Can

shared data infrastructure *transform* agroecological supply networks?

Insights & innovations from three years of R&D

Food Data Collaboration

Introduction

The Food Data Collaboration (FDC) is building platform-agnostic data infrastructure to help agroecological businesses share key information like product listings, inventory, orders, and logistics. By making it easier for data to move between businesses and digital systems, we aim to unlock new opportunities for cross-selling, coordination, and collaboration across the good food movement.

Our model is built on a premise that most food, whether retail, wholesale, catering or procurement, is traded with digital systems. These systems are wildly varied - from text messages and spreadsheet systems to online e-commerce stores, sector specific food hub software, catering and procurement platforms, supermarket ERP and point of sale tools.

When products are sold through small businesses, product and inventory data needs to be input into the sales system so that customers can purchase. When a small number of suppliers are involved, this is not a problem. The agroecological sector has found a niche through direct sales and short supply networks, allowing producers to capture more of the sales price. However, this niche has inadvertently locked the sector into small businesses operating in silos. As a result, cost of sales - administrative overheads, logistics costs - are disproportionately higher than food businesses operating at scale. Under these conditions it is difficult to scale the sector to supply a greater proportion of UK food.

The Food Data Collaboration sees an opportunity here. If product, inventory and ordering data can be shared more effectively between direct sales and short supply network digital platforms, then barriers to cross-selling and collaboration will be reduced. Greater visibility can unlock new market opportunities, new insights for strategic infrastructure development, opportunities for joint distribution logistics. The result - more sales volume, reduced costs and increased viability of the sector overall.

Since 2022 we have been building integrations between digital platforms that serve the agroecological sector, funded by National Lottery Community Fund Growing Great Ideas, to test our hypotheses. In this time we built integrations with Open Food Network, Shopify, BigBarn, Ooooby and Ordle by Cambridge Organics. Two of these integrations - Shopify and Open Food Network - were piloted across in real life operations.

The aim of our pilots was simple - to find out if this technology can not only work, but yield tangible benefit to agroecological producers and retailers.

About our data standard

To integrate across software tools the Food Data Collaboration is using the internationally recognised DFC-Standard for Short Food Chains. This open standard for data was conceived in France and is very effectively designed for this sector - encompassing product transformations for traceability, and wide-ranging business models.

The DFC-Standard is now being trialled in Canada, Australia, France and the UK.

Methodology

Our pilot programme was structured around two trials in different regions, each designed to test the feasibility and value of data interoperability in real trading conditions.

Participants

Participating organisations were:

- **Hodmedod's** - wholesaler specialising in beans and pulses trading on Shopify.
- **In My Back Yard**, **Tamar Grow Local**, and **Galloway Food Hub** – regional food hubs coordinating and distributing orders from multiple producers trading on Open Food Network.
- **Good Food Loop** - regional distribution linking food hubs in Devon and Cornwall trading on Open Food Network.
- **Barnbarroch Organic** - beef producer in south west Scotland trading on Shopify.

Pilot Design

Regional Trial A - South West England ran for six weeks and focused on establishing a regional supply chain link where Hodmedod's delivered weekly to In My Back Yard and Tamar Grow Local, coordinated via the Good Food Loop distribution service.

Regional Trial B - Galloway began as a three-month trial but was successful enough to continue indefinitely. It involved a simpler direct supply relationship between Barnbarroch Organic and Galloway Food Hub, with fortnightly deliveries.

Technology and Integrations

Two key integrations were developed for these trials:

- A **Shopify** integration built by **Yalla Tech Co-op**
- An **Open Food Network** integration built by the **global OFN tech team**

These integrations allowed data to securely flow between businesses using different platforms to enable syncing product listings, orders, and inventory data between the Shopify stores and Open Food Network hubs.
See **Appendix 1: Technical Background** for more detail.

Data Collection

To understand the impact and feasibility of the pilots, we gathered both quantitative and qualitative data:

- **Quantitative data** came from number, value and frequency of orders placed using the data infrastructure.
- **Qualitative data** came from interviews with participating businesses post-trial, including practical reflections on onboarding and integration and speculative reflections on value to their business and the movement.

The Food Data Collaboration wishes to thank and acknowledge **Yalla Tech Co-op**, who we've worked closely with over the past three years to develop the Shopify integration. Half of the Yalla Tech Co-op team is based in Palestine and the experience of working with them over this time has been nothing short of impeccable.

At the time of writing the genocide of Palestinian people by the state of Israel is ongoing.

Yalla has an active fundraiser to support their community in Gaza.
https://www.gofundme.com/f/9qf6nz-hope-beyond-borders-yallas-gaza-crisis-fund

Regional Trial A
South West England

Context

The south west of England is home to a high concentration of small farms and a vibrant network of food hubs committed to ecological and social values. We partnered with Tamar Grow Local and In My Back Yard, two hubs connected via the regional distribution initiative, the Good Food Loop. Our aim was to pilot a live integration of ordering systems, enabling Hodmedod's UK-grown pulses and grains to be listed and ordered across platforms with minimal manual intervention.

Implementation

The pilot ran for six weeks in total. As Hodmedod's was not already a supplier for these hubs we had to establish the relationship, which included aligning in values. This was navigated by offering a limited, organic product range during the pilot.

The technical implementation linked the Hodmedod's Shopify storefront with the Open Food Network (OFN) food hubs via our custom Shopify app. The custom app defined the product offer, including prices, and translated retail demand into wholesale - individual units into cases. On the OFN side, the integration read and automatically updated product listings with stock levels, prices, descriptions, and images. Each order cycle, the Open Food Network integration aggregated orders from Tamar and In My Back Yard and confirmed the resulting order in the Hodmedod's Shopify store ready for shipment.

Order cycles ran weekly on both Tamar Grow Local and In My Back Yard, with a weekly joint shipment for Hodmedod's delivered to Shillingford Organics and distributed via the Good Food Loop.

In Numbers

Over six order cycles:

- 133 Hodmededs line items across 82 orders, totalling £350.81.
- A limited selection of 13 organic product lines was listed.
- Average total weekly order value: £59.48.

Linking with the Good Food Loop's existing delivery routes increases distribution logistics efficiency. The total delivery mileage point-to-point of these orders would have been 21,454 miles. Delivering instead just six distinct orders via existing distribution networks was in total 1,926 miles. Of course, Hodmedod's national distribution partners optimise their routes across their customers and deliveries. In the case of non-perishable goods this is efficient, but this kind of aggregation can bring efficiencies in last mile perishable and refrigerated deliveries. Additionally, this model enables customers to place small orders as needed, which is important with low volume cupboard goods like Hodmedod's products.

In Words

Interview feedback highlighted several key themes:

- **Smooth customer experience**: From the customer's perspective, the ordering process was seamless. "Our customers were really pleased to see the range of produce." Other than the extended offer customers experienced no changes to their checkout flow.
- **Clear value proposition**: All participants noted strong potential for reducing the time spent on both the administration and logistics of stocking additional suppliers and fulfilling these orders. It was clear that this technology can help to enable collaboration and cross-selling across the diverse range of businesses in agroecological supply networks.
- **Ensuring high quality tech is critical**: During the pilot a discrepancy bug between Shopify and the Open Food Network required manual intervention. This issue was resolved in the later weeks of the pilot, but demonstrated that it is possible for bugs to negate the time savings of the technology.

Currently we, and our producers, have to manually manage the inventory of the produce we sell on our hub. If we could connect with their existing inventories (on Ooooby, spreadsheets, Shopify, their POS) it would save us all so much admin time. I can really see the potential of this to increase the number of cross-selling collaborations we can support, and to extend our range, which in turn increases our average basket size.

Claire at Tamar Grow Local

This could really help us supply more small box schemes and food hubs. Their orders are small and fiddly and end up being quite costly for us to fulfil. Having an efficient way to aggregate and supply these orders, the cost savings for us would be massive. And the benefit comes with the volume.

Josiah at Hodmedod's

Limitations

To ensure that Hodmedod's deliveries could be made in time the pilots required a more urgent delivery than their standard processes, adding complexity for the small order volumes. As Hodmedod's products are non-perishable, many food hubs find it more efficient to bulk-purchase and store dried goods rather than rely on just-in-time logistics. However, many small box schemes and hubs cannot store produce yet wish to extend their offer with ethical store cupboard goods. For Hodmedod's, being able to efficiently supply small volumes efficiently at scale is an important consideration.

Conclusion

For both the producer and the food hubs, the technology demonstrably resolves a clear pain point - that cross-selling can be disproportionately time/admin intensive, meaning collaborations often cannot last.

Regional Trial B
Galloway

Context

This trial took place in the Galloway region of South West Scotland - a productive region that is actively supporting local producers. The pilot was designed to alleviate a specific administrative burden faced by Barnbarroch Organic. Barnbarroch Organic manages inventory both through its own direct-to-consumer Shopify shop and via the Galloway Food Hub, which operates on the Open Food Network (OFN). Maintaining two stock systems is onerous, particularly for items of limited stock like weighed joints.

Implementation

Onboarding for this trial was straightforward as the producer and hub had an existing relationship. The focus was largely technical. The integration involved installing the FDC Shopify app on Barnbarroch's store and enabling product sharing via the FDC data layer. On the OFN side, the integration pulled in Barnbarroch's product list, automatically placed stock holds as orders were made through the Food Hub, and sent a consolidated order to the Shopify store at the close of each order cycle.

This setup enabled fortnightly wholesale ordering to Barnbarroch through the Food Hub, beginning on 28 October 2024 and is ongoing at the time of writing (data for this report captured up to 20 May 2025).

In Numbers

Over 15 order cycles:

- 520 line items across 338 separate orders, totalling £4,913.05.
- 89 product lines were listed, various beef cuts and weights.
- Average total order value across order cycles: £327.54.

Prior to the integration, Kylie at Barnbarroch would have to manually update the offering on Galloway Food Hub, including prices and availability. Then during the order cycle Kylie would check low stock items and reduce avaiability for any items that had sold on her Shopify store, or vice versa. The integration is estimated to have saved around 2 hours of admin time for Barnbarroch Organic per order cycle - a cumulative saving of approximately 30 hours over the trial period.

In Words

Feedback from both Barnbarroch Organic and Galloway Food Hub was strongly positive, both clearly recognising the value the integration brought to each business.

Interview feedback highlighted several key themes:

- **High potential to unlock cross-selling**: Food hubs and box schemes offer a significantly higher price to farmers than wholesalers do, but tend to require much more manual intervention. By automating this administration, a wider range of cross-selling, including public procurement, holiday providers, and hospitality, becomes possible.
- **Clear value in simplifying operations:** This integration automated a range of previously manual tasks, vastly simplifying the process for Barnbarroch to supply Galloway Food Hub and saving time, money and precious mental energy.
- **Ensuring high quality tech is critical**: Erroneous error notifications and unnecessary bugs caused confusion early in the pilot. Technical glitches in variant mapping and product categories were fixed during the pilot period. Scale requires clear, shared error handling across integrations and strong quality assurance processes.

Limitations

Creating an automated link between Barnbarroch Organic and Galloway Food Hub is a perfect use case for this data infrastructure. The pilot highlighted some critical technical considerations - the need for standarised error messaging between systems and the need for a strong quality assurance process that can identify bugs and errors during development and before they reach production.

Conclusion

Barnbarroch Organic has enthusiastically requested that the integration continue beyond the end of the pilot period and intend to become our first paying user. The system is currently running with no manual intervention.

The integration means we only need to update stock in one place - that's huge. This lets us stay connected to the grassroots Food Hub without the overhead of running two inventories and avoiding double allocation of stock. We reach more customers, make use of special offers and benefit from the features of our preferred ecommerce tool.

Kylie at Barnbarroch Organic

The integration gave us access to new stock when we needed it, and showed the potential to connect with more producers. We have more demand than supply, especially for ethical and local products, and we want to work with more producers like Kylie.

Lesley at Galloway Food Hub

Cross-Pilot Analysis

The two regional trials took place in different operational settings, offering differing lenses on whether Food Data Collaboration technology could genuinely streamline and simplify agroecological food supply.

First and foremost, the pilots demonstrated that this technology works. Inventory listings were successfully shared and real-time orders were placed. Even with these small volumes the potential of the data infrastructure to support logistics coordination and inventory synchronisation is clear.

Despite necessary debugging in the early weeks, participants in both trials reported that the integrations reduced administrative overheads by syncing inventories across systems and automating the flow of orders. For Barnbarroch Organic, Tamar Grow Local, In My Back Yard and Galloway Food Hub the integration significantly alleviated the burden of manual data entry and order processing. Hodmedod's are clear that this technology can simplify the fulfillment of small orders to box schemes and hubs, enabling them to supply more small outlets at scale.

In this way the trial demonstrated that the value of this infrastructure varies across different product types and business types. For a business like Hodmedod's, with non-perishable produce making use of highly optimised national logistics, the value proposition is in simplifying supply to smaller box schemes and distribution networks, enabling them to reach new customers, reduce packaging and support the wider movement. The small and regional distribution food hubs benefited from an extended product range without additional administrative overhead. For perishable produce, like Barnbarroch Organic's products, the benefits of real-time stock synchronisation and admin time-savings were significant.

	South West England	Galloway
Primary Motivation	Enabling cross-hub purchasing of wholesale goods	Simplifying dual inventory management for a single producer
Distributors	Two food hubs (Tamar, In My Back Yard) and a wholesaler (Hodmedod's) via the Good Food Loop	Galloway Food Hub
Producer	Hodmedod's	Barnbarroch Organic
Trading Period	6 weekly order cycles	15 bi-weekly order cycles (ongoing)
Admin Time Saved	Not quantified, but notable reduction in listing & order management for food hubs	Estimated 30 hours saved over 15 cycles
Sales Volume	£350.81 from 82 customer orders	£4,913.05 from 338 customer orders
Product Type	Dry goods	Chilled beef cuts
Logistical Gain	Improved efficiency of delivery via reduced packaging and potential mileage	Operational simplicity via single-inventory management

During these pilots it was immediately obvious that technical reliability is non-negotiable. Even minor bugs or misaligned data can quickly undermine confidence in the system and reintroduce the very administrative burdens the technology is designed to eliminate. Ensuring robustness and clear error handling is therefore essential. Technical learning is explored in much more depth in section 6.

From a non-technical perspective, relational supply networks hold all the complexity of human relationships. While there was strong values alignment between participants, producers and distributors in the agroecological sector often operate with very specific values and standards, particularly around procurement. Scaling any networked solution must account for this diversity, ensuring that people can create relationships, discuss values and place conditions around both inventory and data sharing in ways that all parties can stay true to their values. This human side is fundamental to the success of relational supply networks. Data infrastructure can and should never take the place of real relationships, but should be a tool to streamline the administrative load, with sensitivity and flexibility, once these human relationships have been established.

Overall the pilots validated the potential of this data technology in real-world settings. The integrations provided a seamless customer experience, with no noticeable changes to the systems they were accustomed to using. The farms, producers and food hubs involved all expressed enthusiasm about the broader potential of the technology, highlighting opportunities to extend their product ranges, access new markets, and deepen collaboration across the agroecological sector.

Impact & Value

The Food Data Collaboration pilots in South West England and Galloway provide early but compelling evidence that technical integrations can unlock significant value for agroecological food systems. The trials revealed both tangible operational benefits and deeper systemic potential.

Immediate Operational Impact

Across both pilots, the integration demonstrably:

- **Reduced administrative burden:** In both pilots we witnessed a significant saving of time and effort in the administrative work of managing collaborations in cross-selling. This benefit was realised by the actor that held the responsibility for this labour, which often happens for the less established food system actor with more to gain from the collaboration. This barrier to cross-selling collaboration is often cited by small-mid scale producers that would like to supply their local outlets but for which the small scales often make the administration not worthwhile.

- **Enabled seamless cross-platform trade**: While volumes in this pilot were modest, the potential for seamless cross-platform trade is evident already. For Barnbarroch Organic, having a weekly £300-£500 order with a higher margin than wholesale and no additional administrative effort is significant. It is easy to imagine the network of local food hubs scaling - as in the south west of England, resulting in more food hub and box scheme orders in turn improving the profitability of the farm overall.

- **Improved customer experience**: From the customers' perspective the only change to their regular shopping was that there was a larger range. For food hubs like Tamar Grow Local, Galloway and In My Back Yard, extending the range usually means manual administration and increased risk of errors along with the potential benefit of a higher basket size and attracting new customers. The trial demonstrated that the customer experience can be improved and seamless, yielding the gains without added costs to the food businesses.

- **Cut delivery overheads**: The food hub model is recognised as a potential model for creating new routes to market for local producers and efficient regional distribution logistics. The Good Food Loop in the south west further demonstrates that connecting food hubs can increase the range and viability for local producers that need a wider geographic area to reach a sufficient market. Our technology is designed to allow data to flow in the same patterns as food does in these types of distribution models. The result is reduced adminstration required to connect new producers and share inventory data across distribution networks.

- **User confirmation of value**: In Galloway, Barnbarroch Organic specifically asked to continue using the integration beyond the funded period, citing it was too beneficial to turn off, which we have agreed to. In the south west of England, participants can immediately see the value and are keen to see a wider range of integrations with different sales platforms to reduce their current administrative load and increase their cross-selling potential.

The trials address long-standing and widely acknowledged barriers within the sector - the hidden costs of collaboration, which often make cross-selling unfeasible for small-scale operations. Though modest in numerical terms, the impact can scale exponentially with sector uptake at scale.

Technical Possibilites

The significance of this work cannot be captured through transaction volumes alone. The deeper value lies in the enabling infrastructure and technical possibilites that can be unlocked:

- **Shared maps, directories and discoverability services:** With individual farms, producers, retailers and agroecological food businesses integrating their software tools into the DFC-standard, product, inventory and distribution data can be shared across the authenticated network. This can unlock functionality such as a nationwide agroecological produce map, availability and price insights across the whole network, discoverability to specific sectors like hospitality or procurement, heat maps of produce availability throughout the year. This data will also highlight opportunties for strategic investment, for example in appropriate-scale processing facilities to enable access to local market opportunities.

- **Shared marketplace and cross-selling matching services**: With ordering functionality interoperable between different producers and retailers integrated into the network, agroecological movements can create shared marketplace opportunities. A collective marketplace for membership organisations (ie a place to buy Landworkers' Alliance produce) or the movement as a whole. Food hubs, box schemes, restaurants, retailers and procurement companies can match producers with other distribution mechanisms to extend range, and connect with producers' existing digital systems to extend market opportunities without additional admin.

- **Logistics collaborations:** With visibility over distribution routes of producers, retailers and aggregators integrated to the network, opportunities for distribution logistics collaborations can be made visible. Similarly, opportunities for strategic logistics infrastructure can be analysed and understood with access to appropriate data.

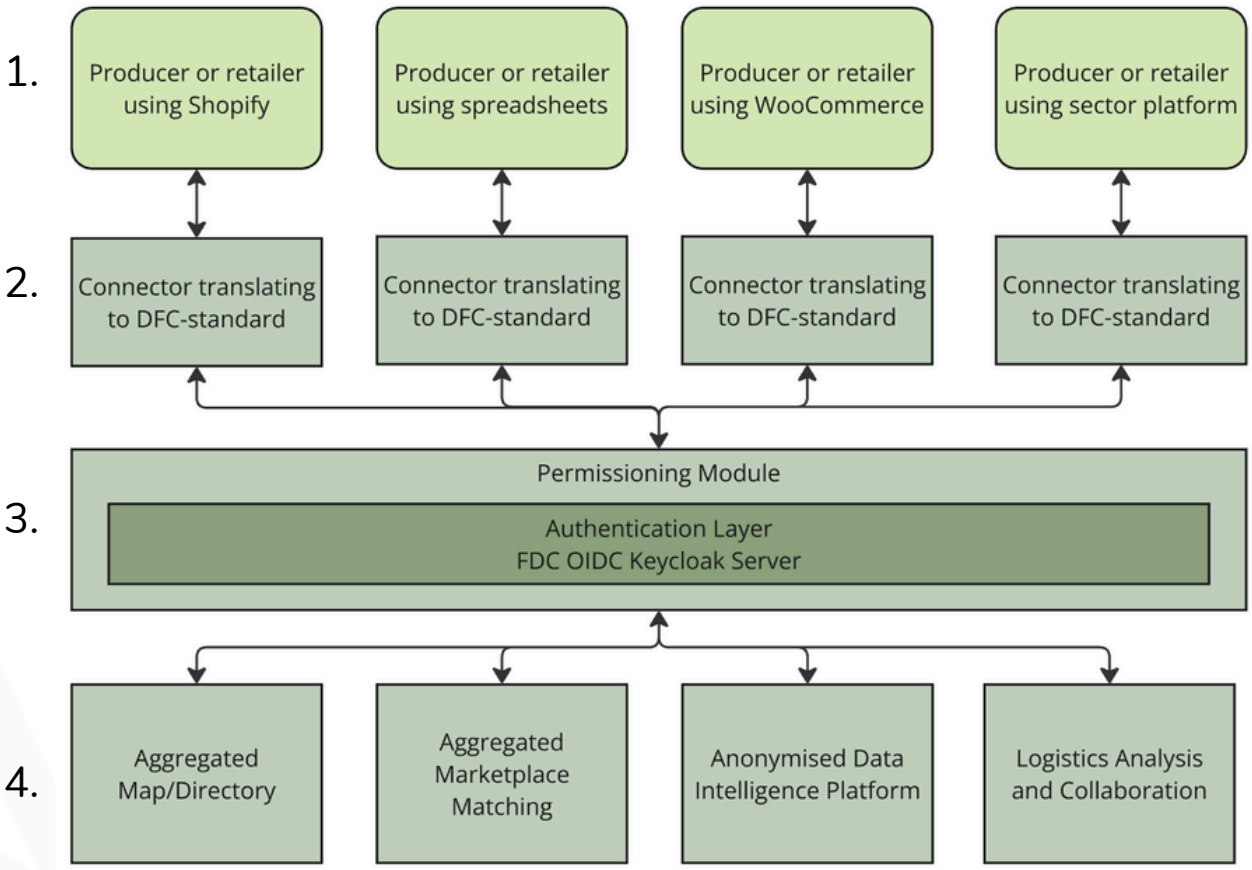

Figure 1 - Managing complex data sharing and permissioning. While the open data standard makes it possible for data to be shared widely, each connected business retains full ownership of their data and control over how their data is shared. Some might wish to share only within a trusted subset of the network - for example a member's map for their membership organisation. Others may wish to share more widely to access new routes to market. These complex data sharing functions are handled by the permissioning module.

1. Individual producers, retailers, wholesalers and aggregators connect via their existing ecommerce tools, spreadsheets, POS. This might happen through a trusted third party, for example via the website of a membership organisation.

2. Translating algorithms (connectors) then convert business, inventory and/or sales data is into the DFC-standard so that it can be easily shared across the network.

3. Data is only shared when permission is granted to do so. Every connected business can grant specific permissions to every other connected business or app, ensuring only trusted partners can access business data.

4. Some of these apps might be new digital tools to support the sector. A membership organisation might use the standard to build a members map. A marketplace matching tool could connect supply and demand. With wide uptake the possibilities are endless.

Movement-wide Value

Unlocking these technical possibilities will require more than just investment in software. It will take straetgic coordination of the agroecological movement. The benefits of this can be far-reaching:

- **Agroecology visible as a movement**: With the agroecological movement working together under a shared data infrastructure, our collective strength can become more visible. As small businesses our visibility and impact is limited. Our combined economic, social and ecological value is difficult to quantify. Thus our voice is marginalised in the context of incumbent and vast business interests. This technology can play a role in creating the conditions in which agroecological supply networks can be understood collectively.

- **Strength in decentralised food networks**: The challenges of running a small business in the agroecological sector create barriers to the scaling out as a whole, with the constant tradeoffs between pleasing customers, maintaining margins and upholding values. Inherited wisdom within current economic paradigms suggests businesses must grow to unlock economies of scale, to reduce costs and ease business pressures. However, agroecology thrives in diversity, with small businesses often better able to innovate according to agroecological values. Scaling out - rather than up - can help to unlock economies of scale but requires streamlined collaboration. Both trials demonstrated that this digital infrastructure can help to knit together disparate actors, allowing busineses in this sector to operate collaboratively when it suits the businesses to do so.

- **Creating economic conditions to scale agroecology**: With an authenticated network of digital infrastructure it is possible to understand the needs of the sector with more granularity, in order to focus support strategically. Creating targeted support is critical to build a food system based on agroecological values. This technology also offers the potential to create sector-specific market conditions, such as collective pricing strategies or progressive fee structures, which can be used to nuture supportive market conditions.

- **Building commons** - Governing the infrastructure and resources using commons governance principles can create the conditions for embedding collective ownership and responsibility. Resulting shared marketplace, shared discoverability and pooled data and logistics networks are tangible resources in which access to the benefits thereof are available to those who agree to collective conditions - for example to uphold agroecological values. The open source digital tools which are built to integrate with the data standard are a type of global commons, as these will have utility in any region in which the DFC-standard is implemented - meaning that investment can have far reaching impact. As with any commons good governance is critical.

- **Strategic role of technology**: Whether intended or not, technology providers end up with a huge amount of control over the structures and business models that can exist and thrive in the sector. This data infrastructure is a much more strategic approach to digital technology. By integrating with a range of platforms, including spreadsheets, this technology serves as a facilitator of grassroots collaboration. Participants were clear that by enabling *existing* digital systems to talk to each other, the tech served them - not the other way round.

Technical Learning

Over the course of our three year research and development period the Food Data Collaboration team undertook extensive development to build out the DFC-Standard ontology into operational business logic. A detailed technical background to this work can be found in Appendix 1. In this section we explore our core learnings through key aspects of the technical side of this work.

Technical Infrastructure

The core technical infrastructure underlying the data standard is:

- **DFC Ontology**: a common semantic structure onto which the data models of other platforms can be mapped. The ontology is extremely flexible, so can accommodate multiple data models from diverse business models including food hubs, CSAs, farmers markets, retail shops, public procurement, catering purchasing, direct sales and buying groups.
- **Connector libraries**: these are code libraries that implement the DFC ontology in specific programming languages so that it can be accessed directly as a data model in the integrating platform.
- **OpenID Connect authorisation layer:** this enables platform integrations to verify the identity of a user using encrypted tokens. OIDC is a highly secure and reputable open standard for secure authentication widely adopted across the internet by both tech giants and the open source community alike.

During the R&D phase, it became evident that the underlying standard was not yet being used in commercial settings in other regions, and that existing management and deployment practices were not adequately developed to support production-level reliability. In practical terms, this meant that breaking changes could be deployed without prior notice - an unacceptable risk for any live operational system. In response, we collaborated with the international community to improve governance and stability. This work led to the agreement of clearer release processes and defined support periods for both the ontology and the associated connectors.

To reduce infrastructure costs during development, we made use of the French OpenID Connect authorisation server. While this allowed for shared resources, it also introduced risk: during one of our pilots the server experienced downtime. The design of our integration proved resilient and once the server was restored all backlogged orders were processed successfully. However, this incident highlighted the presence of a single critical point of failure in the system.
Looking ahead, there are two primary strategies to mitigate this risk at scale:

- **Investing in a high-availability, multi-site clustered Keycloak instance** to provide stronger guarantees of uptime and reliability.
- **Exploring the longer-term potential of distributed identity technologies**, such as verifiable credentials, an emerging W3C standard for decentralised web authentication, which could eliminate reliance on centralised authorisation infrastructure altogether.

Integrating with Platforms

Over the course of our 3 year funded R&D period we partnered with a number of platforms serving the agroecological sector to develop integrations with the common standard. We split the work of integration into three stages:

- Stage 1 **Authentication**: integration with OIDC authorisation layer
- Stage 2 **Product & Inventory**: integration with the product/inventory data models and API endpoints
- Stage 3 **Orders & cross-selling**: integration with data models, API endpoints and business logic to enable cross-platform ordering

Completion of each stage requires completion of the previous stages before work can commence. Various factors influenced which implementation stage was achieved in time for the pilots, including capacity to fit the work into existing roadmaps, ability to contract with external developers and maturity of the platform and delivery processes.

Platform	Delivery Strategy	Integration Stage
Open Food Network	We worked closely with their internal delivery team	3 - Orders & cross-selling
Shopify (Hodmedod's)	Contracted directly with Yalla Tech Coop to build a bespoke app	3 - Orders & cross-selling
BigBarn	We worked with their technical delivery partner	2 - Product & Inventory
Ordle (Cambridge Organics)	We worked with the team delivering their new platform Ordle	2 - Product & Inventory
Ooooby	We worked with their internal delivery team.	1 - Authentication

We used the integrations between Shopify and Open Food Network completed to stage 3 to enable cross-platform ordering as the basis for our pilots, meaning that these integrations underwent the most extensive real-world testing.

Overall, the business logic, sequencing and architecture proved resilient and effective under the pilot conditions, which is a big success. The core challenges we encountered were due to the detailed nuances between how the different platforms and businesses manage specific aspects of business operations.

For example:

- We experienced errors when the manager of one participating business changed. The new associated user account was not authorised by the authentication layer and transactions failed.
- Importing inventory lists into one of the platforms was initially not correctly managed to ensure that products are properly removed from a shop front when removed from the supplier list.
- Display of products and variants was not correctly implemented across platforms at first, resulting in a clunky customer experience on specific products that made heavy use of variants eg weights of beef.
- Product categories were initially not well mapped between platforms.

All of these errors could have been caught and resolved before deployment.

During our integration work we came to understand the level of variance that exists between business processes across the various platforms - particularly in the sequencing of checkout events such as when an order is finalised, when payment is processed, and when stock levels are updated. These variations introduce complexity when synchronising systems across platforms.

A key technical learning from the pilots is the confirmation that the DFC-standard ontology is flexible enough to accommodate the business logic of the diverse platforms tested. This is a significant validation of the robustness and adaptability of the standard. To bridge the discrepancies between platforms, we mapped the specific business processes of each sales platform to the DFC-standard ontology, and then onward to the target platform. This mapping is critical to ensuring consistent behaviour across the network.

Implementing integrations across platforms highlighted that each integration is a bespoke technical undertaking, and each new development will encounter errors, inconsistencies, and overlooked specification requirements. A weak or incomplete integration can introduce persistent bugs and undermine user trust across the system. High-quality integrations are central to the success of the overall network.

Looking ahead, there are three primary strategies to mitigate this risk at scale:

- **Investing in standardised error handling**: Developing a standardised set of error messages to be implemented by all platforms will make debugging and maintenance significantly more efficient.
- **Investing in a standardised unit test suite**: All integrations should be tested against a rigorous, shared unit test suite. Alongside developing good initial integrations, this will help to catch regressions or incompatibilities introduced by future code changes on any integrated platform. We strongly advocate for a test-driven development approach.
- **Creating an extensive API mock testing suite:** During integration development, live testing between platforms often proved cumbersome due to differing time zones, limited developer availability, and mismatched communication tools. Implementing a robust API mock testing suite will allow developers to test integrations independently and in real-time, dramatically improving efficiency and reducing bottlenecks.

Development Processes

In delivering this project, we adopted a distributed development model by partnering with multiple tech houses and running software delivery in parallel. Parallel delivery enabled the rapid development of multiple integrations and allowed us to test different configurations and implementation styles across platforms. The use of a common standard lends itself to micro-service architecture and parallel delivery.

Consistently the development process was hindered by a delivery bottleneck in the internal delivery teams of the participating software platforms. It was much simpler to develop the integration to Shopify, by contracting an independant development team, than it was to Open Food Network, Ooooby or Ordle, for whom this work needed to be prioritised amidst competing priorities. Given that this work was exploratory and unproven, it was understandably more difficult to prioritise, even with monetary resources available to support the work. This resulted in delays and in some cases more limited integrations than originally planned.

Looking ahead, there are three primary strategies to leverage this learning:

1. **Parallel delivery**: We will continue to work with multiple tech partners concurrently, as it accelerates development and builds collective capability across the ecosystem.
2. **Experience first**: For future delivery phases, we plan to augment the core team with two critical roles that will support the work to coordinate with distributed tech teams:
    - Experience Lead: Responsible for ensuring a seamless and high-quality experience across all user journeys - shoppers, retailers, and producers alike.
    - Quality Assurance Lead: Tasked with enforcing rigorous testing standards and overseeing system robustness before production deployment.
3. **Direct developer engagement**: Working directly with developer teams - especially when working with third-party contractors engaged by platform providers - is essential. This allows for clearer communication, faster iteration, and more precise control over delivery timelines.

Effective Investment in Commons

The work undertaken during this phase builds directly upon the foundational efforts of the French team responsible for developing the initial DFC-Standard ontology. Their early vision and groundwork made our contributions possible. We acknowledge this foundational contribution with deep appreciation.

Through this funded period, we were able to significantly advance the standard - shifting it from a conceptual framework to an operational system tested in real-world scenarios. Our efforts focused not only on technical refinement but also on the practical integration of the standard into existing food systems infrastructure. This has greatly enhanced the viability of the standard for broader adoption.

This momentum has been building internationally as well. In Australia, the ontology has been extended to support the creation of shared maps and directories - an essential building block for federated discovery across networks. Meanwhile, colleagues in Canada are building on both our codebase and integration work, as well as the mapping tools from Australia, to serve the needs of the agroecological community in their region. This global uptake is a powerful indicator of both the relevance and adaptability of the standard.

Investing in tools and technologies that adhere to common data standards tailored specifically for agroecological values is proving to be a very effective way to support a global commons of digital tools for agroecology. It allows diverse systems, practices, and communities to retain their distinctiveness while still participating in an interoperable digital ecosystem, balancing unity and diversity.

Strategic Learning

The Food Data Collaboration aspires to be more than a technical integration project - it is an attempt to lay the digital infrastructure that enables a flourishing agroecological economy. As we test and refine the technical tools, we are also gaining clarity on how the infrastructure can be used to further the sector, as well as the strategic conditions required for widespread adoption and long-term sustainability.

Economic Value of Wide Adoption

These trials demonstrated the value of a specific use case of this data infrastructure - to enable cross-selling between platforms. However the potential of this technology is much broader. The same integrations developed and trialled in these pilots can also enable:

- **Greater visibility**: By integrating business information and product information to the standard it becomes possible to gain insights into what produce is available where, when, for how much and how it is distributed across all integrated operations. This can unlock greater visibility of the agroecological sector which may be of interest to:
    - Membership organisations seeking to better understand and network their members
    - Funders and investors looking for strategic opportunities to invest in food production, or in supportive infrastructure such as veg processing, shared logistics, abattoirs.
    - Mid to large scale farmers looking to diversify into agroecological production seeking to understand market gaps and opportunities
    - Mid to large scale buyers seeking to increase purchase of agroecological produce.

- **Revenue opportunities for the sector**: By collecting and collating anonymised data and building data insights tools to make it easier to access and understand, this data can become a saleable product. People who contribute the data should then be able to benefit from the revenue generated, which is something that good governance and data commons stewardship can unlock for the sector.

- **Market access opportunities**: This visibility of what is available where, when and how it can be distributed opens more opportunities for cross-selling and aggregated selling across the network, opening the potential to reach new markets. This may take many forms including:
    - Matching service for producers with surplus to keen buyers, including via aggregation to meet the demands of a wider range of buyers.
    - Cross-selling between food hubs, box schemes and other retail outlets
    - Novel marketing opportunities, for example with social media influences, tapping into existing infrastructure and reaching new markets.

Our vision is that this is a shared infrastructure that unlocks scale in the agroecological sector, by reaching new markets and finding new revenue streams to resource the sector. Achieving this vision requires wide sector uptake.

Achieving Wide Sector Uptake

Achieving wide scale uptake by the agroecological sector is going to be no small feat. The sector is deliberately diverse and values vary widely across this 'movement of movements'. There is no clear way to definitively classify businesses as agroecological or not, though many agree that it is about ongoing action rather than a destination and that the specific certifications and requirements placed on any actor in the system should depend on scale.

Our hypothesis is that data infrastructure purpose-built for the agroecological sector will need to be anchored in the networks stewarding agroecological values. Farmers, producers, distributors and retailers in the sector operate on trust and shared principles, and any intervention - digital or otherwise - must align with this relational fabric. This is a long game, but essential for legitimacy and uptake.

To this end we are scoping potential integration work with membership organisations in the sector, partnering with membership organisations such as the Landworkers' Alliance, Soil Association, Pasture for Life, the Biodynamic Association and Better Food Traders to explore possibilities in connecting their members into a shared data ecosystem. Through these and other membership organisations we aim to reach a substantial base of farmers, producers, and food businesses committed to ecological and social justice, and build trusted pathways for technical adoption.

Achieving Wide Digital Uptake

To date, we have successfully piloted integrations with Open Food Network and Shopify, and partially integrated BigBarn, Ooooby, Ordle and spreadsheet-based operations. Our next planned integration is WooCommerce, which is currently used by about 21% of agroecological SMEs. With these integrations completed and operational we estimate that we will be able to integrate with 72% of businesses in the sector.

Platform	% of Businesses
WooCommerce	21%
Shopify	17%
Spreadsheets/email	16%
Ooooby	11%
Custom/Bespoke	7%
Wix	6%
Open Food Network	6%
Squarespace	6%
Growing Good	3%
Telephone	2%
BigBarn	1%
Other	4%

Achieving Financial Viability

Ensuring financial sustainability is essential to keep this infrastructure in long-term service to agroecological movements. While this section is not a full business plan, it outlines key insights from our pilots that point towards viable business models.

The primary purpose of this technology is to deliver value to the agroecological sector. Revenue and governance models must align with this goal. Through our pilot work and emerging governance processes, we have identified core principles to guide future financial sustainability:

- **Data sovereignty**: Governance must ensure contributors retain control over their data.
- **Revenue for the movement:** Financial returns should flow back to support the agroecological community.
- **Scalable transaction fees**: Fees should be low enough to encourage participation, yet sufficient to support infrastructure at scale.

Potential revenue streams identified include:

- **Integration partnerships**: Collaborations with commercial platforms to enable direct ordering from agroecological suppliers.
- **Transaction fees**: A small fee on automated cross-platform trades enabled by the standard.
- **Bespoke data licensing and services**: Tailored data solutions for stakeholders such as funders, local authorities, or research institutions.
- **Insight platforms**: Tools that generate sector-wide data insights to inform strategic decision-making.

Reaching financial viability will require innovative approaches to both funding and governance. We anticipate using models such as data commons and data trusts, alongside membership-based legal structures like cooperatives, to ensure those contributing data retain ownership and influence.

Achieving scale will also require a blended funding approach, potentially combining grants, social investment and impact loans/investment. While the standard remains open source, there is potential to develop tools to interface with the data standard that are both proprietary and open source. In this way proprietary tools may offer pathways to impact and revenue, particularly for impact investors interested in socially and ecologically aligned data products. Ultimately the data governance will control which tools can and cannot access the data commons, and effective governance will be needed to ensure proprietary tools genuinely serve the agroecological economy.

Conclusions & Next Steps

The Food Data Collaboration pilots have demonstrated that agroecological food businessess can be digitally connected in ways that reduce the administrative friction that so often limits collaboration, while respecting their autonomy and values. Our real-world trials proved the viability and value of cross-platform integrations - not just technically, but strategically as an enabler of more resilient, decentralised food systems.

Key Conclusions

- **Technical feasibility has been validated**. Integrating Shopify and OFN using a shared data layer is achievable in live environments. Real orders moved between systems, stock levels were synced, and errors were rare and largely resolved within the trial period.

- **Value for small businesses is clear**. Across both trials, participants reported tangible benefits: hours of admin time saved, extended range, increased customer reach, higher order accuracy, and new potential for collaboration. The integration enabled each retailer and producer to operate with some increased efficiently — without compromising their values or independence.

- **Wide scale adoption is key**. For this ambitious infrastructure to be realised, it requires adoption by a significant number of actors operating in agroecological supply networks, as well as a high number of digital platforms serving the sector. The right partnerships are critical.

- **Experience comes first**. Scaling to the next stages of this technology will require specific investment in quality assurance and user experience to ensure tools are simple, error free and pleasing to use.

Next Steps

While the most appropriate mid-term approach for the project and infrastructure is still emerging, and will be influenced significantly by the funding landscape, the immediate next steps for the coming 12 months are clear:

1. Conduct a scoping project with membership organisations: It is clear that in order to achieve a wide reach through the membership organisations we need to partner with them and work toward integrating their memberships. At the time of writing the following membership organisations in the agroecological sector have agreed to be involved in scoping this work:

a. Soil Association
b. Landworkers' Alliance
c. Pasture For Life
d. Biodynamic Association
e. Better Food Traders

We would welcome interest from other membership organisations working in the agroecological sector. We also welcome interest from funders that would be willing to support this work.

2. Develop high impact technical integrations: Our research shows that a technical integration with WooCommerce will enable us to connect an additional 21% of agroecological food businesses into the infrastructure, and give a market reach potential of 72%. We welcome interest from funders that would be willing to support platform integrations. We also welcome interest from other digital platforms serving the agroecological sector that would like to discuss integration with the standard.

3. Continue to build relationships: Realising the vision of the Food Data Collaboration will require investment, partnerships, governance development and strong relationships with everyone across the agroecological sector. We're looking forward to continuing to build relationships as we move forward.

Funders

The Food Data Collaboration has been funded over our three year research and development process by The National Lottery Community Fund Growing Great Ideas, beginning 21st March 2022 and ending 20th June 2025. We are enormously grateful for the support of our funders in this early stage.

We also wish to thank our fiscal hosts the Open Food Network UK. This project would not have been possible without their leadership to drive collaboration of digital platforms in the food sector.

Sector collaborators

Technical collaborators

Appendix 1: Technical Background

The technical backbone of the pilots was built on the DFC Open Standard - a common data specification designed specifically for short, relational food supply networks. The DFC Open Standard is comprised of the following technical stack:

- **DFC Ontology**: a common semantic structure onto which the data models of other platforms can be mapped. The ontology is extremely flexible, so can accommodate multiple data models from diverse business models including food hubs, CSAs, farmers markets, retail shops, public procurement, catering purchasing, direct sales and buying groups.

- **Connector libraries**: these are code libraries that implement the DFC ontology in specific programming languages so that it can be accessed directly as a data model.

- **OpenID Connect authorisation layer**: this enables platform integrations to verify the identity of an user using encrypted tokens. OIDC is a highly secure and reputable open standard for secure authentication widely adopted across the internet by tech giants and the open source community alike.

Integrations with sales platforms: individual platforms like Shopify then use the connector libraries and OIDC authorisation layer to expose JSON-LD endpoints exposed in the sales platform that conform to the DFC open standard enabling secure cross-platform communication.

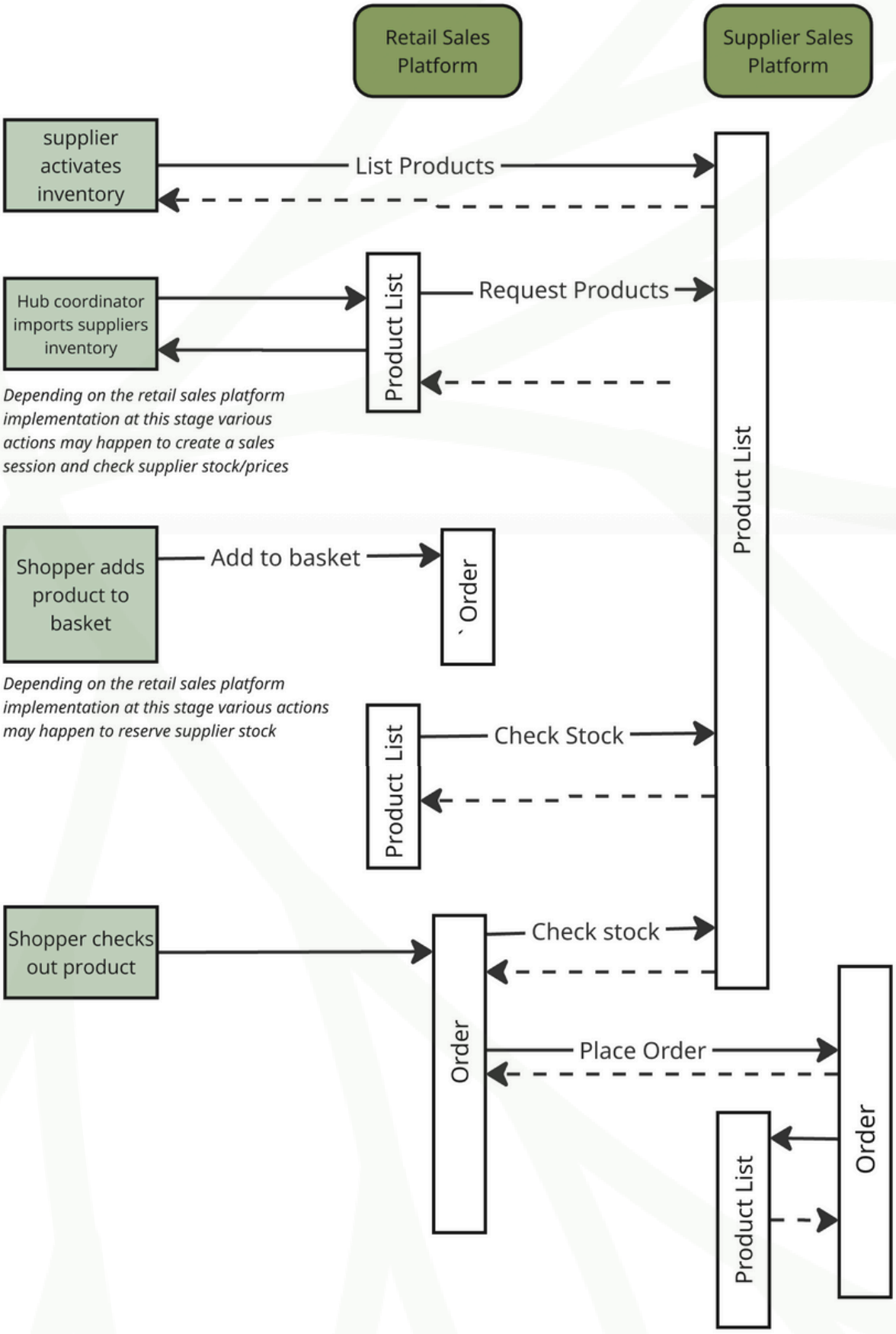

Figure 2 - Sequence diagram of inventory sharing and order placement between platforms

This technical stack enabled a common semantic format for data transmission, onto which we defined the supporting technical and business logic. We defined a common set of API endpoints for platforms to implement. Business logic flows were agreed between platforms to ensure transactional integrity was maintained between systems as inventory and order data flow between systems. This data flow was triggered by webhooks placed within existing customer journeys so that end-users (customers) experienced no change to their existing checkout processes.

To ensure that businesses involved retain full control of their data, additional back office functionality within platforms was built to allow users (food hubs managers and farmers/suppliers) to consent to sharing their data across the network and control what data was shared. By using a distributed web standard, the point of truth for all data remains the original location of the data, and the only data that can be shared across the network is data that the data owner gives permission to be shared. In this way data sovereignty is maintained across the network.

This architecture enables the development of technology in line with our core technical principles of modularity, data sovereignty and interoperability.

Pilot Integrations

Over the course of our 3 year funded R&D period we worked to integrate food system platforms into the DFC-Standard such that we could pilot in real-world use case scenarios. To do this we partnered with:

- Open Food Network
- Hodmedod's (using Shopify)
- BigBarn
- Ooooby
- Cambridge Organics (previously using Boxmaster, now developing their platform Ordle)

These partner organisations were chosen based on a combination of factors - relevance to the agroecology digital sector (at the time of receiving funding), scope of the use case enabled by their participation and the requirements of our funders. These integrations were completed in stages:

- Stage 1 **Authentication**: integration with OIDC authorisation layer
- Stage 2 **Product & Inventory:** integration with the product/inventory data models and API endpoints
- Stage 3 **Orders & cross-selling:** integration with data models, API endpoints and business logic to enable cross-platform ordering

Our original goal was to integrate all platforms to stage 2, however it soon became clear that each platform differed vastly in their capacity to fit this work into their delivery roadmaps. Early in the funded period we changed strategy and instead invested in delivering integrations to stage 3 with some platforms, allowing us to pilot much deeper and more exciting real-world scenarios.

- Open Food Network - completed to stage 3
- Shopify - completed to stage 3
- BigBarn - completed to stage 2
- Ordle - completed to stage 2
- Ooooby - completed to stage 1

We used the integrations between Shopify and Open Food Network completed to stage 3 to enable cross-platform ordering as the basis for our pilots.

Food Data Collaboration (2025)

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Food Data Collaboration