



Data Model Version 2.0

Connectivity Guide



Content Overview

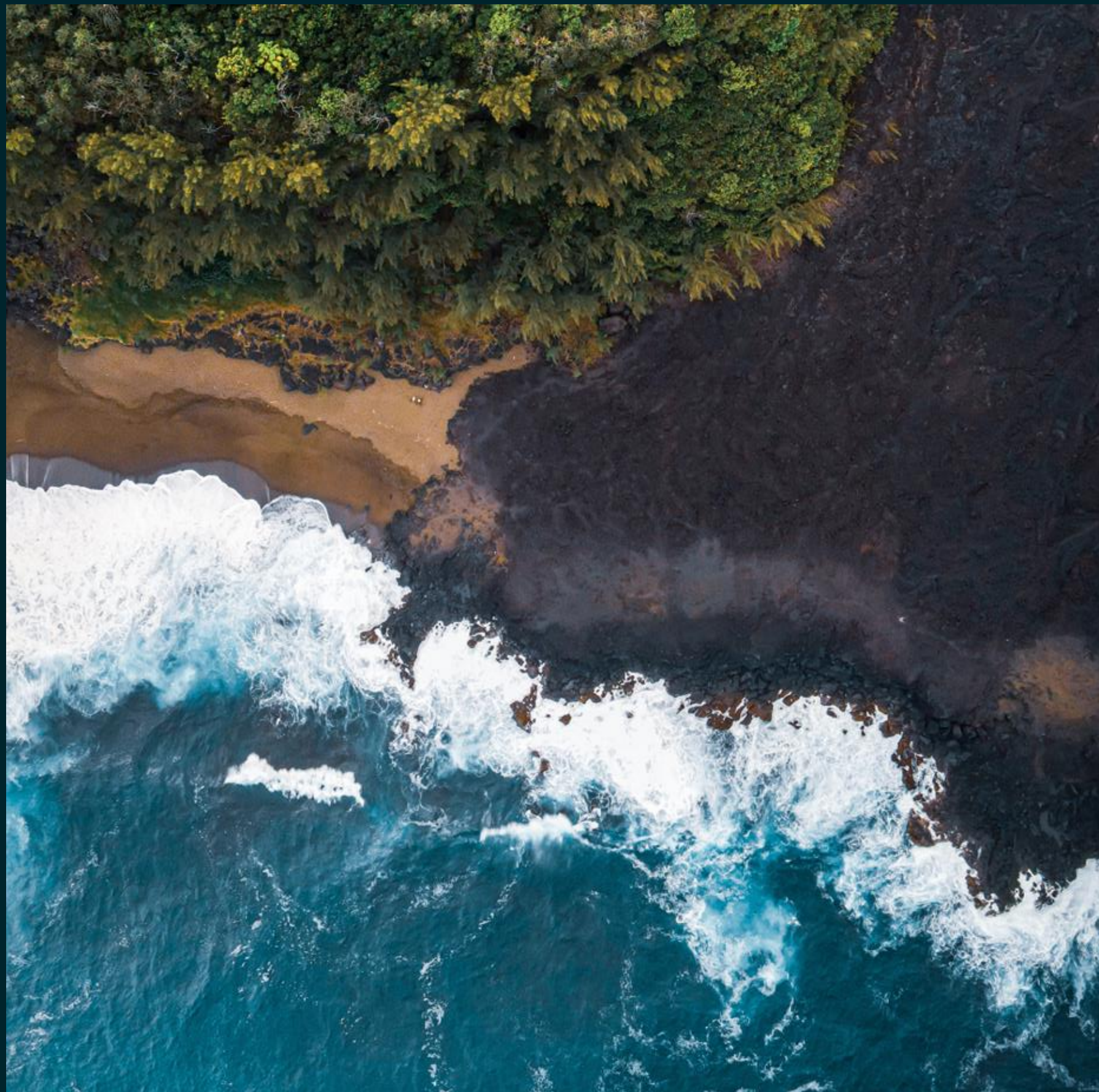


Topic
Introduction to CAD Trust
Technology
Data Layer
Data Model Version 2.0
Installation
Appendix



Who we are





Transparency and accountability are vital for efficient carbon markets that drive climate action and the associated finance. The Climate Action Data Trust acts in the public interest to increase transparency, safeguard against double-counting, support transparent accounting, and build confidence in the market.

We improve access to carbon credit data from compliance and voluntary markets, fostering collaboration, facilitating innovation, and helping unlock the potential of carbon markets across the world.

Connecting carbon markets through open data

- Public carbon market transparency platform
- Common data model for carbon credits
- Collaborative, not-for-profit governance



Co-founded by:



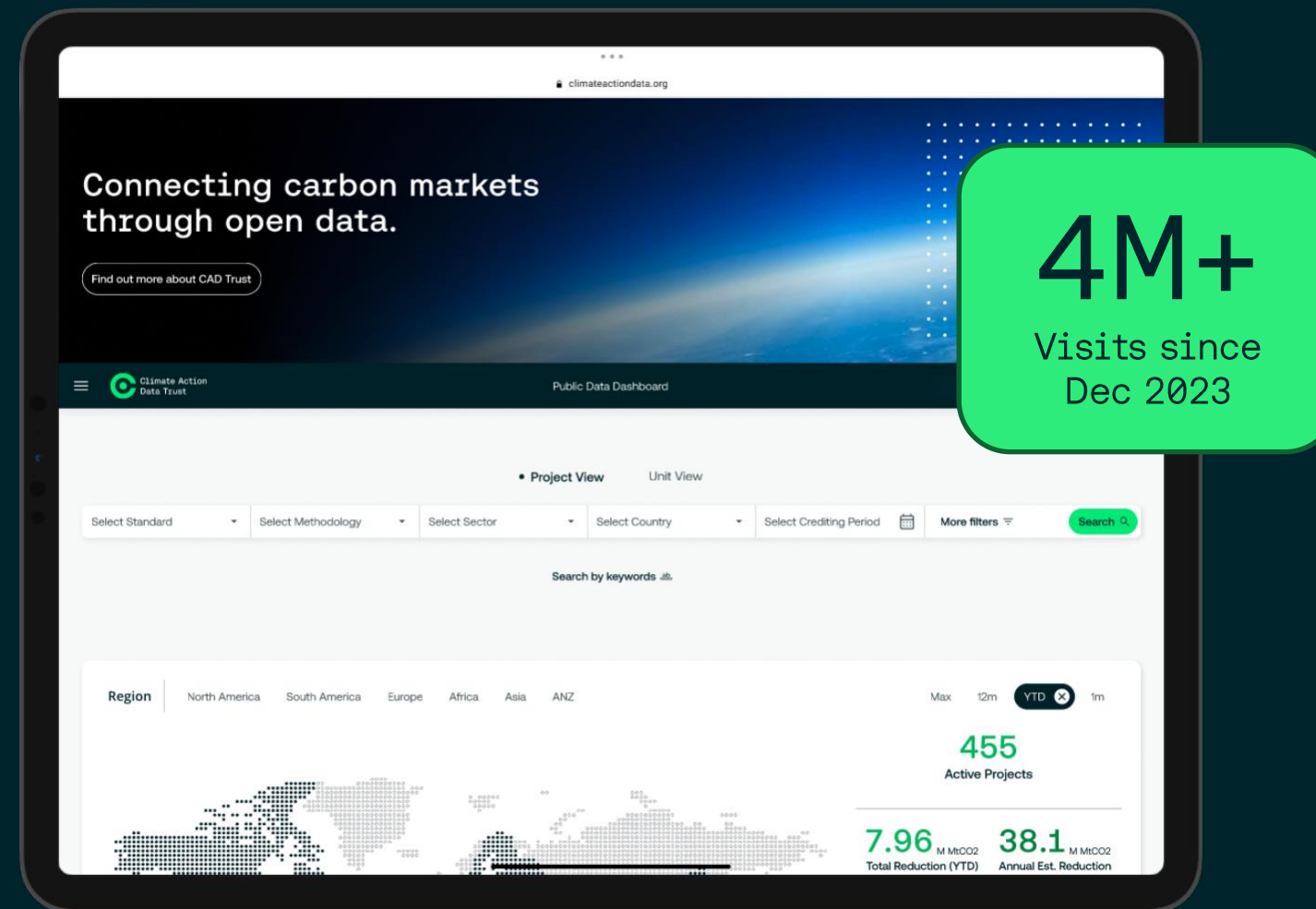
Harmonized data on over 90% of credits ever issued



[Data Dashboard](#) | [API access](#)

16K+
Projects

3B+
Issued units



Top countries by visits

- USA 23%
- UK 13%
- Singapore 10%
- Spain 7%
- Brazil 6%
- Rest of World 41%



Gold Standard



CERCARBONO
Certified Carbon Standard

BioCarbon
Standard

TERO CARBON

Asia Carbon Institute

Rainbow



THE WORLD BANK
IBRD • IDA
Carbon Assets Tracking
System (CATS)



Enabling market growth through data interoperability



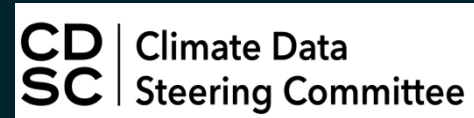
- In 2025, interoperable infrastructure and data standardization came to the fore as enablers for high integrity market growth
- CAD Trust shared expertise and helped convene leading efforts, building pathways for complementarity and collaboration
- CAD Trust Data Model Version 2.0 is a milestone in developing consistent global guidance

Collaboration to improve interoperability



World Bank Carbon Markets Infrastructure Working Group

- Served as convenor and lead author for Data and Systems Interoperability priority area
- Built consensus among key **stakeholders in infrastructure and data standardization initiatives**
- **Resulting guidance note¹ informed ICVCM, G20 Sustainable Finance Working Group**



Common Carbon Credit Data Model (G20 Sustainable Finance WG input)

- Multiple rounds of consultation with the Climate Data Steering Committee over 2025
- Close technical alignment between CAD Trust Version 2.0 and CCCDM v2.0
- Exploring further synergies during the CCCDM piloting phase in 2026



Carbon Data Open Protocol (CDOP)

- CAD Trust is a CDOP member on both Principles & Policy and Technical working groups
- CDOP currently focusing on pre-issuance; CAD Trust focused on post-issuance
- CAD Trust Version 2.0 will be integrated into the CDOP schema in the next round of updates



ISO TC/322 Sustainable Finance

- Co-project lead for TS 32214 Working Group 5 - Carbon Credit Data Model
- Helped structure engagements with CCCDM, CDOP to ensure complementarity

1. [Guidance note](#) on data and systems interoperability (World Bank, June 2025)

How we support the market as public infrastructure



Trusted global public carbon credit metadata

Improving auditability

Increasing integrity

Supporting transparent accounting

- Tracking issued credits using certain criteria (jurisdiction, sector, methodology, stakeholders...)
- Monitoring credit status or eligibility for various schemes
- Reconciling information on projects tracked in multiple registries
- Identifying potential double counting across systems
- Tracking status and supporting reports on credit use in policy frameworks (e.g., Article 6, CORSIA)

We support:



Governments and
regulators



International
organisations



Integrity
initiatives



Crediting programs

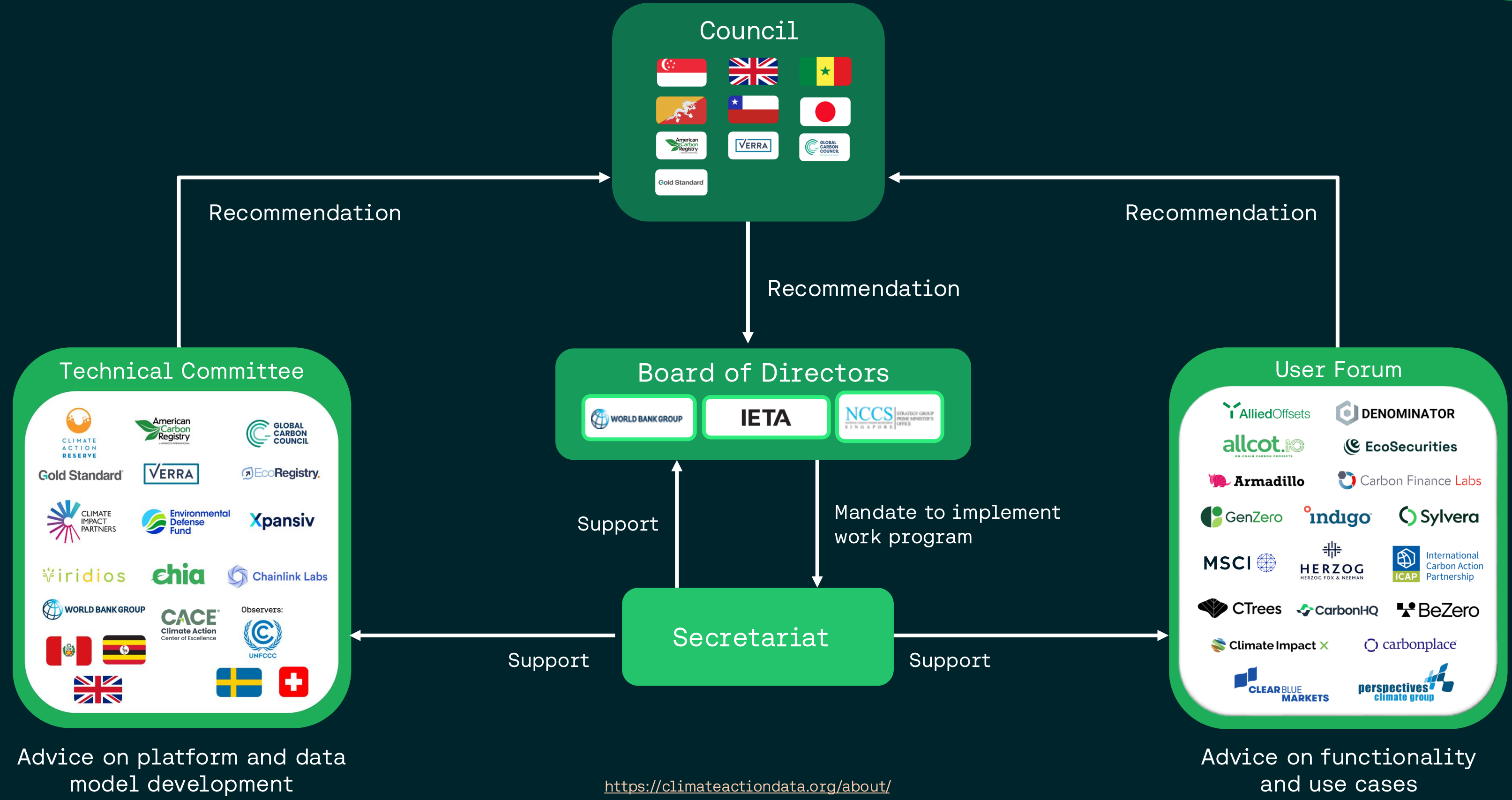


Market
participants



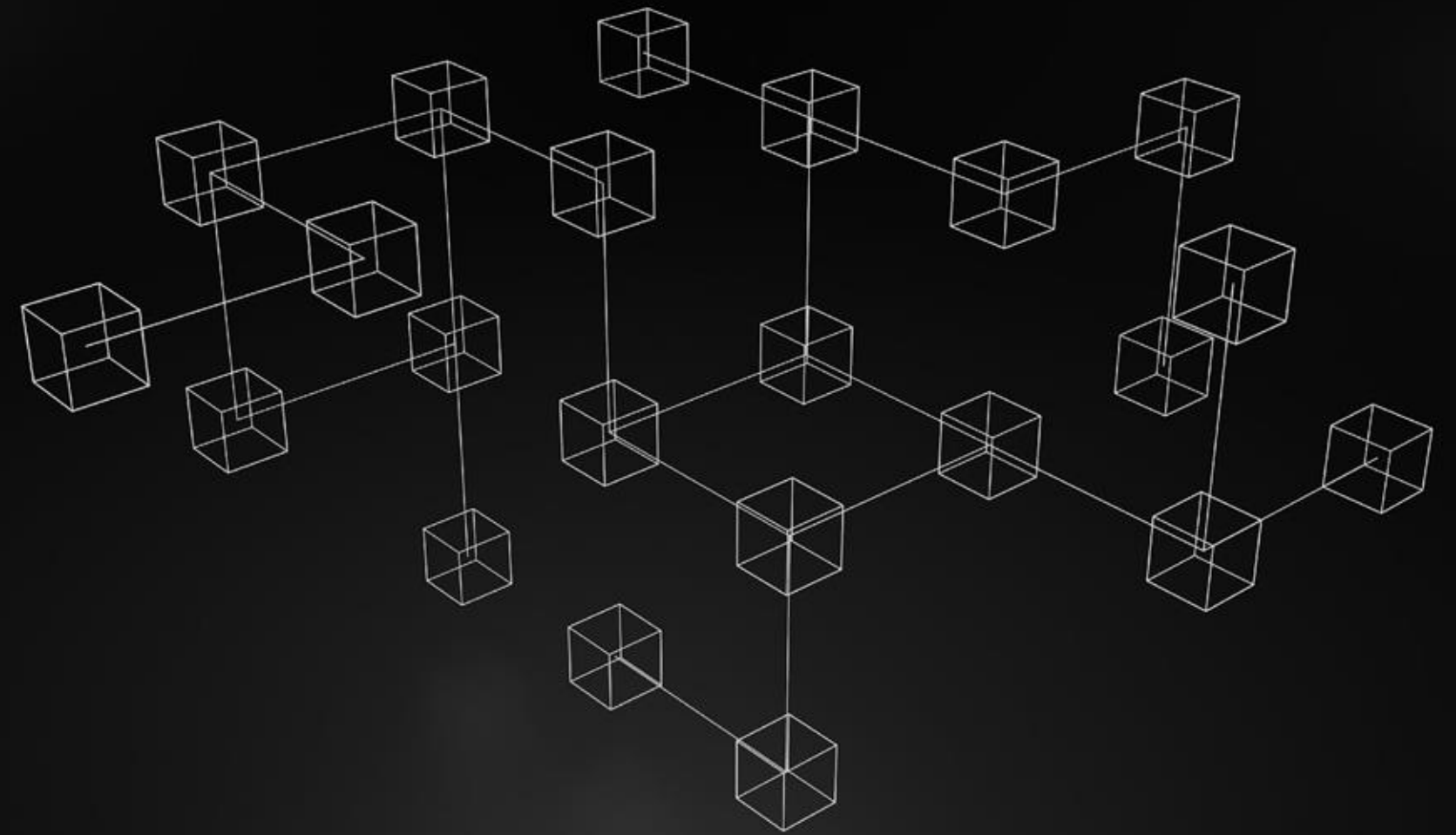
Researchers and
civil society

Collaborative global governance





Technology



Chia Blockchain



Sustainable blockchain technology driving real climate action.

Chia designed a more sustainable blockchain, offering globally-inclusive access to those farming Chia blockchain's version of mining and to the broader financial system.



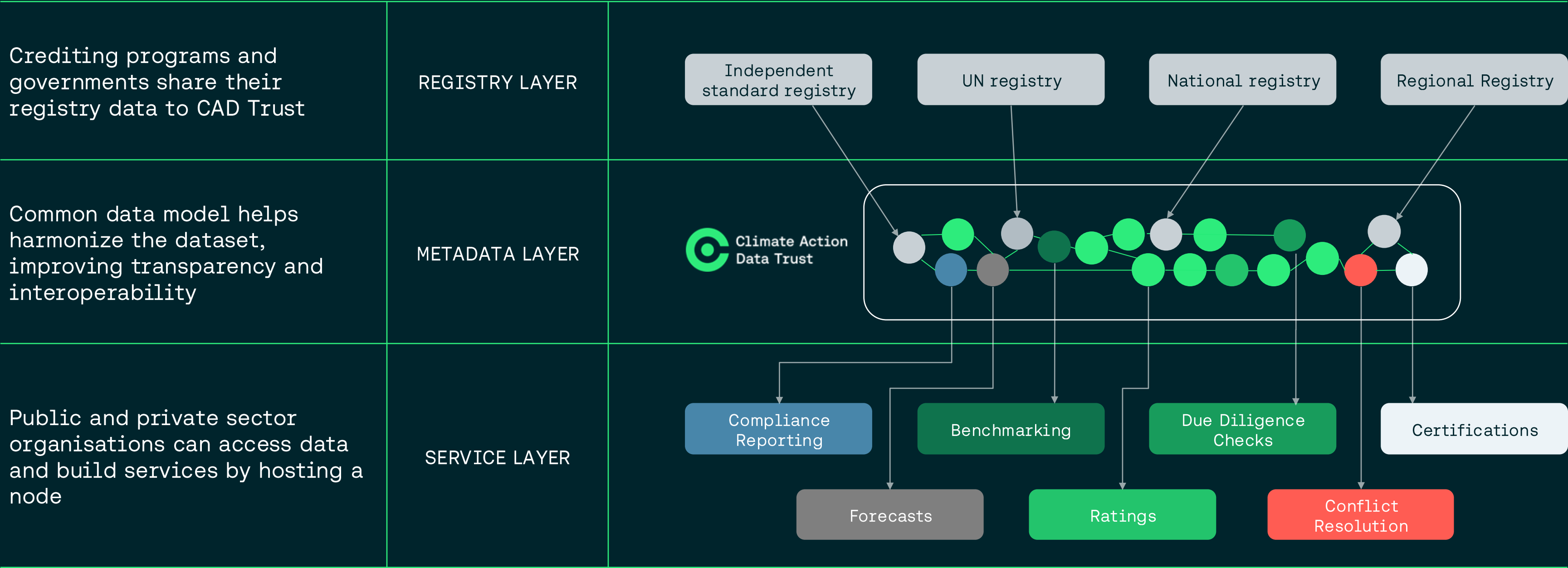
Data Layer



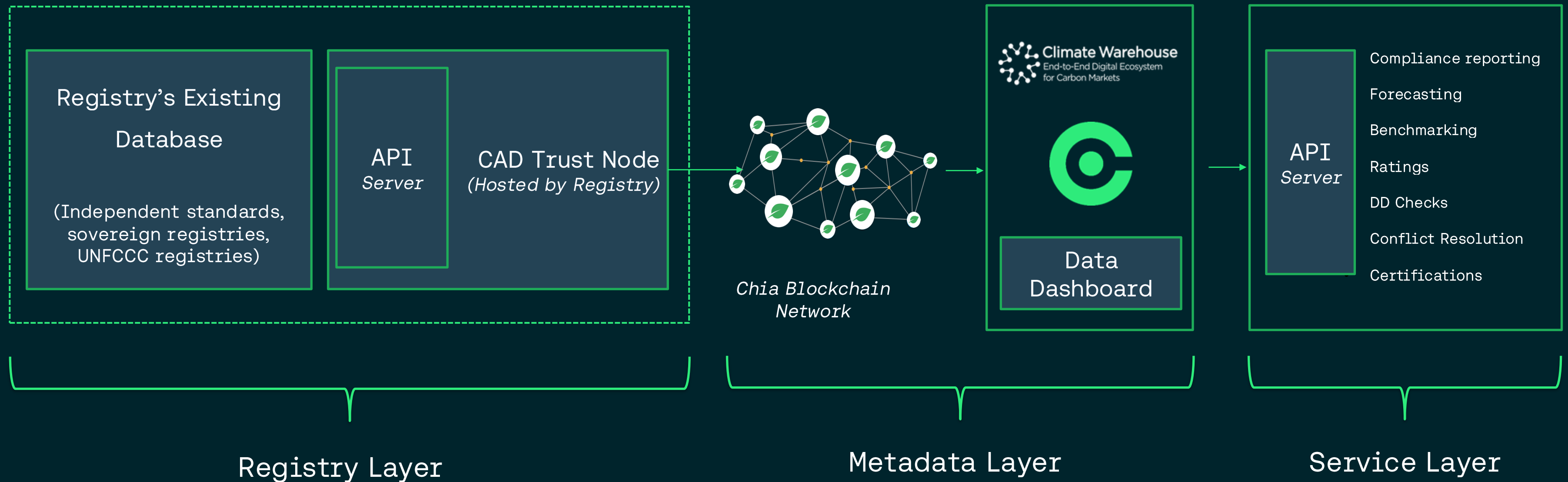
Public metadata infrastructure for carbon markets



CAD Trust leverages open-source software and public blockchain technology. We enable each registry to broadcast their data to a global decentralised network in a harmonised fashion while keeping full control of their systems.



Data Flow



Key application features



Secure, decentralised data storage application for carbon credit registries worldwide

Open-Source

The Climate Action Data Trust application is delivered as open-source software. This means there are no fees incurred to obtain the CAD Trust application.

Standard/ Registry Managed

Each Independent Standard and/or Registry has their own copy of the CAD Trust application. This provides each entity full control of their deployment decisions without requiring changes to existing registry systems or processes.

Decentralised

Public blockchain technology allows each registry to keep full sovereignty of their data while sharing it to the CAD Trust for global transparency goals. Users can access a read-only version of the harmonised dataset.

How it works



Chia Data Layer is a shared data network with no central authority. Data is stored locally by a member (in this case: crediting programs and governments), while proofs of the data are stored on the blockchain with URLs that can be used to fetch the stored data. Members in this network can subscribe to data from other nodes and receive updates whenever the data changes and can compare the received data to the proof on the blockchain and confirm that the data is correct.

In use, each participant in the CAD Trust publishes data in their Data Layer tables, using their Chia wallet and keys, running on its own infrastructure. The “governance” node publishes another Data Layer table with the list of Data Layer tables published by each of the recognised participants. Each participant and observer only needs to know the Data Layer table ID for the governance node to locate all of the other participants’ data.

Because this is done on the public blockchain, anyone can subscribe to the data and audits log – ensuring transparency and auditability.

Connectivity



Participants / Publishers:

- Each registry publishes data using their own instance of the CAD Trust software
- The data must conform to the data model established for the CAD Trust



User Type:

Registry Layer

Observers / Subscribers:

- Anyone can download and run the open-source CAD Trust software
- The CAD Trust software can find and download the published data based on the registry ID



User Types:

Registry Layer + Service Layer + Public

Participants / Publishers: publishing data



- The CAD Trust software creates encoded data files representing the data entered by the registry
- The Registry makes those files available on the internet
 - Can use cloud services like AWS, Azure, GCP, etc
 - Can use CAD Trust built-in server
 - Can use 3rd party hosting service
- The Registry announces the location of the files for its ID to all other users of CAD Trust

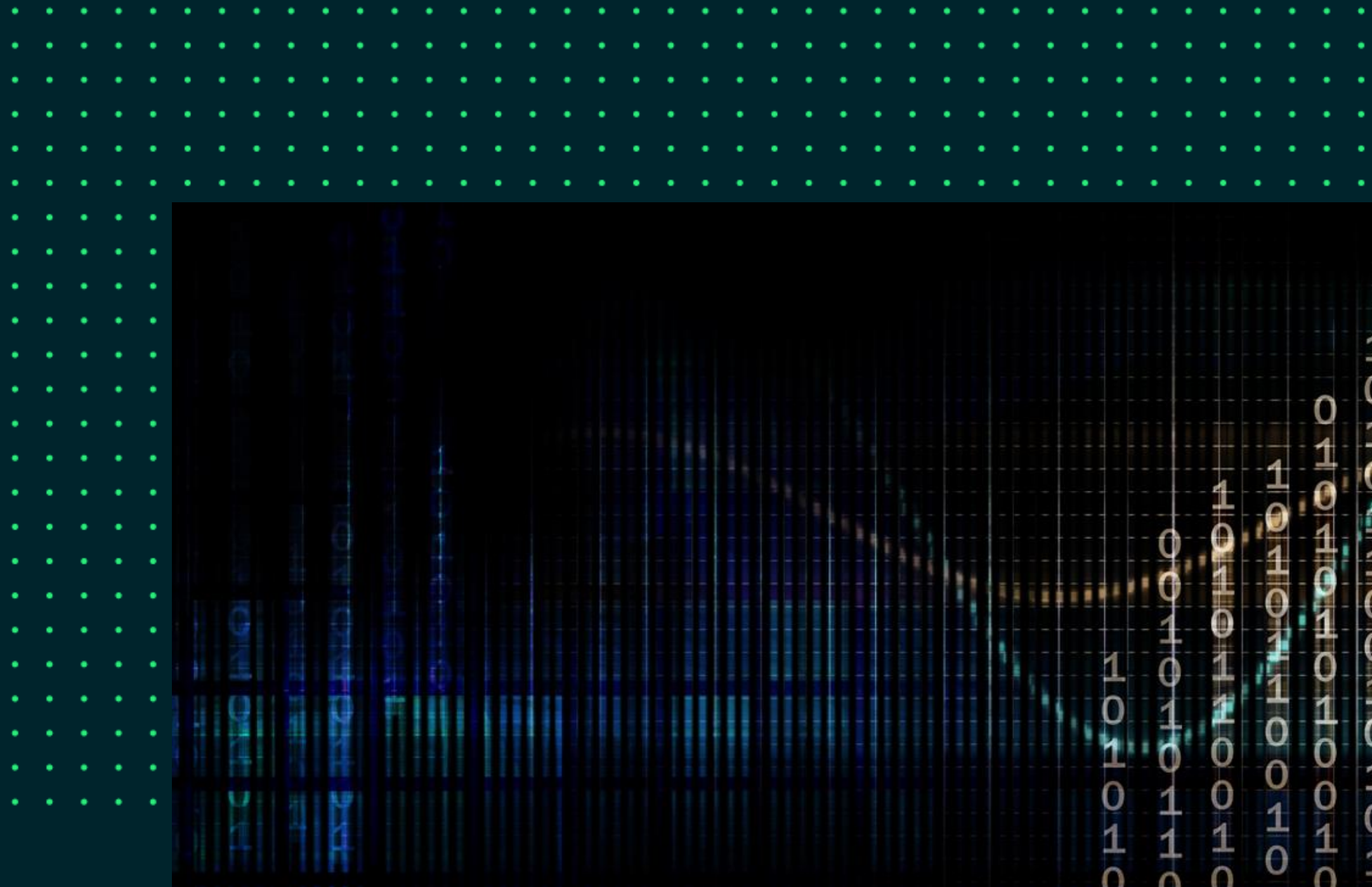
Observers / Subscribers: subscribing to data



- Subscriber looks up the registry ID for the registry they want to subscribe to
 - CAD Trust governance body publishes a list of known registries
- Subscriber's CAD Trust software:
 - Finds a location to access the data files, which may or may not be directly from the Publisher.
 - May also get the files from another Subscriber.
 - Downloads the files.
 - Decodes them to make the data available to the subscriber/user
- Subscribers can subscribe to many registries at once
- By default, the CAD Trust software automatically subscribes to all the registries on the list of known registries published by the CAD Trust Secretariat (also accessible through the Data Dashboard)
 - Users of the CAD Trust software can decide not to subscribe to certain registries, even if they are on the list provided by the Secretariat.
 - Users of the CAD Trust software can subscribe to registries not on the list provided by the Secretariat by entering that registry's ID manually



Data Model



Data Model Version 2.0



Version 2.0 is the new mandatory data model that all technical registries must follow for CAD Trust connectivity.

Comprehensive architectural upgrade addressing gaps identified in Version 1.

Official release: October 2025

- Development Period: November 2025
- Registry migration period: Q4 2025 through Q1 2026
- Version 1.96 will be deprecated following complete migration of all connected registries

Features comprehensive **Baseline Tables** for core carbon credit post-issuance operations and dedicated **AEF Tables** for Article 6.2 international compliance reporting



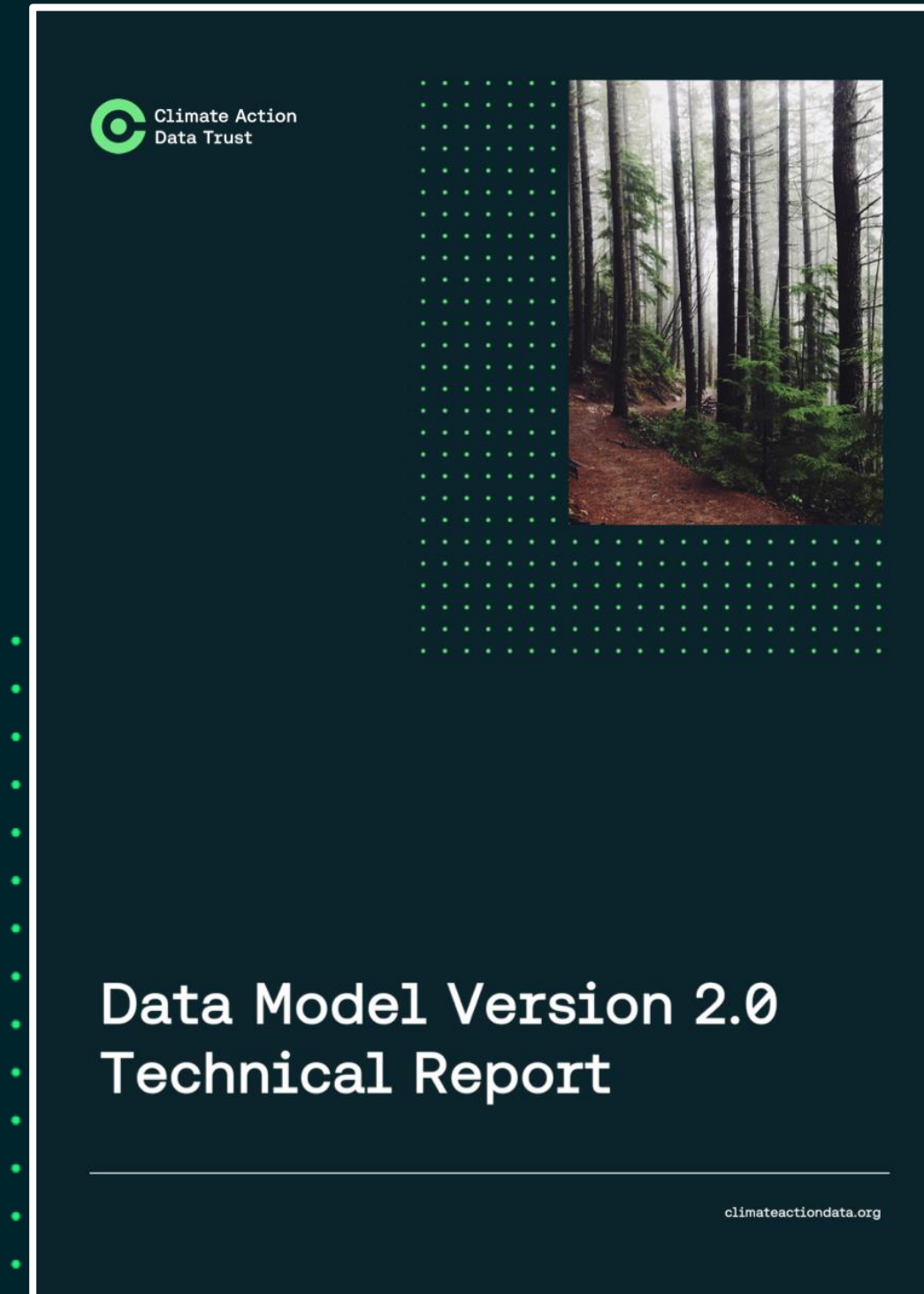
CAD Trust Data Model Version 2.0



Version 2.0 is our enhanced baseline for harmonising carbon registry data, supporting greater registry interoperability and public good use cases while improving infrastructure performance.

Access all information:

- [Press release](#)
- [Technical Report](#)
- [Data Dictionary](#)
- [Entity Relationship Diagram](#)



Data Model Explanation



CAD Trust will provide the Data Model Version 2.0 excel - a business-oriented document describing the expected fields in the data layer.

Key data attributes:

Organisation data

The organisation ID is the unique identifier generated by CAD Trust App. Registries will update their organisation using the CADT APIs.

Project

Organisation will post project data they host, such as project names, types, owner, status, etc.
Each Project gets assigned a unique project ID

Units (Carbon Credit Data)

It is connected to specific projects through the project ID. Organisation will input information denoting the issuances, amount, status, etc.

Governance (Picklist values)

CAD Trust governance node will maintain the values in certain data fields (picklists); data providers are expected to match their data accordingly to the various picklist values maintained within CAD Trust

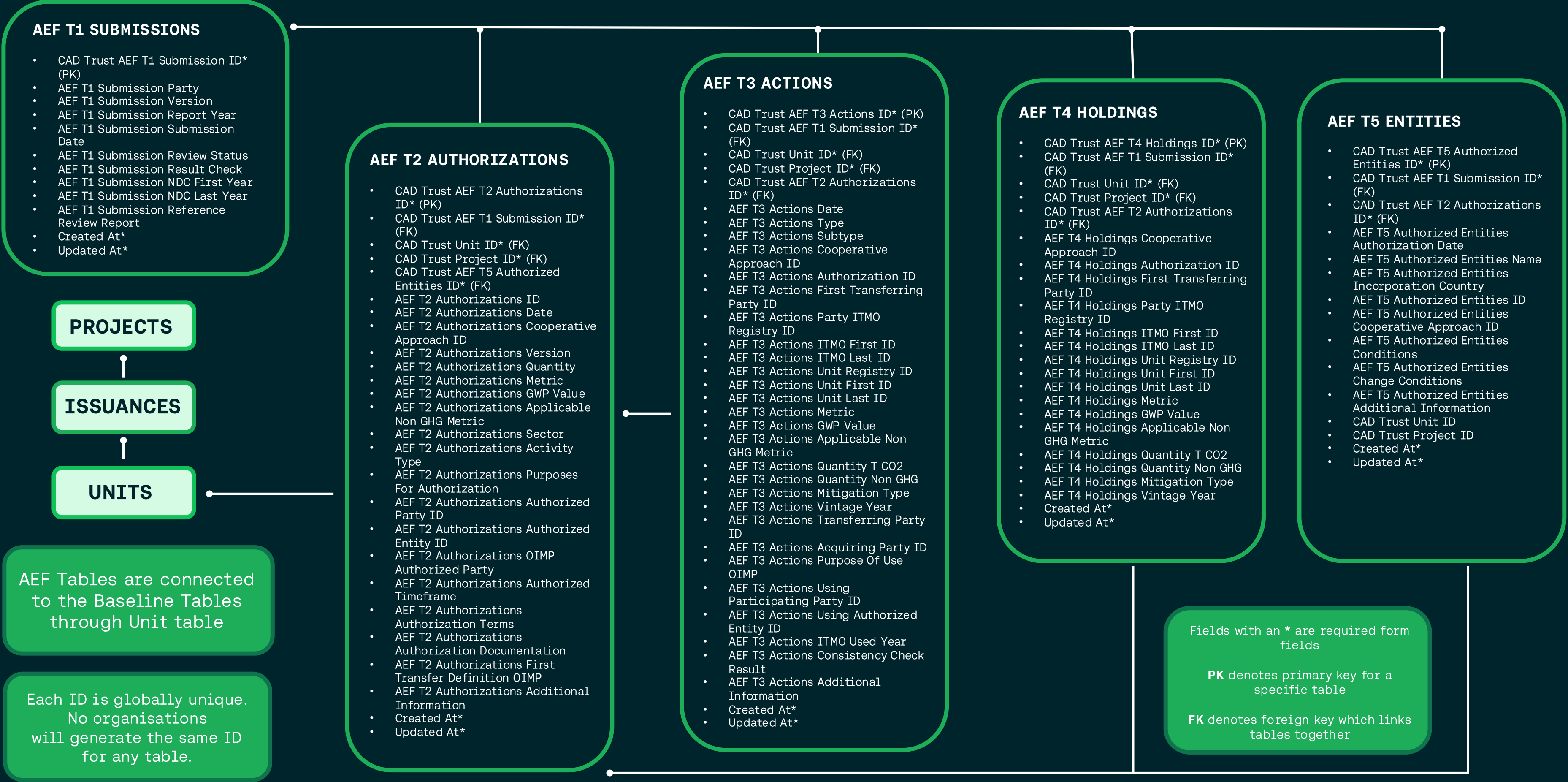
Article 6.2 AEF Data Tables

International compliance requirements under Paris Agreement Article 6.2 framework. Five essential AEF tables: Submission (T1), Authorizations (T2), Actions (T3), Holdings (T4), Authorized Entities (T5)

Baseline Tables

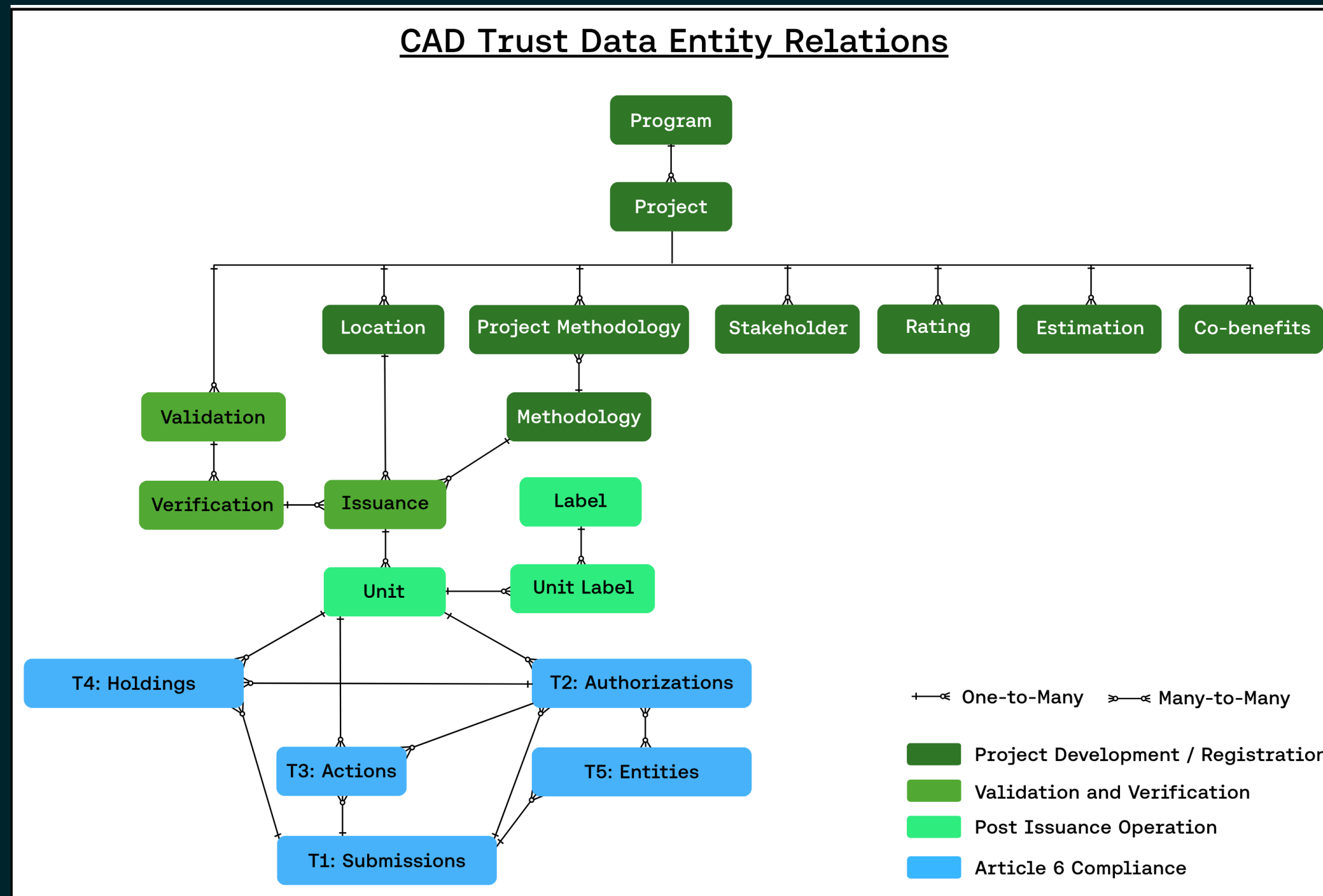


Article 6 AEF Tables



CAD Trust Data Model Version 2.0

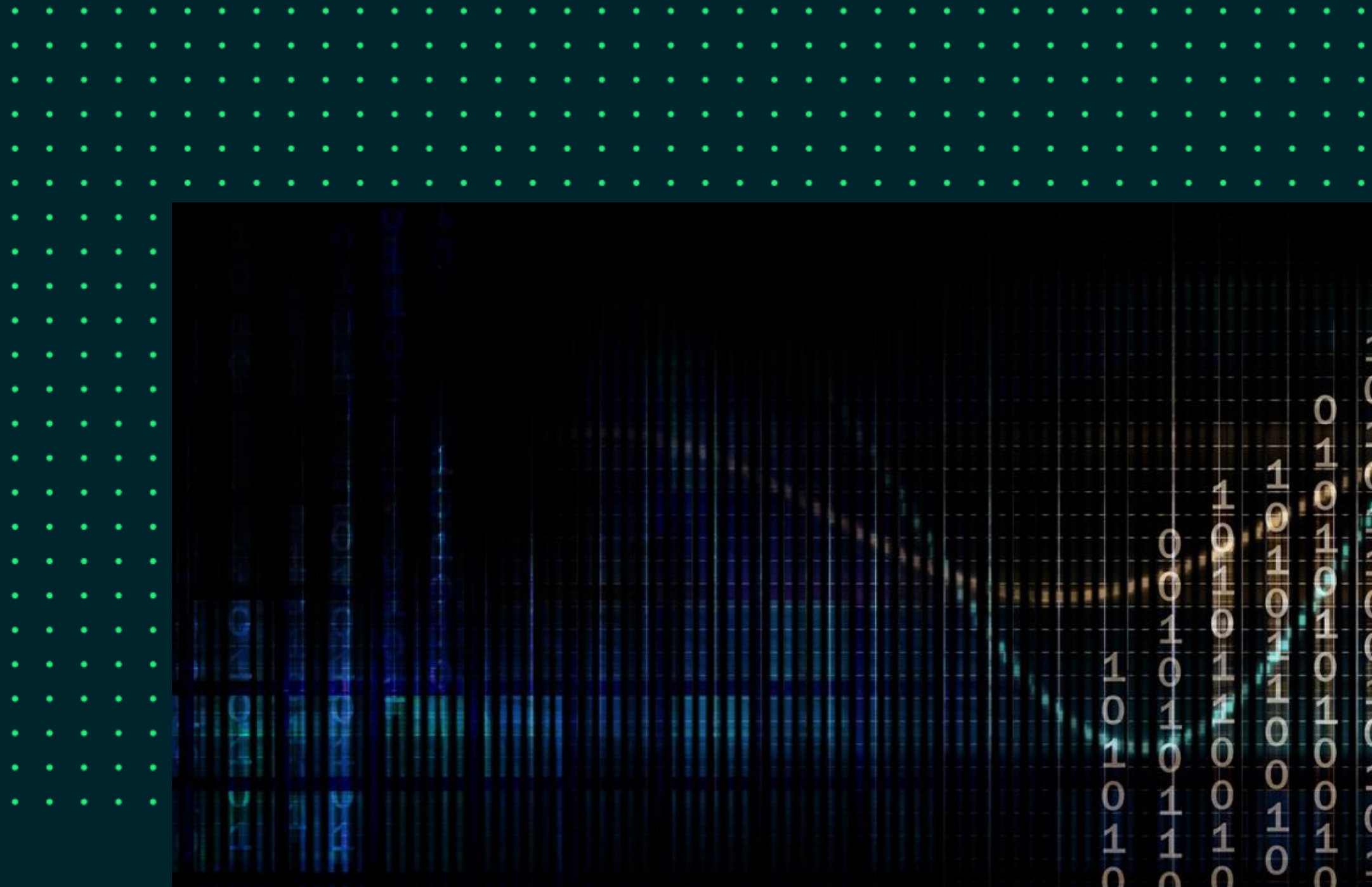
Relational Structure



- **Project** as the main entry of the carbon credit lifecycle.
- Project progresses through **Methodology**, **Validation**, followed by **Verification** before **Issuance** and **Unit**.
- **Unit** as the connector for **Labels** and **Article 6 Authorization**, **Action**, **Holding** details.
- All five AEF tables can be linked back to the project level.



Installation



Deployment Methods



Server Based

Local Install

On-Prem Hosted

Runs in a secure environment inside an organisation's network.

This is the lowest-cost secure deployment model.

User Type:
Registry Layer + Service Layer

Private / Hybrid Cloud Hosted

Minimizes cloud hosting costs while still providing a robust deployment of CAD Trust.

It is anticipated to be the most common model for service providers that consume data from the CAD Trust.

Public Cloud

This is anticipated to be the **most common** model for Participants and the Governor node.

All components other than the CAD Trust API and Chia are provided by the cloud service provider.

The most common model for **observers** will be to simply install the CAD Trust App on their local computers.

Observers do not require cryptographic keys and cannot change data in the CAD Trust, so the reduced security of this model is acceptable.

User Type:
Service Layer + Public

System Requirements



Server Based

**On-Prem
Hosted**

**Private /
Hybrid
Cloud
Hosted**

**Public
Cloud**

Deploying the CAD Trust requires installing both the Chia blockchain software and the CAD Trust API server software.

For **hosted** deployments, both pieces of software are typically installed on the same machine but can be installed on different machines and pointed to one another. The machine should have at the least the following minimum specs:

- **Dual core 1.5Ghz CPU (64 bit) x86**
- **8 GB ram**
- **500 GB SSD disk space**
- **Python version 3.8+**

Ubuntu is the preferred OS to use as the Chia and CAD Trust software is packaged and tested primarily with Ubuntu. Other Linux distributions should run Chia and CAD Trust fine, However this may not be extensively tested or have packages routinely built. Windows or Mac systems can be used to host a remote CAD Trust instance.

Local Install

Deploying the CAD Trust requires installing both the Chia blockchain software and the CAD Trust API server software.

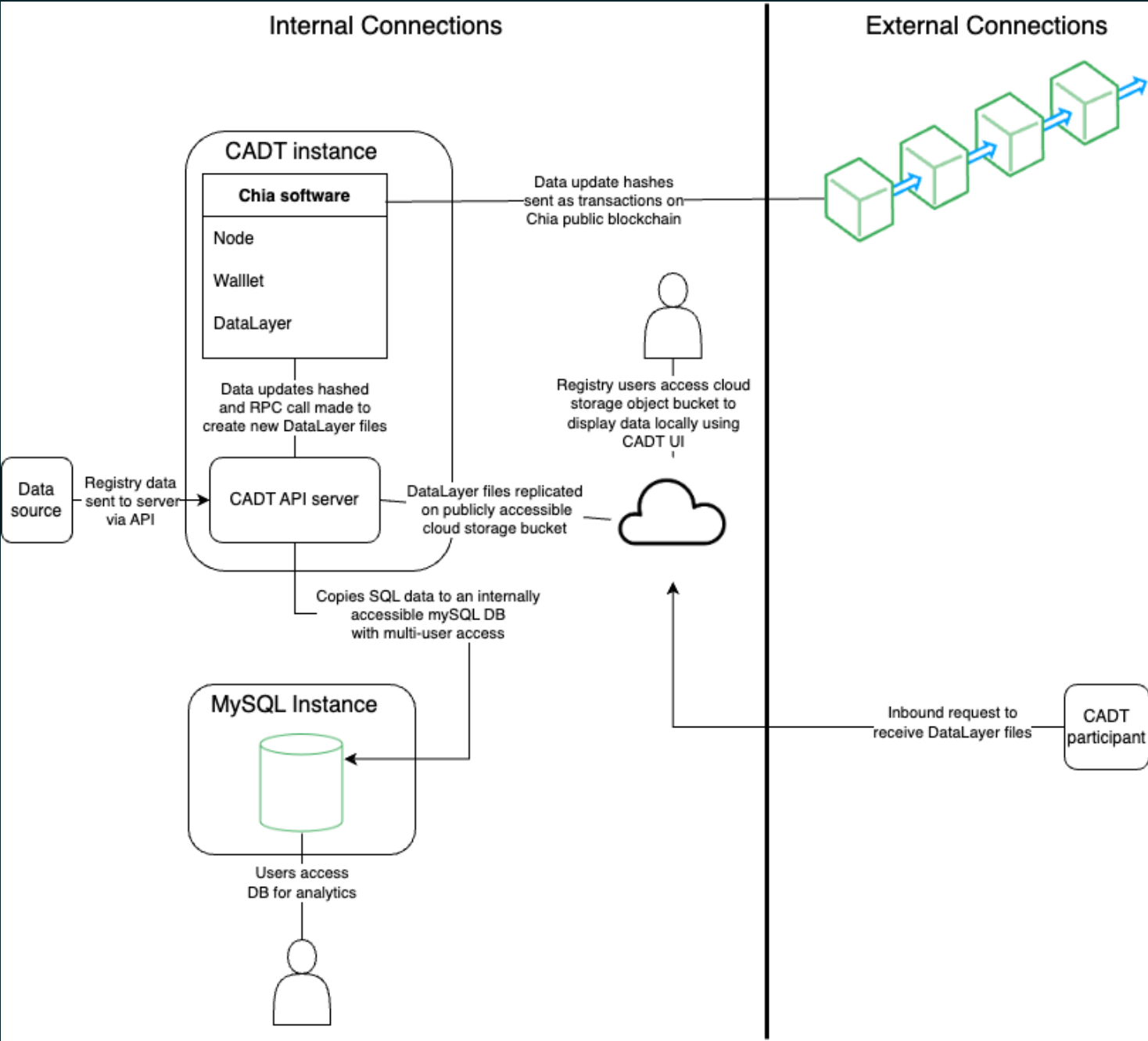
For **local** deployments, both pieces of software are always installed on the same machine. The machine should have at the least the following minimum specs:

- **Quad core 1.5Ghz CPU (64 bit)**
- **4 GB ram**
- **500 GB disk space**
- **Python version 3.8+**

Architectural Components



The primary components of a CAD Trust deployment will include:



Component	Description
CADT API Server	This is the CAD Trust API, which provides all the business logic for CAD Trust.
Database Server	The database server is optional. If available, the CAD Trust API will maintain a complete copy of all of CAD Trust in the database for easy access by standard reporting and analytics tools.
Chia Wallet	The Chia Wallet stores the cryptographic keys and the assets controlled by those keys, such as Chia DataLayer data tables and chia cryptocurrency (XCH) for use in paying transaction fees.
Chia Node	The Chia Node is a full validator node on the Chia blockchain and always keeps an up-to-date and validated copy of the blockchain. The Chia node is optionally capable of farming chia cryptocurrency (XCH) to pay for transaction fees.
Chia Data Layer	Chia Data Layer sends the data from peer to peer through a http protocol.

Building ETL Architecture



- Goals: Continuous Integration in updating registry own database and pushing to CAD Trust Service via API and eventually Chia Data Layer
- It is up to Registry to determine the frequency of data extraction and loading
- Ensure that sensitive data is handled securely throughout the ETL process. Implement encryption, access controls, and data masking as needed
- Thoroughly test the ETL pipelines in different scenarios to ensure data accuracy and consistency
- Regularly review and optimise your ETL pipelines for performance, reliability, and maintainability

User Type:
Registry Layer

Key Management: Purpose, Usage, and Ownership



There are **two keys** to manage when deploying and using the CADT and Chia software.

Chia Private Key

Purpose: The Chia private key provides a cryptographic lock to your Chia wallet. This key is required to manage an organization's data on the Chia blockchain.

Usage: These keys are used by the Chia software to write data updates to DataLayer and to submit the updates to the blockchain as a transaction.

Ownership: This key is generated upon installation of the Chia wallet. The key should only exist on the machine that is used to run Chia and CADT.

The backup 24-word mnemonic to recover the key should be stored in some key management software such as AWS KeyCloak or GCP Cloud Key Management.

CADT API Key

Purpose: The CADT API key acts as a password and protects the CADT software from receiving unauthorized requests. Any requests made without this key will fail.

Usage: The CADT API key will be used by the registry to make any requests to CADT, including generating data updates and fetching existing data. The CADT API key **does NOT** give direct access to the Chia wallet or the Chia private key. Note: an observer node (which runs in read-only mode) may not have an API key as the data is meant to be public.

Ownership: The registry owns and manages this API key. Sharing this API key should follow the registry's password sharing policies, as the key is essentially a shared password for CADT users.

TestnetA Server Setup: Importance and Configuration Steps

As with any data integration project, it is important to set up a test environment to test integration patterns before deploying them to a live production environment.

This allows for test data to be used without worry and will provide confidence when moving to production.

Setting Up a Test Environment

Start by provisioning a machine using one of the methods mentioned in previous slides.

If using a cloud method, simply spin up an additional instance using the same parameters. If using a local deployment method, find another local computer to use for testing.

This instance will need to have both Chia and CADT installed to serve as the test environment.

Configuring CADT and Chia

Once the software has been installed on the instance, one may configure CADT and Chia to send data to the test blockchain, rather than the real “mainnet” blockchain. This allows users to send data to a chain that only serves test data, which means any mistakes will not be visible to the public.

To do this, you will need to edit the configuration file for Chia to point to the testnet blockchain. More details can be found at: https://docs.chia.net/guides/crash-course/introduction?_highlight=testnet#getting-on-testnet

In addition, you will need to configure CADT to use testnet. Follow the instructions listed in the configuration section of the readme on Github. <https://github.com/Chia-Network/cadt#configuration>

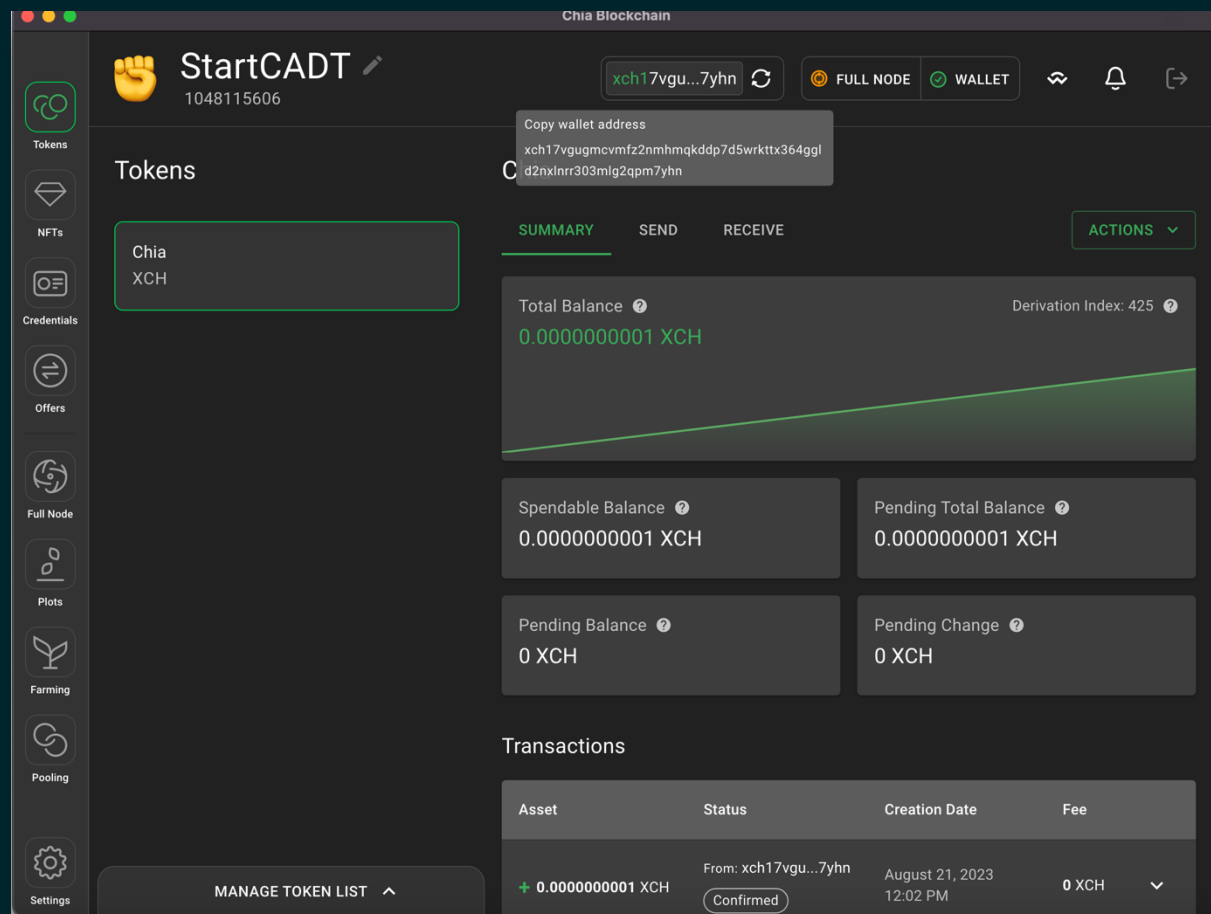
Steps to install CAD Trust



1. Download Software

Setting Up Chia Node / Wallet

- [Official GUI Installation Download Page](#)
- Reference : [Installation Documentation](#)



Setting Up CAD Trust API Server Software

[Main CADT Public GitHub repository](#)

Server Based

[Server / Remote Installation Guide](#)

Local Install

[Local Installation Guide](#)

Setting Up CAD Trust UI App (Optional)

The CAD Trust UI is useful for visualizing the data that is entered into the CAD Trust, but presumably the data will be visible on the public observer node.

The CAD Trust UI is a JavaScript application that connects to the CAD Trust API. It is offered as a desktop application packaged with Electron, or as a web application. If running as a web application, most organizations will host the UI on the same server as the CAD Trust API or in a public S3 bucket. Alternatively, each user can run the desktop application on their workstation and connect to the single CAD Trust API. In either scenario, the CAD Trust API must be connectable from the user's workstation, which usually means making it publicly available on port 31310.

[CADT UI Installation](#)

Steps to install CAD Trust



2. Additional Setup / Config

Setting Up Mirror Database (Optional)

One additional server can be added to this setup in order to mirror the CAD Trust DB structure into a multi-user access database such as MySQL.

This is useful for analytics on the data that is reported to the CAD Trust ecosystem - this database will have both the data the registry owns, along with the data other registries have provided.

We recommend the machine for the MySQL instance to have at least:

- Single core CPU
- 2 GB ram
- 50gb disk space

[Configuration Details](#)

CAD Trust Version 2.0 API Documentation

[CAD Trust API v2.0 Documentation](#)

GET Examples

List all organizations

Request

```
curl --location --request GET 'localhost:31310/v2/organizations' --header 'Content-Type: application/json'
```

Response

```
{
  "77641db780adc6c74f1ff357804e26a799e4a09157f426aac588963a39bdb2d9":{
    "orgUid":"77641db780adc6c74f1ff357804e26a799e4a09157f426aac588963a39bdb2d9",
    "orgHash": "0x14d8ea0f809c73c649827837cada5ec4d931153839383008a28c59fd1de86d2e",
    "name":"Org Test",
    "icon":"https://www.chia.net/wp-content/uploads/2023/01/chia-logo-dark.svg",
    "isHome":true,
    "subscribed":true,
    "synced": true,
    "fileStoreSubscribed": "0",
    "registryId": "xfy7oofvb31bg07stafbqxcug7mmmjzxg0gi8r1nwk63u3pxwy85s5xpgs204bk",
    "registryHash": "0x34c4671f721ff0132b4eb80a8e0d46ffb446ec8f03ed87368adcd29415cdbac4",
    "sync_remaining": 0
  }
}
```

Reference of links / documents



Setting Up Chia Node / Wallet

[Official GUI Installation Download Page](#)

- Reference : [Installation Documentation](#)

Setting Up CAD Trust API Server Software

[Main CAD Trust Public GitHub repository](#)

Server Based

[Server / Remote Installation Guide](#)

Local Install

[Local Installation Guide](#)

Setting Up CAD Trust UI App (Optional)

[CAD Trust UI Installation](#)

Setting Up Mirror Database (Optional)

[Configuration Details](#)

Postman API Collection

[CAD Trust API Collection](#)

Appendix



Threat Analysis



The CAD Trust is unique in that it is a fully-decentralized application. There is no central server that can be attacked by a malicious actor to cause system-wide failures. Instead, it is a true peer-to-peer network with each participant running a node that acts as a peer to all of the other participants' nodes.

Identified potential attacks on the CAD Trust fall into a few broad categories:

- Changing data - a threat actor attempts to either change data without permission or causes the data to appear to be changed when other users view it.
- Denial of service - a threat actor attempts to prevent legitimate users from accessing the system.
- Malicious code injection - a threat actor attempts to cause the system to distribute malicious payloads.
- Stealing cryptocurrency - there is a small amount of chia cryptocurrency (XCH) required to publish data using the Chia blockchain that a threat actor could attempt to steal.
- Blockchain attacks - a threat actor attempts to change data previously confirmed on the blockchain or stops the blockchain entirely.

Threat Analysis



The CAD Trust is designed to allow nodes to be deployed in a wide range of environments:

- Public cloud hosted
- Hybrid / private cloud hosted
- On-prem hosted
- Local install

The local install deployment model is only intended for observer nodes, which do not have cryptographic keys to change data. The effect of an attack on observer nodes installed locally would be limited to the experience of the local user.

All of the hosted deployment models mitigate most attacks using industry-standard technologies including:

- Isolated and secured subnet deployment
- Reverse proxy with SSL/TLS
- Web application firewall (WAF)
- Identity and access management system (IAM)
- Local firewall on the application server

Threat Analysis



- Exogenous factors such as compromised client computers or networks, leaked credentials, phishing and zero-day vulnerabilities are outside the scope of the CAD Trust and must be mitigated through good security hygiene practices among users and node administrators.
- Blockchain attack vectors and their mitigating factors are thoroughly described in documentation published by Chia Network, Inc.
- As a truly decentralized system, DDoS attacks would have very limited effectiveness and can only disable access to a single node. Users of all other nodes would be unaffected.
- A number of additional potential attack vectors are considered and mitigations addressed, including malicious source code commits, malicious upstream library releases, poisoned installers and leaked or lost cryptographic keys, among others.
- In summary, the application can be fully secured through the use of correct deployment and maintenance practices by node administrators, good security practices by users and good source code control and upstream monitoring by code maintainers.

Chia Technical FAQ



Q: Why was it important to use a public blockchain instead of a private blockchain?

A: Public blockchain is within the spirit of the Paris Agreement's decentralized bottom-up approach. It does not rely on the trust of any central authority, including the company managing the chain. It is a truly decentralized tool that democratizes access and cannot be manipulated by any authority or owner.

Q: More validators (nodes) on a blockchain network make it more decentralized and secure. Are there adequate incentives to ensure Chia's 200,000+ validators continue? Have there been any reductions in the hype leading to a decrease in validators?

A: Chia's Proof of Space & Time consensus mechanism rewards the storage ecosystem effectively and incentivizes validators. If validators start to leave the Chia ecosystem, that creates a higher rate of return for new validators allocating storage to Chia and thus incentivizes more validators to add space to the network.

Q: Carbon credit project data is often very high volume. Is this costly? Are all participants expected to store all the data in order to participate with the CAD Trust?

A: Chia's blockchain was designed to be simple, extremely resource-efficient and functional. Chia's unique Data Layer is a decentralized database that is calculable on-chain and secured by Chia's entire network. The CAD Trust Data Model is limited to critical fields to ensure fast and ultra-low-cost datasync on blockchain. Although uniquely "calculable on-chain" the blockchain only stores proofs (hashes) of the transactional data, so each node is not required to store every other node's data, but rather proofs that the other nodes' data are all provable, calculable, and correct.

Technical FAQ



Q: What are transaction fee projections? How are the projections calculated?

A: Settling transactions on the blockchain can incur a fee when block-space is limited. This fee to secure block-space accrues to validators (nodes), not to Chia. Today blocks are below capacity, so no fees are charged and there is enough excess capacity that the Chia Network does not expect fees of even 1 US cent to be required for a long time to come. Although the Chia Network cannot control when small fees could be required, Chia has been developed to easily add layer 2 functionality that would exponentially increase Chia's data capacity while still executing all smart contracts.

Q: How is Chia addressing the complications other blockchains are having in terms of regulatory problems?

A: In order to deliver on the promise of the next-generation blockchain technology, we believe that we must be regulatory compliant globally. We let our securities be securities and our commodities be commodities, with the view that both the SEC and the CFTC have a place in regulating our activities. We intend to become a public reporting company.



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