#)



[Read more](#)



[Read more](#)

## 2023 highlights

2023 saw the Cardano Foundation deliver on a host of initiatives, advancing and reflecting the maturity of the Cardano infrastructure. Highlights include:



### Operational resilience

- Implemented network monitoring to assess and optimize the health of the network.
- Tested decentralized governance mechanism with a stake pool operator (SPO) poll.
- Supported the Valentine hard fork that brought improved interoperability.
- Launched own block producer to enhance technical and operational insights.

[Read more](#)



### Education

- Established and opened registrations to the Cardano Academy.
- Leveraged the Cardano Explorer to engage with regulators.
- Launched 'Let's talk Cardano' webinar series.
- Hosted the Cardano Summit 2023.

[Read more](#)



### Adoption

- Developed compelling use cases to demonstrate the diverse applications of Cardano, including the Global Impact Challenge with Switzerland for UNHCR.
- Created services and APIs to support enterprise-grade Cardano applications.
- Launched the new open source programming language Aiken to simplify the developer experience around smart contract development.
- Started implementation of auditable calculation of consensus rewards.

[Read more](#)

A message from our CEO

# As we look back at 2023, we can be enormously proud of what we have achieved.

At the Cardano Summit 2023 I quoted former Bank of England Governor Mark Carney, who noted that the value of money requires not only the belief of the public at a point in time but – critically – the consent of the public at all times. The need to nurture and maintain the consent and trust of the public is at the core of our thinking.

As we continue to work at pace to advance the Cardano infrastructure, this report provides an opportunity to take stock of the scope and scale of what we achieved during the year. The team has delivered exceptional work, especially considering the nimble size of the Cardano Foundation. The contributions of the Cardano community have also been inspiring, and so I want to highlight some examples to illustrate their impact, as well as their interconnectedness.



## Operational resilience

The fabric of society is interwoven with the critical infrastructure upon which we rely. For this reason operational resilience forms the bedrock of the Foundation's work.

The **real-time, continuous network monitoring** capabilities the Foundation developed during 2023 have added immensely to our insights. The ability to identify unusual activity allowed us to pinpoint issues with two exchanges and work alongside their respective technical teams to resolve these issues, resulting in improvements to the overall health of the network. This clearly demonstrates the value of knowledge sharing harnessing multidisciplinary teams to identify and address issues.

Capabilities such as these are also an area of keen interest in our discussions with some of the most sophisticated regulators in the world. We were met with strong interest in the Foundation's perspectives on business continuity and disaster recovery, as well as with the concept of running enterprise applications on a decentralized and distributed system.

Our operational resilience activities also resulted in contributions by the Cardano Foundation to the Cardano node visible [via GitHub](#). Notwithstanding the Cardano community's ability to innovate and make changes to the network while it operates –



## A message from our CEO continued

akin to flying a plane while working on the engine – the infrastructure has run continuously for more than 2,000 days.

Establishing representative governance is another core element of ensuring the sustainability of the Cardano infrastructure. As part of our ongoing collaboration with the University of Zurich we ran a simulation to assess the impact on business continuity of introducing voting. We evaluated the proposed revision of Cardano's on-chain governance system, CIP-1694, using a digital twin of what exists today as well as what could exist in the future. That process gave us valuable insights into the impact of changes in governance, and we concluded that incremental rather than wholesale changes prove more effective. In this vein, our SPO poll experiment saw an incredible level of participation – 50% of active stake – and generated valuable governance and operational learnings.



### Education

Having identified a need for high quality educational materials about third generation blockchain that are accessible to all, the Foundation began to develop the [Cardano Explorer](#) so that **legal stakeholders can verify that Cardano does what it should**. Later on, December 2023 saw the launch of the [Cardano Academy](#) to allow anyone to learn about

blockchain and Cardano. We also offer a large and growing [repository of tutorials and materials](#) to onboard new developers. Likewise, the [Cardano Developer Portal](#) remains an important and growing resource to encourage diversity of the developer community by sharing solutions and features.

Our flagship event, the Cardano Summit 2023, was a resounding success. The main stage event in Dubai included attendees both from long established industries and from multiple blockchain ecosystems, as well as regulators and policymakers. In addition to an inspiring program of presentations and panel discussions, the two-day event provided a valuable opportunity for networking, collaboration, and celebration of achievements.



### Adoption

We are keen to disprove the persistent misconception that associates blockchain solely with capital markets or digital applications. Our work with the Georgian wine industry and Merchadise exemplifies precisely these wider uses and advantages. It showcases the benefits of assigning digital identities to individual physical items and making them verifiably authentic. In fact, *the Georgian wine organization registered sales in countries they had never marketed to*, from buyers

keen to authenticate their purchases in a way not currently possible through established online marketplaces.

In order to be able to anchor these physical products onto the Cardano blockchain without users needing technical knowledge, the Foundation developed a web application to sit on top of the blockchain. Additional examples of freely accessible, off-blockchain tools developed by the Foundation to drive adoption and accelerate enterprise onboarding include the open source [Identity Wallet](#) as well as the searchable, data provisioning tool [Ledger Sync](#).

These efforts to **bring more open source into the Cardano ecosystem** stood as a key goal for 2023. The Foundation therefore asked the community to think about the biggest problem they could solve using a widely adopted programming language, and they identified an opportunity to simplify and enhance the development of smart contracts on Cardano. We gave them the freedom to see if their solution could work, and the outcome was Aiken. In every situation we observed so far, Aiken led to lower execution costs, sometimes saving up to 90%. It has lowered the barrier to entry so significantly that some of the largest projects on Cardano have switched to Aiken. This demonstrates the power of open source and that the best solutions need not require large investment.

## Looking ahead

The emergence of exponential technologies such as AI and synthetic biology make the need for verifiable credentials and infrastructure more important than ever. Trust in our systems must be strengthened, especially when these systems facilitate governance, commerce, global trade, and education. Achieving this requires transparency and traceability. It also calls for agile yet dependable infrastructure. With the network's extraordinary up-time, a testament to the reliability and trustworthiness paramount to any critical infrastructure, Cardano stands not just as a beacon of innovation but as a paragon of stability.

As we navigate the complexities of this brave new digital age, I call upon enterprises and social systems to join us on our blockchain journey. We invite you to partake in a future that is resilient, equitable, and transparent.

### Frederik Gregaard

CEO, Cardano Foundation



# Operational resilience

# Ensuring a robust and reliable Cardano blockchain.

An operationally resilient blockchain ensures the safety, availability, and trustworthiness of the network. It meets business standards and regulatory needs. It can endure disruptions, maintaining integrity and consistency even in the face of unforeseen events. Resilience strategies such as redundancy and monitoring improve network stability and user confidence.

A core element of the Cardano Foundation's work to support operational resilience focuses on decentralization because as a public, permissionless blockchain that utilizes proof of stake (PoS), Cardano's network security increases as on-chain participation grows. We also need to achieve economic escape velocity for the Cardano infrastructure through the generation of transaction fees that are then distributed back to those ensuring the operations and consequent security of the network.

Mechanisms to support this include the Cardano Improvement Proposal (CIP) program, which **allows the community to propose new features**, align on standards, and receive feedback. The Developer Portal helps all those building on the network as well as technical newcomers, bringing more people into Cardano's technical ecosystem. At the same time, the Foundation's Integrations Team provides technical support to third parties during infrastructure upgrades, contributing to seamless transitions.

A vital element of the Cardano blockchain's long-term sustainability as a decentralized, self-sustaining network relates to establishing representative governance policies where those operating and maintaining the infrastructure, as well as those participating on-chain through delegation and additional ecosystem stakeholders, must play a role in decision-making.

## Improving interoperability

The implementation of the Valentine - or Standards for Efficient Cryptography protocol (SECP) - upgrade on 14 February 2023 allowed the expansion of Cardano's capabilities for cross-chain interoperability.

Traditionally, when Cardano developers needed to engage with other blockchains, the process was arduous, time-consuming as well as expensive, and exposed potential security vulnerabilities. The Valentine upgrade streamlined the process, making it fast, straightforward, cost-effective, and better able to withstand security threats. As a result, Cardano now supports interoperability, ensuring developers more familiar with alternative ecosystems can easily build on the infrastructure.

03

**4.4+ million**

stake credentials registered

04

**9.3+ million**

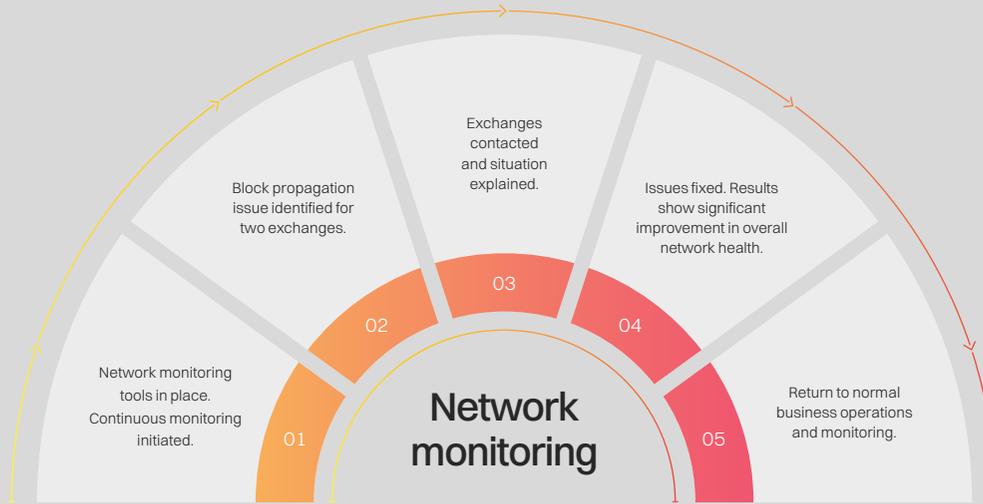
native tokens minted

## Operational resilience continued

### Monitoring the Cardano network

2023 began with a project to build real-time monitoring capabilities of global block propagation to be able to evaluate the health of the network, gain insights to help SPOs enhance their operations, and adapt where needed. The Foundation's solution has **enabled the collection of data across five continents**. This wealth of information increases the quality of our contributions, enhances the Foundation's research, and provides valuable insights to the Parameter Committee.

The new capabilities allowed the identification of anomalies relating to two important stake pools. The Foundation contacted the affected parties and worked with their respective technical teams to resolve the issues, resulting in changes to how the nodes were configured that, in turn, led to improvements to the overall network health.

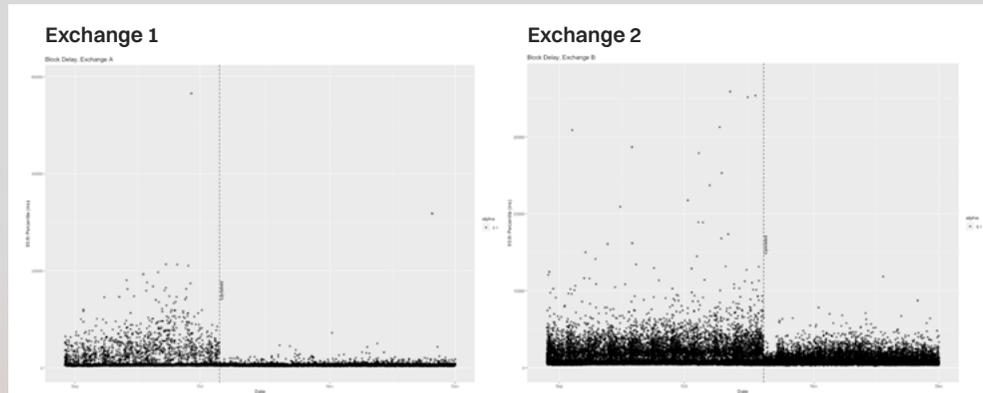


### Enhancing stake pool insights and revisiting delegation strategy

The Cardano Foundation regularly revisits and updates its delegation methodology to better support the Cardano community. Changes to improve the quality and effectiveness of the approach included reducing the number of pools the Foundation delegates to, which will increase the size of the packages. This, combined with extended delegation duration, will help enhance the overall quality of selections, plus allow pools to flourish and establish themselves more effectively.

In addition, the Cardano Foundation launched its own stake pool. Maintaining and running a stake pool for a fraction of the Foundation's own assets will allow a greater understanding of topologies, building from source, pre-releases, hard fork preparations, server-resources and network bandwidth. This first-hand knowledge is essential for refining our decisions and offering more nuanced support to the community.

05 **97%**  
average block production health  
(chain density)



06 **3,100+**  
stake pools

## Operational resilience continued

### Establishing sound and representative governance

The advent of Voltaire, Cardano's development phase relating to governance, has included the release of the first draft of CIP-1694. This Cardano Improvement Proposal (CIP), co-written by the Foundation, introduced a new, more inclusive and equitable on-chain governance model for Cardano, ensuring every ada holder can have a voice in Cardano's governance.

The proposal outlined a tricameral model consisting of SPOs, delegated representatives (DReps), and a Constitutional Committee (CC), each with distinct responsibilities. Under the proposed model these three groups will collaborate on governance decisions, including determining parameter adjustments and treasury withdrawals.

CIP-1694, the subject of extensive discussion and community feedback since its release, was merged into the main branch of the CIP repository on GitHub in June 2023, marking its transition to 'Proposed' status. The next important step for CIP-1694 is public ratification.

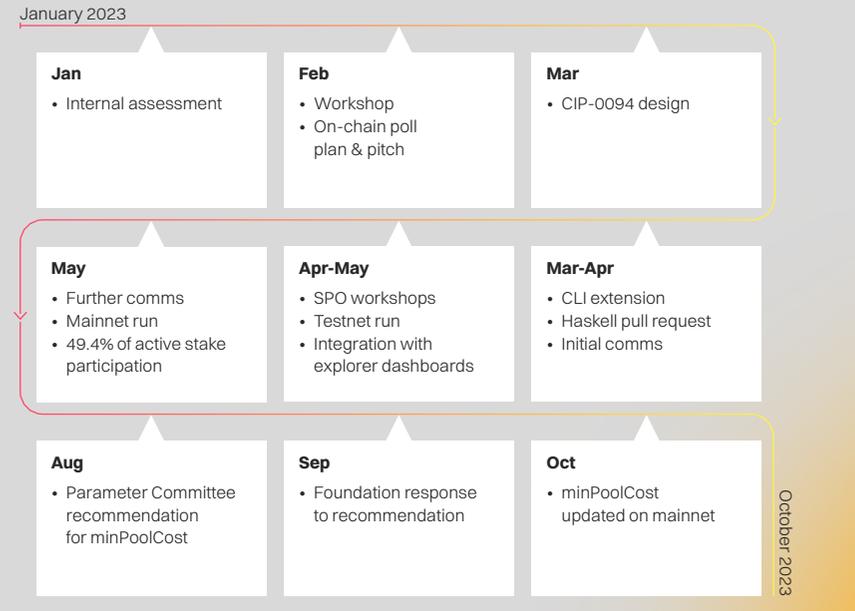
The Foundation's work to support the development of decentralized governance included extensive feedback on proposal, convening of CIP-1694 workshops and upgrades to the Cardano Ballot (details on page 18).

### Testing on-chain governance

As a first step to testing potential governance mechanisms, all SPOs were invited to participate in an on-chain poll experiment. The on-chain poll asked SPOs for their stake-weighted opinion on potential changes to parameters, providing the Foundation with valuable insights into the community's needs and preferences.

As part of the project's key goals, the Foundation wanted to ensure that stake delegators could respond to a vote from their current pool if they disagreed with it. For this reason, the initial two response epochs of the pools were followed by two more epochs at which delegates could choose to remove their support and redelegate to another pool more aligned with their views, with the reallocation of stakes serving to influence the outcome of future voting rounds.

When the complete implementation of Voltaire takes place, polls could be used to assess the community sentiment regarding specific topics. Delegated representatives (DReps), with an influence proportional to the amount of support they receive through delegation, would vote on the polls. These binding votes would allow the Cardano community to make important decisions on various proposals. The Foundation's on-chain poll for SPOs is an important step in this direction, to test the system and ensure it is calibrated for forming robust proposals.



### Answers by pool stake

	▲ / %
Keep k at 500 and minPoolCost at 340 ada	2.08b / 19.2%
Keep k at 500 and halve minPoolCost to 170 ada	2.73b / 25.1%
Increase k to 1000 and keep minPoolCost at 340 ada	1.46b / 13.4%
Increase k to 1000 and halve minPoolCost to 170 ada	2.99b / 27.6%
I would prefer to abstain	79.56m / 00.7%
None of the provided options	1.51b / 14.0%



# Education

# Contributing to understanding of blockchain and regulatory clarity.

Enterprise adoption requires comfort with the opportunities and risks of blockchain, as well as certainty on the applicable legal and regulatory frameworks. A functional understanding of blockchain is fundamental to the development of appropriate regulation to protect users and investors, building trust and confidence in the technology; it also proves essential to empowering enterprises and developers to use and contribute to the ecosystem.

The Cardano Foundation has long championed diverse forms of education, from seeking to foster regulatory clarity and supporting blockchain research to providing reliable information. In addition to the Foundation's ongoing work to engage with regulators, participate in events and write expert articles, 2023 saw the launch of the [Cardano Explorer](#), the [Cardano Academy](#), and the 'Let's talk Cardano' webinar series to advance understanding of the infrastructure and its applications.

07 **10+ engagements**  
with regulators and policymakers

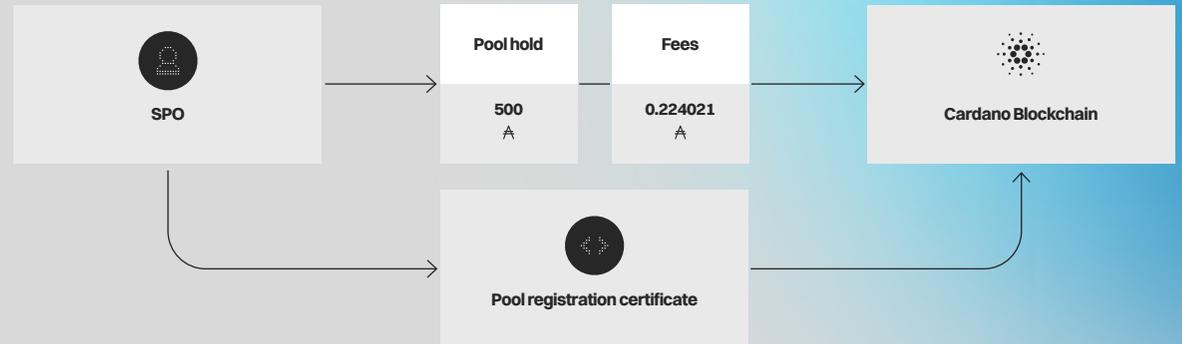
## Leveraging Cardano Explorer for regulatory outreach

The beta phase of a new [Cardano Explorer](#) launched in August, the first part of a visualization tool designed to explain to regulators, policymakers and other legal stakeholders how Cardano functions. Indeed, the Explorer has already proved an **invaluable tool to open conversations and build understanding and trust** as the Cardano Foundation seeks to meet the need for high quality information and build on our reputation as a responsible guide to blockchain.

User experience is at the heart of the Explorer. For example, an infographic depicts the staking lifecycle, setting out transactions and user journeys with accompanying explanations. These can be viewed

from the perspective of both delegators and SPOs, showing the incentive structures and financial flows. Likewise, the Explorer provides similar visualization for Cardano's smart contracts and native scripts, as well as compliance with the various asset standards based on Cardano Improvement Proposals (CIP). The tool also includes the protocol parameters, the full lifecycle of the parameters on Cardano, and the key properties of how Cardano functions.

Built primarily in Java and standard Web 2.0 technology, the Explorer looks to attract a broad new community of developers and encourage them to contribute code to the project. The code will become open source in the coming months.



## Education continued

### Engaging with policymakers

The *Cardano Explorer* contributed to the significant strides the Foundation made in its regulatory outreach work. During the year we engaged with the EBA, ESMA, FCA and FINMA, achieving coverage in jurisdictions spanning more than one third of the global population of smartphone users.

In addition to participation in events and face-to-face meetings, a core part of the Foundation's engagement with regulators centers on responding to consultations. Examples included the Financial Stability

Board's consultation on its stablecoin and crypto-asset activity recommendations, as well as the Token Mapping Consultation by the Australian Government's Treasury. The Foundation also contributed to policy developments and publications on Staking in Switzerland.

In all responses, the Foundation **advocates for an appropriate, risk-based legal and regulatory framework** that takes into consideration the vast range of existing and potential blockchain use cases.

### Launching webinars

As a further way to equip the community and stimulate conversations, the Foundation created a series of webinars titled 'Let's talk Cardano'. The first focused on the Women of Cardano, featuring three panels: Businesses Building on Cardano, Cardano NFTs (cNFTs), and Women in Catalyst. Later episodes discussed the ways blockchain can create positive social impact, delved into tokenization, and offered insights into the role of oracles in the decentralized finance (DeFi) landscape. The webinars also gave the Cardano community an opportunity to ask questions of our CEO, Frederik Gregaard.



## Establishing the Cardano Academy

In December the Foundation launched the Cardano Academy, a free resource housing the Cardano Blockchain Certified Associate (CBCA) course. This followed the success earlier in the year of the Alpha Program, comprising the first 10 modules of the course, which was accessed by more than 1,500 participants spanning more than 30 nationalities and 15 different industries.

Designed for anyone from business professionals, students, teachers, or researchers to Web 2.0 professionals and blockchain engineers, the course incorporates gamified micro-learning delivery to maximize engagement, comprehension, and retention. In 2024, the Foundation intends to provide those undertaking the course with the opportunity to become CBCA-certified.

The Foundation is delighted to have welcomed Brazil's state-owned energy company Petrobras as **the first Fortune 500 partner of the Cardano Academy**, with content delivered via the Petrobras University.

The Cardano Academy is empowering the digital architects of the future.

Take the course





# Adoption

## Adoption

# Creating the conditions for diversifying blockchain adoption.

The Foundation works to encourage adoption through targeted partnerships with enterprises, institutions, government agencies, NGOs, and universities to develop a range of legacy use cases anchored on blockchain. Another significant part of our mission is to engage with and support the Cardano community, assisting the development of tools the community can use to leverage Cardano to solve problems in new ways.

The Foundation sees the advancement of open source technologies as an important step towards a sustainable and robust Cardano ecosystem. An open source approach facilitates the creation of technologies that meet specific enterprise needs, while supporting the community by ensuring an egalitarian, innovative space that allows all developers to build upon and improve tools for the future of the network. We advocate for the open source maturity of the Cardano ecosystem, supporting collaborative initiatives that increase the diversity, as well as the quality and quantity of blockchain solutions.

### Assuring the authenticity of licensed merchandise

As part of the Cardano Foundation's collaboration with the US-based sports brand, Epoch Sports, and the full-stack apparel ecosystem, Merchadise, limited edition lacrosse jerseys were embedded with a near-field communication (NFC) Epoch branded patch and distributed during the 2023 World Lacrosse Men's Championship.

Scanning the patch with a smartphone takes the user to a website showing a digital NFT version of the jersey, linking the physical garment to a secure blockchain to prove the item's authenticity. These NFC patches not only allow consumers to register their purchase, but to access exclusive rewards and special offers.

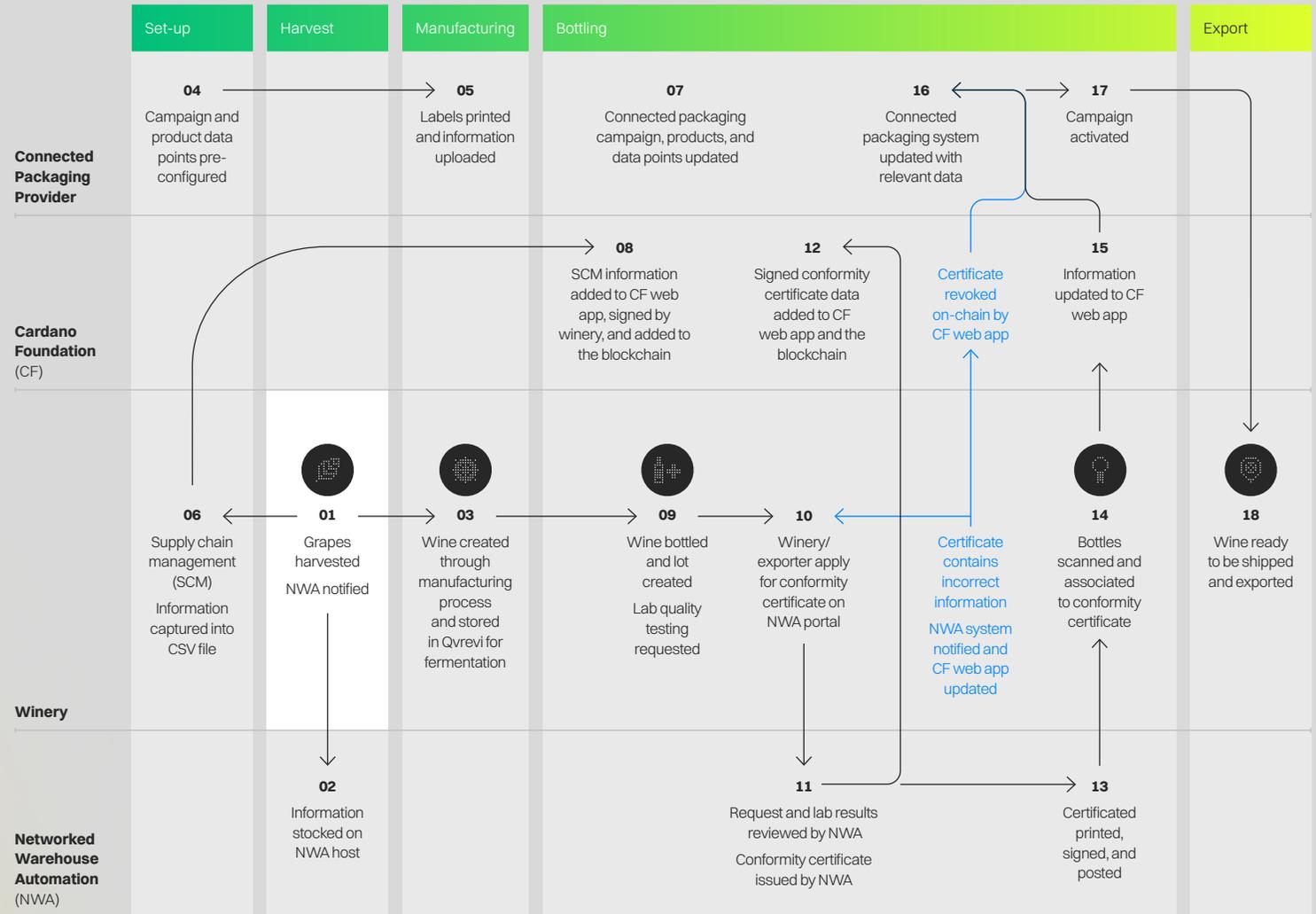
This technical collaboration seeks to drive blockchain adoption in the licensed merchandise industry by potentially **enhancing intellectual property protection** as well as engagement. NFC chips or other technical solutions, securely linked to a blockchain record in the form of non-fungible tokens (NFTs), could replace traditional licensed intellectual property hologram tags on sports apparel, guaranteeing authenticity for purchasers and empowering license owners to combat counterfeiting.



## Adoption continued

### Facilitating verification of provenance

Keen to demonstrate ways of leveraging Cardano to facilitate traceability in supply chains, the Foundation collaborated with the wine industry in the Republic of Georgia to **address challenges in relation to counterfeiting** as well as the cumbersome, heavily paper-based export process. Digitalizing processes and putting them alongside digital signatures onto a shared system on a trusted blockchain, especially one not governed by a single authority, makes it possible to validate the entries, even if the participants in the international supply chain access the information via different applications.



Adoption continued

## Using blockchain for impact

Launched in January 2023 at the 'Blockchain for Good' conference in Davos, the Cardano Foundation's second Annual Global Impact Challenge happened in collaboration with Switzerland for UNHCR, the UN Refugee Agency's partner in the country.

Rather than the typical approach of donating directly to a charity, **the project established a mechanism for providing ongoing support**, with ada holders delegating to a stake pool and any potential rewards generated from that stake pool directed towards supporting Switzerland for UNHCR's mission. With this innovative approach, Switzerland for UNHCR can receive long-term support that is not earmarked to a particular crisis, while donors can continue to help while retaining their original delegated stake.

Leading Swiss digital asset infrastructure provider Taurus operates the charity stake pool, and the Cardano Foundation made the initial delegation of 3.5 million ada. The UNHCR's Innovation Program receives 20% of the stake pool rewards, while the remaining 80% fund Switzerland for UNHCR's missions supporting forcibly displaced people.

Other examples of the Foundation's work with Switzerland for UNHCR include a 'Let's talk Cardano' webinar held on World Refugee Day about the potential of NFTs for humanitarian aid, and joint participation in a Sygnum Bank podcast to discuss how blockchain can help to solve humanitarian challenges. The Foundation has also facilitated introductions across the Cardano community, leading to multiple projects in collaboration with the UN Refugee Agency's Swiss partner to help the refugee cause, including the launch of exclusive NFT series.

The work with Switzerland for UNHCR follows the Cardano Foundation's first Annual Global Impact Challenge, a partnership with veritree that saw the Cardano community contributing to the planting of one million trees in Kenya. The Cardano Foundation designs these Impact Challenges **to unite the international Cardano ecosystem** in support of an application that demonstrates the utility of blockchain technology while creating positive impact.



08

# 3.5m ada

delegated by the Cardano Foundation for the Impact Challenge with Switzerland for UNHCR

09

# 1.7m ada

delegated by the Cardano community for the Impact Challenge with Switzerland for UNHCR

## Adoption continued

### Growing on-chain activity with technical enablers

Equipping developers with the best tools and information ensures they have the means to continue problem-solving and building solutions. Moreover, using accessible programming languages is key to driving developer diversity, helping to maintain a strong, secure blockchain that fosters and rewards innovation as well as collaboration.

The community identified an opportunity to simplify and enhance the creation of smart contracts on Cardano. An open source approach resulted in [Aiken](#), a new programming language for smart contracts, easily approachable for developers familiar with languages such as Java and Rust. This new solution has already seen promising levels of adoption, achieving more than 4% of smart contract volume on Mainnet in the three months to December, and more than 1% on PreProd Testnet even before its officially released for production.

Summer 2023 saw the launch of [Ledger Sync](#), a Java-based data provisioning tool built on open source software enabling ready and dependable access to data on the blockchain. Basing Ledger Sync on this well-established programming language further supports diversification of the Cardano developer ecosystem. In addition to running this project in an open source fashion,

the Cardano Foundation has committed to provide ongoing maintenance, plus to work with the community to define standards and potential reference implementations for decentralized data APIs where Ledger Sync might be used as the underlying data layer. Delivering a hosted data API that guarantees high availability and accuracy with a professional support model would further address the needs of enterprises and make it easier for them to implement blockchain solutions.

The Foundation also made significant strides on a new version of the Rosetta application programming interface (API) to be rolled out in 2024. This will replace the heavyweight dependency on db-sync with a more lightweight data provisioning layer to reduce the application's resource footprint. The Rosetta standard simplifies blockchain deployment and interaction, ensuring developers can use external applications to interface with different blockchains in a similar way. This should reduce the operating costs of trading for exchanges.

A new partnership with TxPipe provides easy access to common Cardano services on their platform Demeter and streamlines the development process within the Cardano ecosystem to make building decentralized applications (DApps) more developer-friendly. The Foundation subsidized a free tier that offered access to the Demeter platform. It enabled

access to several developer tools from the Cardano ecosystem, as well as starter-kits for various use cases including templates for quickly bootstrapping new projects.

Launched in December 2023, the [Identity Wallet](#) makes it possible to maintain digital and physical identities in an off-chain infrastructure that links to the blockchain. The open source wallet characteristics also ensure its **interoperability with the most widespread identity standards and mobile platforms**. Furthermore, the wallet is scalable across blockchains, acknowledging that user identities should not end up bound to a specific infrastructure but rather that user sovereignty must be core to any solution design.

As a more formal complement to ongoing input from developers, the Foundation invites feedback from the technical community on gaps and opportunities for improvement in its annual [State of the Cardano Developer Ecosystem](#) outreach. The second edition of the survey ran in the autumn and provides a useful barometer of the current technical landscape, its evolution since 2022, and potential opportunities for enhancement in the current programming stack.

10

# 40%

largest Cardano DApps migrated to Aiken

11

# 200+

developers completed Aiken's introductory tutorial

Equipping developers with the best tools and information ensures they have the means to **continue problem-solving and building solutions.**

## Adoption continued

### Optimizing reward calculation

In return for their role in operating the network, SPOs may receive rewards, shared with those staking funds to that pool. The Foundation open sourced a node-independent reward calculation with the objective of diversifying the means of performing and validating the rewards calculation, and also to provide comprehensive documentation related to Cardano's treasury, reserves, and pool rewards.

### Upgrading Kupo and Ogmios

During 2023, features were added to Kupo, a chain-indexer that synchronizes data from the blockchain according to patterns matching addresses in transaction outputs. Performance and usability improvements included allowing inputs to be filtered by metadata tag, the ability to use Hydra nodes as possible data sources, and a new command to allow copying and filtering of an existing index.

The Ogmios bridge interface also underwent a significant upgrade during the year. The release of the new major version 6 led to several key changes in the API, as well as a normalization of the underlying schema in an effort to make interfaces across all Cardano tools more uniform.

### Improving Cardano Ballot

Since its initial deployment for the Cardano Summit 2022, the Cardano Ballot has evolved significantly into a modular, open source repository featuring independent backend services that can be coupled with bespoke user interfaces, enabling a **customizable blockchain-based voting solution**. In addition to free, user-based voting, the Ballot can now also be leveraged for stake-based voting events, weighted according to the amount of ada staked by participants before a predefined snapshot of the Cardano blockchain.

Additional innovation in 2023 included supporting the Cardano Summit 2023 Awards voting with the first-ever Hydra Tally. To enhance transparency, scalability, and auditability, the Foundation used Aiken smart contracts and Hydra to enable on-chain validation of the voting results. This allows the public to inspect the smart contract data and easily confirm whether the results were tallied correctly for each award category.

During the year the Foundation also supported IOG for a CIP-1694 pre-ratification event using the Cardano Ballot. The requirement for a stake-based – as opposed to user-based – approach to voting saw each ballot weighted according to the amount of ada staked by an address at a given time.

### Launching the Cardano Store

Managed by the Cardano Foundation, the [Cardano Store](#) sells a limited range of Cardano-branded merchandise accessories to further activate the Cardano brand and help bring it to a wider audience. In addition to elegant designs, the Store also looks into ways of leveraging blockchain's immutable records to authenticate products. The first batch of 250 hoodies incorporate an evolved version of the Merchandise solution with improved verifiability using encrypted NFC tags and CIP-25 based NFTs.



12 **1,050+**  
user-based votes for Cardano Summit Awards

13 **700+**  
stake-based votes for CIP-1694  
pre-ratification event



Connecting, educating,  
and inspiring the  
Cardano community.

# Each year the Cardano Summit stands as a highlight, offering a valuable forum for celebration, inspiration, and collaboration.

Taking place in November, this year's main stage event in Dubai was complemented by 27 community-led events around the world, with thousands of virtual attendees accessing the content remotely, live and on demand.

The first ever Cardano Summit Hackathon preceded the event, providing the community with further opportunities for learning and collaboration. Hackathons also frequently **trigger fresh ideas and lead to rapid prototype development**. The Summit Hackathon therefore challenged participants to develop technology-driven projects that promote transparency in governance, a focus in the Voltaire phase of the Cardano blockchain. Participants were tasked with creating solutions such that individuals and organizations unfamiliar with blockchain can easily access and understand governance actions, policies, and decision-making processes. More than 1,000 people worked on 41 submissions, with the winner announced during the Gala Awards Dinner at the end of the Summit.

14

**10,000+**

attendees globally

15

**1,000+**

Cardano Summit Hackathon participants

16

**500,000+**

on demand content views



## Cardano Summit 2023 continued

In addition to the invaluable networking opportunities that characterize the Summit, the opening evening of the event in Dubai included an energizing Battle of the Builders. The Cardano Foundation designed this new feature to encourage innovation and entrepreneurship. Ten finalist startups, poised to leverage the Cardano platform, pitched their projects to the expert panel of juries and in front of the Summit attendees.

The following two days covered a rich program of presentations, panel discussions, workshops and masterclasses. Day 1 focused on operational resilience and education, with over 35 sessions, while the panels and keynote sessions on Day 2 delved into adoption and impact. The Summit closed with a Gala Awards Dinner in the shadow of the world's tallest building, to celebrate award recipients across ten categories in addition to the winning Hackathon team.

The Foundation was also pleased to announce at the Summit our third Cardano Global Impact Challenge partner, the UNDP-led community platform Tadamon. The partnership seeks to increase awareness of **how blockchain technology can address the development challenges faced by civil society organizations** (CSOs) across Africa, the Middle East, and Asia. The collaboration will develop capacity-building programs, knowledge-sharing initiatives, training sessions, and collaborative events to foster knowledge about blockchain technology.

The Cardano Summit exemplifies the power of bringing people together. It is a reflection of – as well as a catalyst for – the palpable growth of the Cardano community and the exciting opportunities that lie ahead.

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Visit Summit website



17

75+

sessions and workshops in Dubai

18

25+

community-led events across the world



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