



PACT
PARTNERSHIP FOR
CARBON TRANSPARENCY

Identity Management

Facilitating identity integrity and seamless
connectivity across the PACT Network



Powered by



Collaborators

PACT would like to thank the following companies and organizations that have supported and contributed to the development of the vision for Identity Management on the PACT Network.

We always welcome new collaborators – [reach out if interested!](#)



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Introduction

Since its formation in 2020, PACT continues to see significant traction globally – an indication not only of the need for unambiguous, interoperable product carbon footprint (PCF) standards but also of the increasing pressures companies face to accurately report and manage their greenhouse gas (GHG) emissions. The PACT Network is transitioning from vision to reality, as an open and global network of interoperable solutions for the secure peer-to-peer exchange of accurate, primary, and verified product emissions data – across all industries and value chains.

To enable the PACT Network to scale, Identity Management was envisioned from the beginning as a fundamental capability. With Identity Management, organizations globally may register to the PACT Network, enabling them to identify each other securely and efficiently connect their respective software solutions.

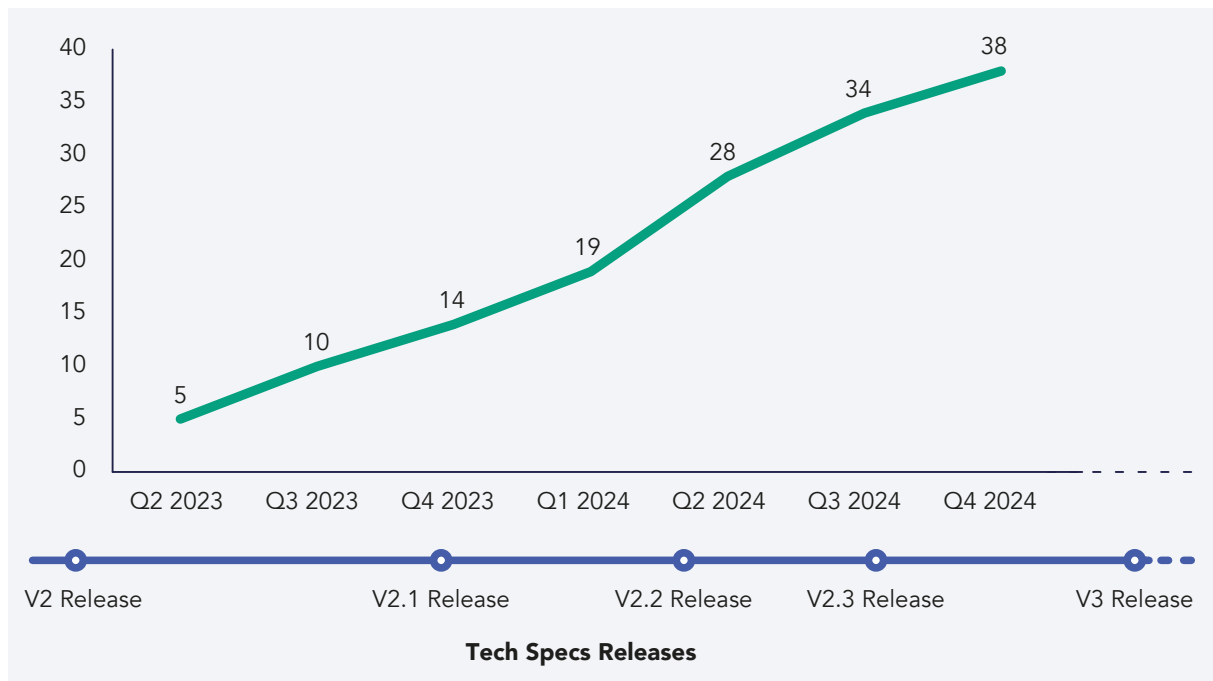
We invite the global PACT ecosystem to engage in this project. An MVP of the Identity Management service is already available for testing, learn more [here](#).

This Vision Paper presents the community’s vision for Identity Management on the PACT Network, building upon the vision established in the [PACT Network Vision Paper](#). Note that this vision paper focuses on *organization-level identities*, such as businesses, not-for-profit organizations, corporations, etc.

PACT Network adoption on a global scale

Following initial piloting of Version 1 of the [PACT Methodology](#) (formerly Pathfinder Framework) and [PACT Technical Specifications](#), Version 2 of both were released in early 2023. Although it is difficult to know the extent of adoption globally as the standards are public and open-source, PACT has observed significant growth among the PACT community. In just the past two years, we have seen a 177% increase in participating companies in the PACT Implementation Program¹, scaling to 2,500 companies in 2024 with 4,500 PCFs exchanged, a 805% increase from 2023. This momentum is also seen from a technical perspective; in less than two years, [38 companies globally](#) have implemented the PACT Technical Specifications into their solutions, achieving PACT Conformance.

Figure 1: Growth of PACT Conformant Solutions through time



1. A program PACT runs supporting organizations globally to engage their suppliers to calculate and exchange standardized PCFs.

Our Vision

Our vision for Identity Management builds upon the PACT Network Vision:

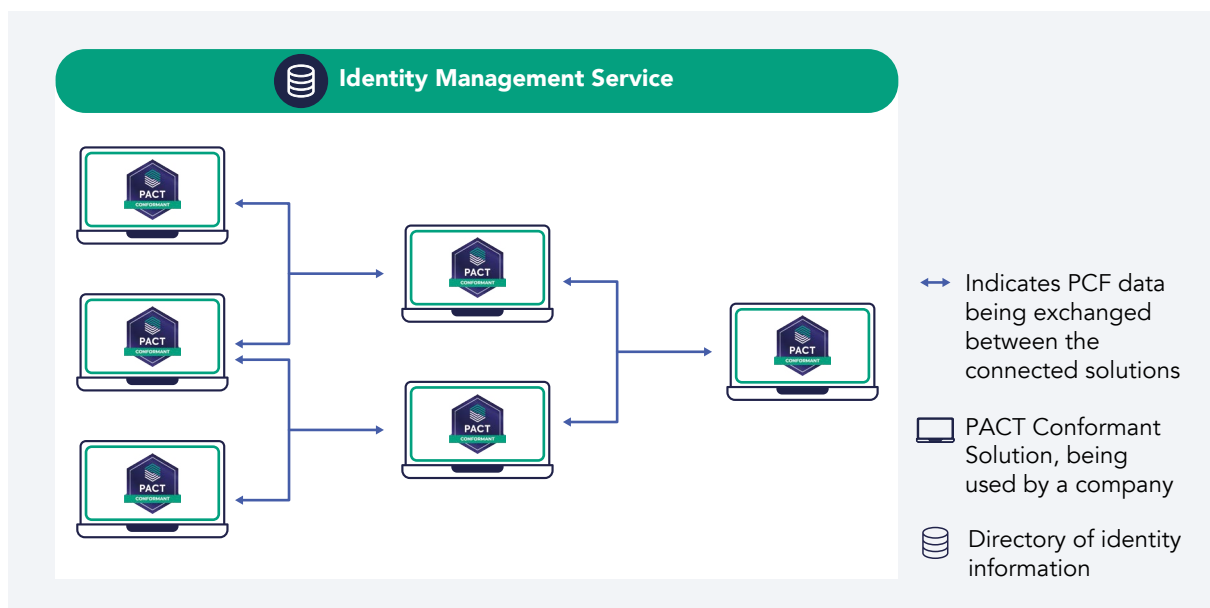
PACT Network Vision

An open and global network of interoperable solutions for the secure peer-to-peer exchange of accurate, primary and verified product emissions data - across all industries and value chains.

Identity Management Vision

An easy-to-use service to register to the PACT Network, enabling organizations to securely and efficiently identify and connect to each other's solutions.

Figure 2: Illustration of the PACT Network and Identity Management Service



The Benefits of Identity Management

Identity Management brings the following benefits to users of the PACT Network:

1. **Identity Integrity, Verification, and Trust:** Identity Management ensures a highly integrous network where identities can be trusted, where information exchanged is secure, and identity inaccuracy (either intentional or malicious) is proactively identified and addressed.
2. **Identity Discoverability:** A common global directory of identities enables organizations using the Network to discover others on the Network.
3. **Scalable Solution Authentication:** A common Identity Management service significantly streamlines the authentication process between solutions, reducing the burden of credential maintenance and increasing the security and standardization of each network connection.
4. **Critical to enable Value Added Services:** Robust organization identity on the Network is critical to enable a suite of additional "value added services", which PACT plans to develop as the Network matures.

Identity Management relevant to a wide range of user groups

Identity Management enables companies to connect to their suppliers, enabling seamless exchange of PCF data. Thus, two core user groups most immediately benefit from the service:

1. **Companies:** Any company globally exchanging PCF data with their business partners (suppliers and customers).
2. **Solution Providers:** Any organization building a PACT Conformant Solution², supporting companies and their suppliers to calculate and exchange PCF data.

Additional user groups are envisioned to likewise benefit from Identity Management as use cases evolve, such as auditors, third party certifying bodies, regulators, banks and financial institutions, and more.

Identity Management will continuously evolve through global collaboration

PACT convenes organizations globally to collaborate on a standardized approach for calculating and exchanging PCF data, learn more about the organizations we are collaborating with on the [PACT website](#).

We also recognize the evolving nature of the global regulatory environment and technical trends. Regulations like the [Digital Product Passport](#) and [Carbon Border Adjustment Mechanism](#) in the EU are two of a growing number of regulations globally relevant to PCF calculation and exchange. Further, tech trends in security and identity management will continue to inform our vision. For example, we foresee technologies such as [Decentralized Identifiers \(DIDs\)](#), [Verifiable Credentials \(VCs\)](#), and [International Data Spaces](#) as potentially relevant.



2. Any software solution that implements the PACT Technical Specifications and completes the PACT Conformance Testing Process, validating that the solution can exchange PCF data in an interoperable way with other solutions on the PACT Network. Learn more at www.carbon-transparency.org/guides/guide-join-pact-network.

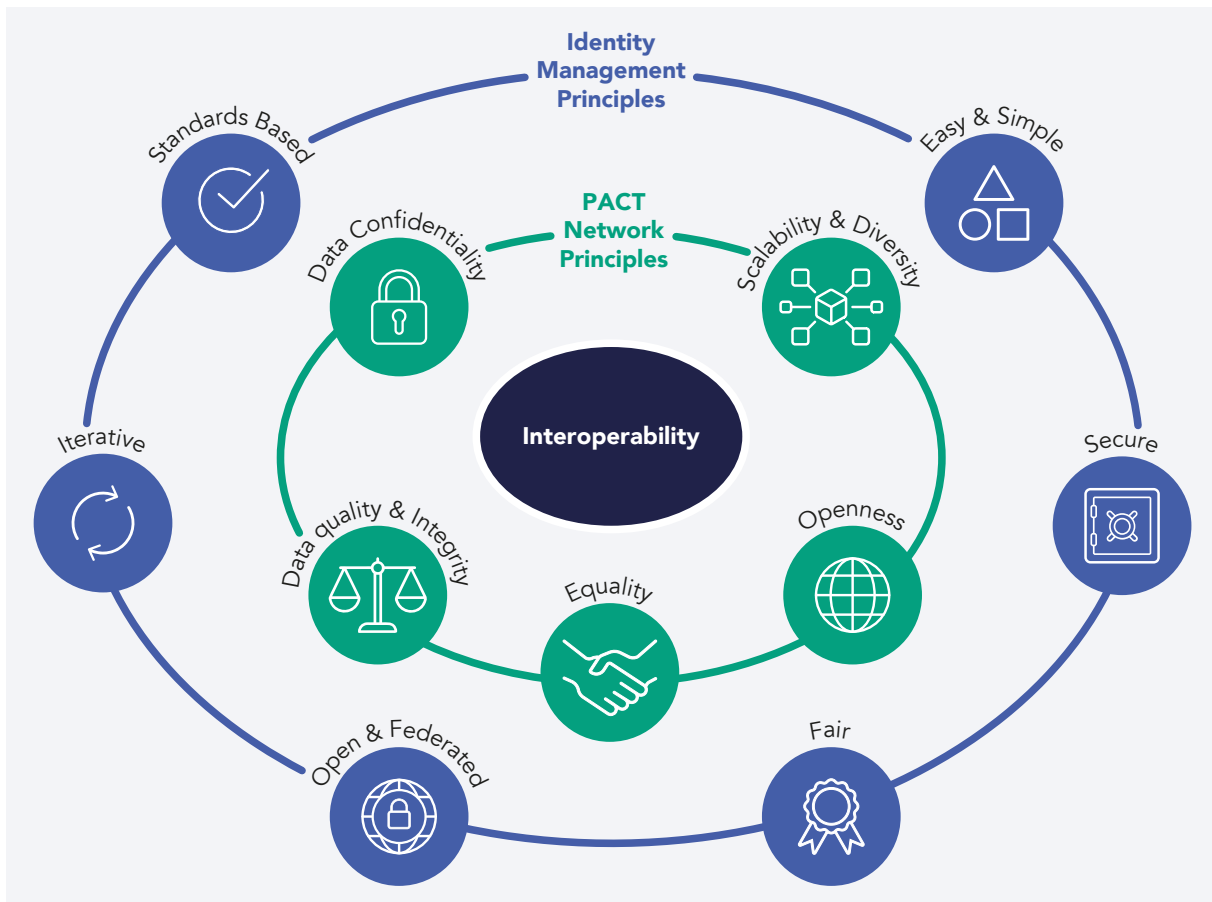
Making the Vision a Reality

United by a common vision for Identity Management on the PACT Network, PACT is now working to build an Identity Management service.

Design Principles

The design of and control over identities is one of the most important control levers for any network, thus the PACT community has identified the following principles in addition to the existing PACT Network principles to guide this work. All principles derive from the fundamental principle of interoperability.

Figure 3: PACT Identity Management and PACT Network design principles



Easy & Simple

PACT Identity Management must be easy to join and use, for companies of all sizes, anywhere – especially important for SMEs globally. Barriers to entry will be systematically identified and removed. The service will be operated at-cost, preventing financial barriers of adoption.

Secure

Sustainability data, and especially Product Carbon Footprint data, is sensitive commercial information; the Identity Management service will help ensure secure connections between solutions. The principle of ease and simplicity must be considered along with security; security features must be seamless and as frictionless as possible.

Standards Based

The Identity Management service will leverage existing standards and approaches whenever possible, thus avoiding “reinventing the wheel”; for example, we will use existing standardized authentication protocols (e.g. OAuth2) and standardized widely adopted identifiers (e.g. LEI, DUNS, GLN, etc.).

Fair

Fairness must persist: every digital identity must have the same opportunities, rights, and obligations on the Network as all other identities. Identities will be portable and interoperable, preventing vendor-lock-in.

Open and Federated

PACT aspires to establish an open and federated network.³ Establishing trusted links between different business networks with their own identity providers, PACT Identity Management will facilitate interoperability without requiring duplicative registration processes. PACT Identity Management is an open-source project; contributions are welcome from the global PACT community, and PACT commits to releasing all source code under an open-source license.

Iterative

We will resist getting lost in complexity and avoid seeking a “perfect solution”; rather we will prioritize a solution that can be built and tested quickly, and evolve as the community evolves. This said, we will strive to maintain backwards compatibility of iterations to the extent feasible, helping to ensure compatibility between releases and therefore lowering barriers of adoption.

3. Federated identity management enables users of one network/environment the ability to access the services of another network/environment, without requiring the user to register within the user directories of both. Federated networks require a high degree of trust between networks, to ensure the integrity of shared identities.

Core Functionalities

The core capabilities of the Identity Management service of the PACT Network will enable three main functions:

- **Network Registration**
- **Network Discovery**
- **Connection (i.e. Authentication as a Service)**



Network Registration

Ability to Register: Organizations must register to the directory by providing basic identity information using their existing business identifiers (DUNS, LEI, GLN, etc.); PACT will not issue organization identifiers. The directory may also include employee identity information, such as personal contact information (email addresses), to facilitate connections between organizations. Registration options will be designed for ease of use and quick onboarding, potentially via an online portal, email-based registration, API-enabled bulk registration, and/or registration via partner identity providers. Companies may have different IDs for various purposes, such as international use or domestic use, and these various IDs will be accommodated.

Identity Verification / Identity Integrity Management: Functionality will ensure the integrity of identities registered always remains accurate and trustworthy. Processes to conduct identity verification and “Know your Customer” flows will be implemented. Duplicate records will be avoided and detected and removed if present (due to M&A activity, etc.). Identity Verification will be automated and seamless, through integration with entity registries like GLEIF API and/or collaboration with existing local identity providers—whether operated by the government or trusted industry associations.

Network Directory: PACT will maintain a Directory, consisting of registrants and their technical identities on the PACT Network. Given the global reach of the PACT Network, we envision the Network Directory to function as a global federated directory, with each sub-network maintaining their own directory, and leveraging a standardized schema for cross network search.

Opt-in to data sharing terms and conditions:

During the registration process, organizations may agree to network-wide terms and conditions for data exchange, including terms related to PCF data itself. This agreement will foster trust relationships, minimizing the need for bespoke legal agreements in the future.

Federation with other networks: PACT Identity Management can also establish trusted links to other networks (with their own Identity Management). Organizations will thus only need to register once to a federated Network, thereby streamlining the onboarding process.



Network Discovery

Directory Search: Once registered, organizations may search for and locate information in the Directory using a variety of parameters (company name, company identifier, location, etc.). Search will be enabled via UI, API, and across federated networks; ultimately we envision directory search to be API driven and thus this functionality may be embedded within PACT Conformant Solutions.

Adoption Analytics and Visualization: Dashboards will display the adoption metrics of organizations to the PACT Network, allowing the PACT community to assess engagement across various factors, including geography, organization size, and industry. These analytics will be openly and publicly available, promoting transparency of adoption of the Network.



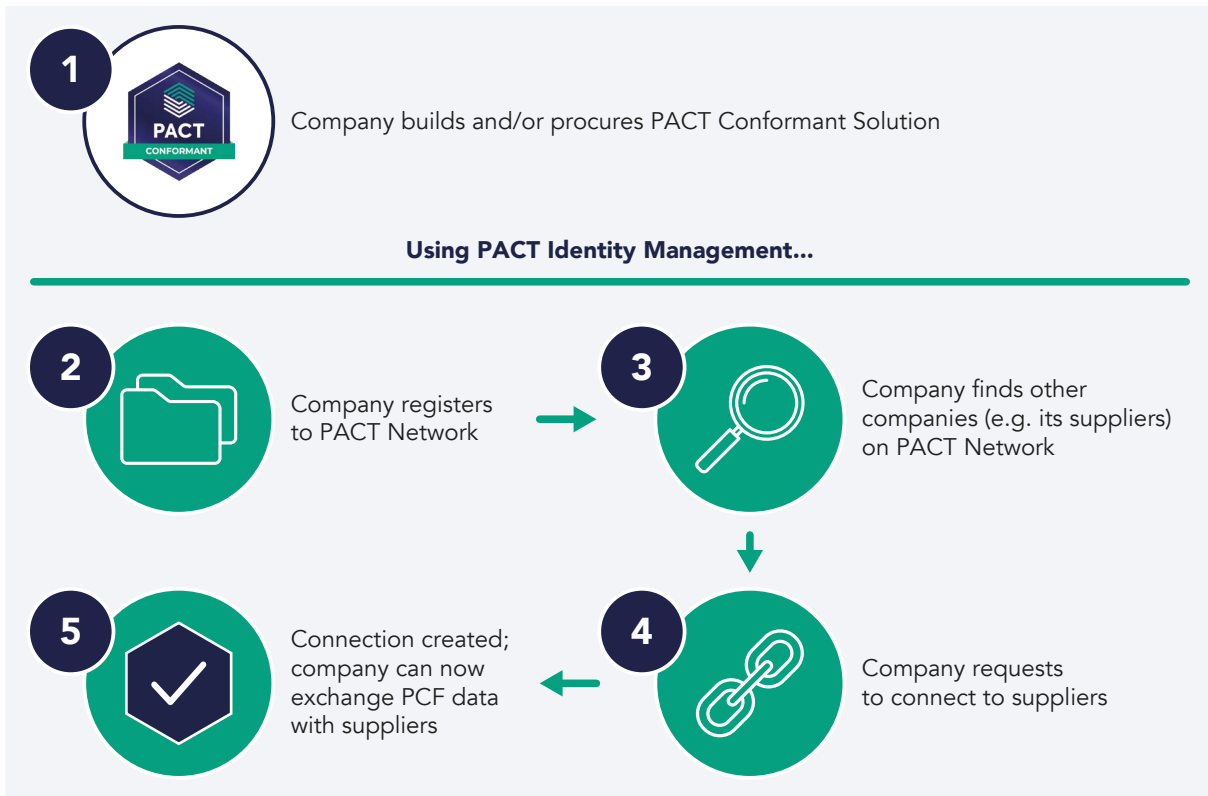
Connection and Authentication as a Service

Access Controls: Identity Management provides access controls at the organization level, specifically which organizations may access a particular organization’s PACT Conformant Solution. PACT Conformant Solutions themselves however implement fine-grained user access controls, including management over which organizations and/or users have access to which PCF data; PACT Identity Management will not duplicate this level of access control.

Authentication Service: This service enables the seamless management of identity information between organizations, establishing authenticated connections among their PACT Conformant Solutions. It serves as an optional service for PACT Conformant Solutions to facilitate authentication with each other. The PACT Technical Specifications already suggest an access token authentication mechanism for API requests. This token will be provided (should the organization so choose) by the Authentication Service which will hold the necessary information about organizations and their connections.

Standards Based and Optional: The authentication service will adhere to the PACT Technical Specifications authentication standard (OAuth2) and remain optional for organizations to use. Organizations will always be able to establish peer-to-peer authenticated connections between systems independent of the PACT Identity Management service.

Figure 4: Core functionalities and benefits of PACT Identity Management



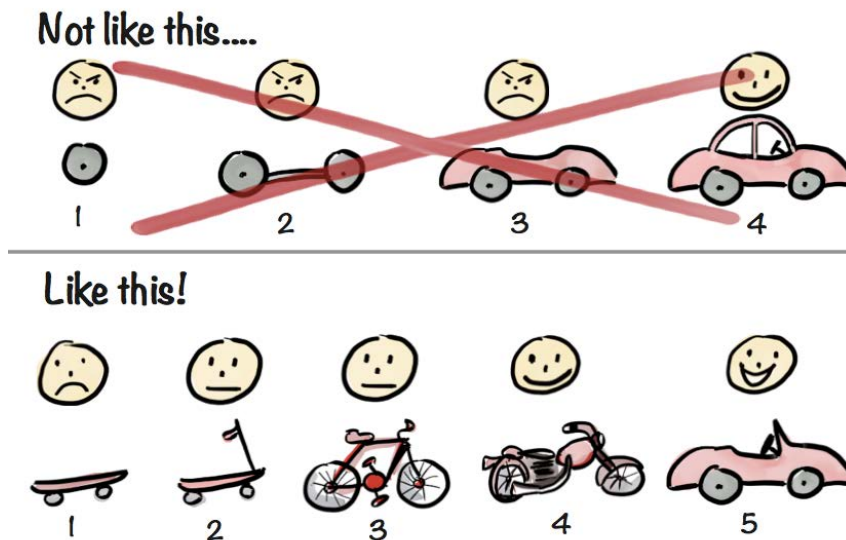
The functionalities listed above capture our current vision of the service, however as organizations test and use the service we envision the functionalities to evolve

Development Approach

The community has chosen a highly iterative “test and learn” approach to building Identity Management. While we believe this service will bring value to organizations in the PACT Network, we prioritize validating this hypothesis by creating a simple, functional Minimum Viable Product (MVP) initially. This MVP has been designed to be tested by both technical and non-technical audiences, as it is built with a graphical User Interface as well as back-end Authentication as a Service functionality. To further reduce barriers, MVP testing is conducted in a non-production environment, and any organization globally is invited to participate at no cost.

In summary, we take an approach to building the service that is highly iterative; rather than building individual components of the end-product (top row in the diagram below), we will build usable products of increasing functionality and complexity.

Figure 5: PACT approach to product development



Source: <https://blog.crisp.se/author/henrikkniberg>

Test PACT Identity Management MVP

As of January 2025, we invite any organization globally to participate in the testing of PACT Identity Management. Organizations with a PACT Conformant Solution are best positioned to participate in testing, although anyone is invited to engage in testing if interested.

[Found out more here.](#)

PACT’s Role as a Service Operator

A core decision shaping our vision for Identity Management involves PACT’s role in providing services for the PACT Network. Until now, PACT has primarily acted as a specifier, convening stakeholders to facilitate consensus-driven processes for drafting standards. However, we recognize that this role of standards convener is not sufficient to accelerate the adoption of these standards and promote the widespread calculation and exchange of PCF data. Therefore, with Identity Management we envision evolving our role into that of an operator of services on the PACT Network, including an Identity Management Service and beyond.

In summary, PACT makes the following commitments:

PACT will	PACT will not
<ul style="list-style-type: none"> ✓ Operate as a not-for-profit ✓ Convene community to maintain, evolve, and publish publicly accessible Tech Specs ✓ Run conformance processes to validate solution interoperability ✓ Develop network services as a digital public good, releasing the code open source ✓ Setup Governance to guide decisions re Network services operating model ✓ Potentially charge Network service usage fees to cover costs of operating the service ✓ Ensure security and availability commitments per an SLA (Service Level Agreement) for paying users ✓ Hire in-house software developers and/or outsource to development agencies to build services 	<ul style="list-style-type: none"> ✗ Compete with commercial offerings and/or detract from value proposition of Solution Providers ✗ Create proprietary code and/or services ✗ Prevent other organizations from offering services on PACT Network (i.e. via federated model) ✗ “Gate-keep” identities and/or use costs to unfairly prevent any organization from participating in the Network

Funding Model

Running an Identity Management service will involve basic costs that PACT must cover to ensure a reliable offering to the community. As a not-for-profit dedicated to enhancing value chain transparency, PACT is committed to providing an Identity Management service in a way that minimizes costs for adopters. The most appropriate funding model will be chosen according to PACT principles and market needs. Options being considered include charging users of the service directly (freemium, co-investment, SaaS pricing based on organization size, etc.). PACT is sincerely grateful for our partnership with the Patrick J. McGovern Foundation, which has enabled our investment in an Identity Management service for the PACT Network.

Governance

Since inception, PACT has recognized the criticality of a robust, independent, and highly effective governance model to support and defend the integrity of decisions impacting the PACT community. To ensure robust Governance of PACT Identity Management, we list below aspects of PACT Governance that are currently or will be put in place:

- **Transparency:** Any individual or organization is invited to contribute feedback, ideas, and/or code, following the PACT Network Contribution Policy. Feedback and discussions should be made directly via GitHub, and thus made public.
- **Consensus-oriented:** Decisions are made through consensus-based processes. A working group composed of PACT Members has been convened to design, test, and evolve Identity Management and PACT Network services.
- **Independent oversight:** New governance bodies (beyond the established working groups) will be introduced for both technical and business decisions related to PACT Identity Management, such as an Independent Standard Board and a Steering Committee.
- **Inclusivity and Diversity:** PACT membership will be opened to any organization publicly, not only WBCSD members. This will lower the cost of participation and drive greater diversity of perspectives contributing to the project.
- **Efficiency and Effectiveness:** PACT Governance will ensure effective and efficient decision making, removing barriers and accelerating time to market; highly integrous escalation paths will be established to prevent progress from stalling.
- **Accountability:** Organizations participating in the project or using Identity Management will be required to agree to Terms of Reference and/or Terms of Use.



Frequently Asked Questions

We collect here a set of FAQs the community has raised and debated, with each question and discussion we sharpen our collective vision. We will continue to maintain this FAQ on [GitHub](#) as the project evolves.

What identities does Identity Management manage?

A range of identities are relevant within the PACT Network, ranging from organization identities, product identities, solution identities, and even personal identities. PACT Identity Management service will manage *organization identities* and the *technical identities* of their corresponding PACT Conformant Solution. In parallel to our work on Identity Management, the PACT community is currently working to address challenges with interoperability and standardization of product-level identities (outside the scope of this vision paper).

Will PACT issue organization identifiers?

No. PACT will enable organizations to leverage their existing standardized organization identifiers (such as LEI by GLEIF, DUNS by Dun & Bradstreet, GLN by GS1, etc.). PACT may maintain a set of accredited providers using a federated model to ensure organization identifiers can be trusted and interoperable. PACT is establishing partnerships with the relevant organizations accordingly.

How will different organizational “hierarchy” levels be accommodated?

PCFs are often calculated by one business “entity” (business unit, legal entity, parent entity, geographic entity) yet sold by a different business “entity”. The relationship between these entities will be critical to know, maintain accurately, and trust to ensure seamless PCF exchange on the PACT Network. PACT Identity Management service will leverage identity-provider organizations like GLEIF, DUNS, GS1, etc., responsible for maintaining such hierarchical relationships, to ensure the latest and most accurate information is available.

Will organizations on the PACT Network be required to use PACT Identity Management Service?

No, use of PACT Identity Management Service will not be mandated, and further we expect some organizations will choose to implement their own Identity Provider. The choice to use PACT’s service will be based on cost of implementation, security tradeoffs, and ease of use.

What technologies does PACT leverage and reuse for building Identity Management?

Following the design principles, PACT is building an Identity Management service that is standards based, avoids reinventing the wheel, and leverages existing solutions whenever possible. For the MVP, we are building an Identity Provider, based on OAuth standard libraries and not leveraging a SaaS Identity Provider. The MVP is intended only as a functional MVP for testing purposes. For the post-MVP and production solution, we will explore SaaS / Open-source Identity Providers (like Keycloak). For details see the [technical design](#).

How does PACT Identity Management conduct KYC (Know Your Customer) processes?

Ensuring the integrity of identities on the PACT Network is critical to achieve our vision. Organization identities will always be verified, yet processes will be established in a way that does not pose unnecessary cost and/or burden. PACT envisions leveraging existing KYC processes companies must complete before

receiving an organization identifier; PACT does not envision conducting rigorous Know Your Customer processes ourselves.

How does PACT's approach to Identity Management ensure Network security?

Solutions on the PACT Network must pass conformance testing, to ensure they conform to the same [authentication flow](#) using OAuth and/or OpenID. Further, PACT Identity Management's Authentication as a Service enables solutions to exchange security credentials (**client_secret**, **client_id**) directly and securely. We recognize the importance of building a service that is highly robust, resilient to malicious intent, and compliant with the latest security standards. This said, we take a highly iterative approach to developing PACT Identity Management, ensuring that as community needs evolve, so too will the layers of security implemented.

Will PACT Identity Management federate to other networks?

Yes, inherent in our vision is federation. As PCF exchange networks mature globally, PACT will work with relevant organizations to enable a "network of networks" approach and drive interoperability globally for emissions exchange. In practice, with a federated model users will only register to one Network, yet may benefit from seamless connectivity to all other networks also federated to PACT. Each sub-network in turn has the flexibility to define

within-network identity requirements, provided such requirements remain compatible with cross-network interoperability. This approach promotes the principle of openness, and reduces risk of a vendor lock-in by facilitating connectivity among networks rather than mandating participation to a specific platform or network.

Who will operate the PACT Identity Management service?

Initially, PACT will build, run, and operate the Identity Management service. PACT is a project hosted by WBCSD, and through its role as a convener of organizations most closely working to evolve and implement the PACT Standards, PACT is best placed to build and evolve the service initially. The operating model of PACT Identity Management service will evolve as the community evolves, and alternatives to PACT running the service will be explored over time. In parallel, PACT is putting in place robust, transparent, and fair governance processes and bodies, which will govern decisions related to the operating model of PACT Network services.

How to get involved

The success of an Identity Management service for the PACT Network depends on the engagement of the entire PACT community. As an open-source project, we invite any organization or individual to get involved. Learn more at www.carbon-transparency.org or reach out to pact@wbcscd.org.

Glossary

Term	Definition
(Technical) Interoperability	We imply technical interoperability throughout this paper; the ability of different solutions to work together seamlessly by exchanging and using information effectively.
PACT Network	An open and global network of interoperable solutions for the secure peer-to-peer exchange of accurate, primary, and verified product emissions data – across all industries and value chains. Learn more here .
(Network) Service	A function or resource provided by a network (in this case the PACT Network), that enables solutions to more easily interact and perform tasks, such as PCF exchange.
Identity	A unique set of attributes used to authenticate and distinguish an organization on the PACT Network.
Federate	Enables the collaboration or integration of multiple networks, while allowing each network to retain their independent control and governance.
PCF	Product Carbon Footprint, the total greenhouse gas emissions associated with the product throughout its lifecycle.
PACT Technical Specifications	HTTP REST API standard for the exchange of PCF data by interoperable solutions on the PACT Network. Learn more here .
(PACT Conformant) Solution	Any technical solution which has implemented the PACT Technical Specifications and passed conformance testing, a process to validate interoperability with other solutions. Learn more here .

Acknowledgements

The vision for PACT Identity Management was developed by the PACT community. A sub-working group was convened in September 2024, building on previous work on the topic over the past several years. PACT wishes to especially thank the SINE Foundation for their foundational role in the PACT Network and Identity Management vision.

A sincere thank you to all community members who are participating in this work.

About PACT

The Partnership for Carbon Transparency (PACT) promotes decarbonization across value chains by offering a streamlined methodology for calculating and exchanging supplier specific product carbon footprints (PCFs).

Developed in 2020 and hosted by the World Business Council for Sustainable Development (WBCSD), PACT harmonizes the PCF calculation and exchange through a universal methodology, technical specifications for PCF exchange, and a committed global ecosystem.

With participation from more than 150 stakeholders, including businesses, policymakers, and standard setters, PACT collaborates with over 11 industry-specific initiatives. More than 2,500 companies have adopted PACT, striving to accelerate supply chain transparency and foster decarbonization within the private sector, driving sustainable and enduring business practices.

www.carbon-transparency.org | [LinkedIn](#)

About PJMF

The Patrick J. McGovern Foundation (PJMF) is a philanthropic organization dedicated to advancing artificial intelligence and data science solutions to create a thriving, equitable, and sustainable future for all. PJMF works in partnership with public, private, and social institutions to drive progress on our most pressing challenges, including digital health, climate change, broad digital access, and data maturity in the social sector.

www.mcgovern.org

About WBCSD

The World Business Council for Sustainable Development (WBCSD) is a global community of over 225 of the world's leading businesses driving systems transformation for a better world in which 9+ billion people can live well, within planetary boundaries, by mid-century. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality.

We accelerate value chain transformation across key sectors and reshape the financial system to reward sustainable leadership and action through a lower cost of capital. Through the exchange of best practices, improving performance, accessing education, forming partnerships, and shaping the policy agenda, we drive progress in businesses and sharpen the accountability of their performance.

www.wbcSD.org | [LinkedIn](#)

