

Fr8 Network Whitepaper

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1 December 2018
v0.3.1

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1 Introduction

The global supply chain consists of a complex network of stakeholders across industries, geographies and functions. Logistics is an intricate and crucial component of supply chains referring to the management and coordination of the flow of goods from the point of origin to destination.

Friction and inefficiencies in the highly fragmented global freight market result in significant revenue loss, opportunity costs and increased expenses for all participants.

At present, this network suffers from inefficient coordination, pricing, and incentivization resulting in higher costs, slower deliveries, and frequent errors. These problems are exacerbated as a result of a poorly structured data architecture that has evolved reactively alongside the growth of the industry and advances in technology. These inefficiencies also stem from outmoded processes, redundant paperwork and manual transactions resulting in human error, costing organizations billions of dollars each year due to failed deliveries, fraud and damaged goods.

The Fr8 Protocol and initial applications highlighted in this whitepaper aim to modernize logistics with a vastly improved solution for the industry as a whole, leveraging blockchain technology at its core. This set of standards, suite of software tools, and precisely targeted incentivization structure will provide benefit to actors throughout the supply chain.

2 The State of The Global Supply Chain Ecosystem

Every year, millions of competing entities across the supply chain rely on an intricate fleet of trucks, ships, planes and trains to transport approximately 92 billion tons of physical goods. By 2023, the global logistics industry will be valued at \$15.5 trillion¹.

Global logistics affects every person on the planet. Yet, it relies heavily on manual, inefficient processes vulnerable to human error and fraud. These inefficiencies cost organizations hundreds of millions of dollars each year due to failed deliveries and damaged goods. When breakdowns in the system result in a failure to deliver items like life-saving medical supplies, the human toll grows even greater.

Frictions also put significant stress on the industry's high-dollar hard assets which includes more than 160 million trucks, 92,000 cargo ships and 700,000 miles of rail-

¹<https://www.transparencymarketresearch.com/logistics-market.html>

way².

In recent years, major technology organization such as SAP, Salesforce, Oracle and others have introduced cloud-based solutions to improve freight and order management, transportation planning and execution, settlement costs, analytics, and reporting.

But none of these addresses the human element in the industry, which is hampered by friction and an overall lack of trust and expediency. Carriers mistrust brokers because they offer no transparency into load data or pricing. Shippers treat carriers as commodities, often working with those offering the lowest prices. Brokers and carriers dispute responsibility of damage claims. All the while, profit margins dwindle³, operating costs rise, and the supply of drivers declines⁴.

With such a fragmented and distributed market, solutions must be cost effective and powerful. They demand great design with ease of use paramount, given the bulk of the logistics industry must transition from manual workloads into digital ones.

3 Key Stakeholders in the Global Logistics Ecosystem

Understanding this friction is easier when one considers the many stakeholders in the supply-chain management ecosystem and the roles they play.

3.1 Carriers

A licensed carrier business, or for-hire carrier, or trucker, provides freight transportation services and owns and operates the transportation equipment. There are 4 million trucks on U.S. highways, owned by about 1 million registered trucking companies, but carriers also include rail, air, and container transportation providers. (The terms ‘carrier’ and ‘trucker’ are used interchangeably in this paper when discussing the U.S. domestic freight industry)⁵.

²<https://data.worldbank.org/indicator/IS.RRS.TOTL.KM?end=2016&start=2016&view=bar>

³<https://www.supplychaindive.com/news/hanjin-timeline-bankruptcy-shipping-effects/430694/>

⁴<https://www.thestreet.com/markets/truck-driver-shortage-may-triple-by-2026-analysts-say-14650452>

⁵https://www.trucking.org/News_and_Information_Reports_Industry_Data.aspx

3.2 Suppliers

Shippers are manufacturers or distributors needing to move goods from Point A to Point B. They are named on most contract documentation as the responsible parties for initiating shipments. (The terms ‘shipper’, ‘supplier’, ‘manufacturer’, and ‘distributor’ are used interchangeably in this paper.) There are over 550,000 manufacturers or distributors operating in the U.S. alone, with 98% of them considered small businesses⁶.

3.3 Intermediaries

Intermediaries refer to any person or organization facilitating the transportation of cargo belonging to others, using for-hire carriers. These include brokers (associated with carrying companies), shipping companies, freight forwarders, and third-party logistics providers (3PL). There are more than 15,000 registered freight brokers in the U.S., with the top firms generating revenues in excess of \$66B⁷.

3.4 Freight Factors

Freight factors purchase a carrier’s receivables at a discount, providing up-front funds to improve the carrier’s cash flow. Factors charge up to 5% of invoice totals for their services. Due to the convenience they offer and the potential for relationship-based credit lines, brokerage factoring is typically costlier for carriers than traditional freight factors.

3.5 Insurers

Insurance is provided at all levels of the shipment process. Carriers are required to hold minimum levels of insurance in the U.S. For example, truckers are required to have a minimum \$100,000 policy covering any goods in transit. Brokers must be bonded to ensure they are held financially liable for the ultimate completion of shipments they coordinate.

⁶<https://www.bls.gov/iag/tgs/iag31-33.htm>

⁷https://medium.com/@mbarlin_42335/sizing-up-the-freight-brokerage-market-10106c6fce65

3.6 Regulators

There is an array of regulatory bodies around the globe ensuring the supply chain operates in accordance with local laws. The Federal Motor Carrier Safety Administration (FMCSA), for instance, is responsible for aggregating U.S. carrier performance data. Globally, organizations like the International Chamber of Commerce regulate commercial terms in the sale of goods through Incoterms and trade finance rules. For the purpose of this paper, regulators include customs agents as well.

4 Challenges Facing Global Logistics

Logistics stakeholders coordinate and manage shipments via antiquated, disconnected information systems. The result:

- Poor Communication
- Limited Shipment Visibility & Data Transparency
- Redundant Data Management
- Environmental Waste

4.1 A Tale of Two Cereals

Throughout the lifecycle of a shipment, it changes hands a multitude of times. At each of these exchanges, the shipment is recorded with a new tracking number and entered into a new, isolated, and internal tracking system. There is no visibility into the history of the shipment. This gap in information creates opportunities for errors, lost products, and erroneous deliveries. A long tail of credit, insurance, capacity planning, and tracking struggles to follow a shipment as it bobbles throughout the global logistics ecosystem.

Imagine a wheat processor in China that is shipping raw ingredients to a cereal manufacturer in the US. This US cereal manufacturer then produces the cereal and ships it to the distributor that delivers it to grocery stores. If this document were to detail the complexity in the workflow of this transaction, it would likely be used for kindling before anyone finished reading it.

Consider this shipment cycle in 4 phases.

Phase 1: From the ingredient manufacturer to the port in China.

Phase 2: From the Chinese port to the US port.

Phase 3: From the US port, through customs, to the cereal manufacturer.

Phase 4: From the cereal manufacturer to the distributor.

A TALE OF TWO CEREALS

The logistics process of a US distributor as it tries to receive a delivery of cereal, but the wrong flavor gets delivered!

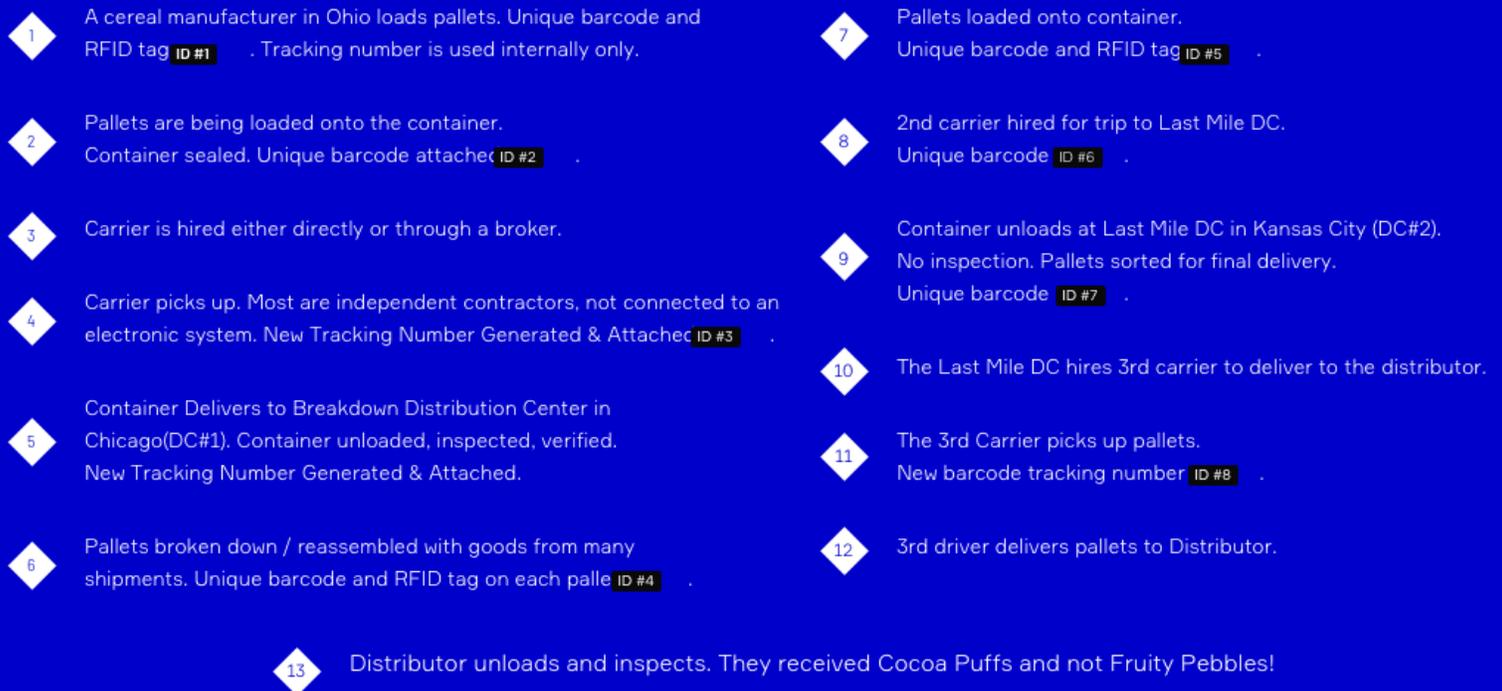


Figure 1: The journey of the cereal.

So what happened? Where did the mistake occur and where did the desired cereal end up? Currently, there is no way of knowing with certainty. Because pallets are rarely inspected after they leave the Breakdown Distribution Center (for speed and efficiency reasons), there is no way to detect a mistake has been made until the pallet has arrived to the consignee. It would not be uncommon for an incorrect barcode to be placed on a pallet in steps 7, 8, 9, or 11.

This shipment has been tagged with 8 separate tracking IDs, but there is no traceability. Each tracking ID is entered in a separate enterprise resource planning (ERP) system, and as a result, all of the previous tracking IDs are completely meaningless.

The Fr8 Protocol fixes this clueless exchange of goods by creating a single source of truth for data related to a shipment. It ties a shipment's tracking IDs, radio frequency identifications (RFIDs), documentation, and other relevant information to create meaningful relationships between multiple data points. All of the involved stakeholders will have unprecedented visibility into shipments and their associated data.

Reimagine this same story of cereal with the shipment subscribed to the Fr8 Protocol. Now when a shipment is picked up by a driver or arrives at a new distribution center (DC), that party has the ability to scan any of the shipment's previous tracking ID's and get visibility into its journey and contents.

In step 11, a driver comes to pick up the pallet from the Last Mile DC. Before the pallet leaves the DC, the DC's proprietary tracking ID is scanned to mark that the pallet is out for delivery. To double-check the contents, a warehouse employee is also able to scan a previous tracking ID to corroborate the pallet's contents and bill of lading. An error is found! One tracking ID indicates chocolate cereal, and the other indicates honey nut cereal. From here, we can deduce that the pallet was likely mislabeled when it entered the Last Mile DC.

The labeling error was caught before the shipment went out, and the DC was able to correct the error immediately. Damages were eliminated because the distributor received the correct cereal on time. Throughout this logistics process, common pain points were shared, and all stakeholders involved were able to benefit from implementing the Fr8 Protocol.

There is currently no way of knowing if a pallet is mislabeled until the pallet is unpacked. This creates massive inefficiencies for a shipment's stakeholders and insurers. If a shipment error can be caught earlier in the shipment cycle, it could be remediated sooner. In turn, the damages caused by the error would be reduced. The consignee or DC will have the foresight to put in a replacement order long before the erroneous shipment arrives.

Insurance costs would also be reduced. Because the Fr8 Protocol has an im-

mutable, single source of truth of a shipment cycle, we can identify the cause of error. As a result, the offending party will be easier to identify, and responsibility for damage will be easily assigned.

To summarize, when the Fr8 Protocol is in use, the carriers and DCs run more efficiently, the manufacturer has a more resilient distribution process, and insurance costs are reduced due to the mitigation of errors.

Again, we promised not to detail an entire global shipment in this focused paper, but if we had, the above section would be a 20-page incredibly intricate explanation of machines, paperwork, information systems, and human coordination that would detail over 100 potential error states throughout the shipment cycle.

5 A Better Way: The Fr8 Protocol

A standardized protocol data layer creates seamless information flow throughout global logistics by allowing any permissioned system and stakeholder to reference the same dataset as the source of truth.

1. Interoperable

It creates standards for data that streamlines communications in the ecosystem, improves efficiency, and provides greater visibility into shipments. Now, all information systems can connect to each other via the same rules and formats.

2. Immutable

It creates a single reference for critical data by generating one shared version of information that is visible to all key stakeholders without the need for replication or the risk of misinformation and fraud. All the players in the workflow are able to trust that what they're referencing from the Fr8 Protocol has not been tampered.

3. Secure

It allows data to be accessed selectively by only authorized actors while maintaining the integrity of that data by storing its cryptographic hash on a public immutable ledger. Concerns about data privacy are squashed by the security technology of the Fr8 Protocol.

We detail below the 4 primary layers of the Fr8 Protocol and how they operate.

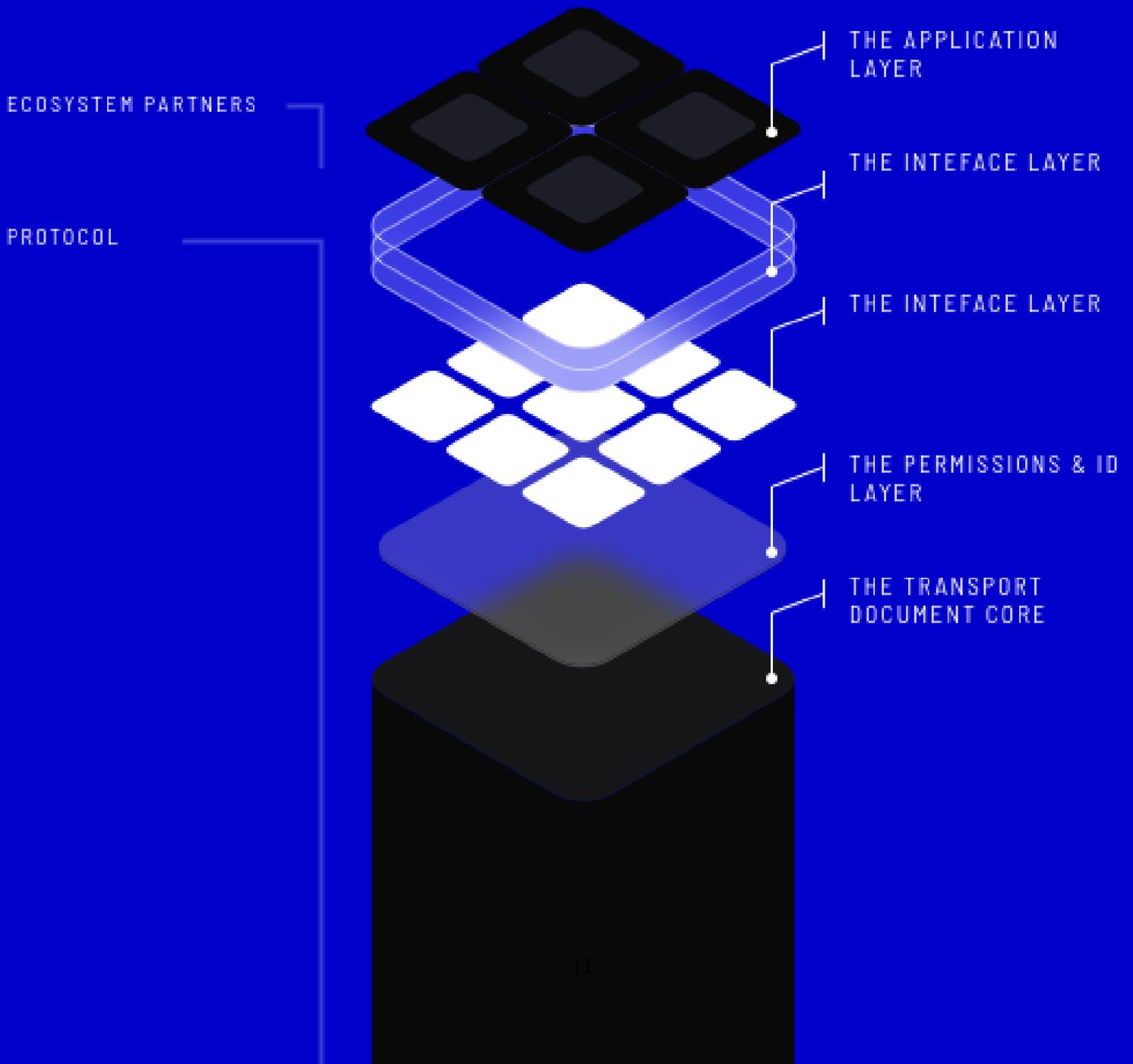


Figure 2: Fr8 Protocol stack.

1. Transport Document (TD) Core to house the data and metadata of a shipment.
2. Permissions & ID Layer to ensure data integrity and permissions.
3. Interfaces Layer to exchange data between the TD Core and Services Layer.
4. Services Layer to connect the Fr8 Protocol with applications.
5. Application Layer works with Services and Interface layer to display and manipulate data.

The Fr8 Protocol uses blockchain to prove existence, authenticity, and integrity of all shipment data. The blockchain we use, by design, is not important so long as it has sufficient integrity and low data writing fees. Blockchain smart contracts and cryptography authenticate users in the Permissions & ID Layer. Data is appended to a shipment throughout its lifecycle and is pushed into the Fr8 Protocol. This data can take many forms, such as documentation, tracking numbers, or even temperature data. As this data comes into the protocol, we store the data itself securely off-chain and the data's cryptographic hash on-chain to ensure continued integrity and scalability. The cryptographic hash essentially seals the data to ensure that it is untampered, and stands as a permanent record of its existence.

5.1 Protocol Layers in Detail

5.1.1 Transport Document (TD) Core

The TD Core serves as the central hub of the Fr8 Protocol and is effectively the air traffic controller, where all of a shipment's relevant data is stored and where all of the connectivity between parties happens. It knows everything about a particular shipment, who can view its contents, and who can change them. It uses the tools it has access to in order to achieve the goals of the shipment.

The TD Core contains data regarding needed inspections, customs compliance, metadata, and hashes of links to documents. It's in charge of orchestrating interactions between data, documents, metadata, and communicating with the Interfaces Layer that connects to the Services Layer. Applications deliver data to the TD Core that ties inspections, transit data, and metadata together to a specific shipment.

An important consideration is how often shipments are consolidated together into trucks, containers, ocean freight vessels, airplanes, and trains. They couple and decouple from shipments headed in similar directions constantly. The TD Core manages the relationship between smaller units as they are combined to make up larger shipments and segregated and then decoupled down to the Last Mile DC to home or retail delivery.

Enabling the next critical layer in the protocol, the TD Core also contains permissions lists. This is an essential module for controlling rules around viewing and/or writing data, such as who is allowed/required for inspections and does their registration ID comply or are they an unregulated or bad actor? Who/what device can upload data? Who can read/write shipment metadata? While this is driven through the governor of the Permissions & ID Layer, the underlying instructions are housed in the TD Core on an immutable ledger.

5.1.2 Permissions & ID Layer

The Permissions & ID Layer insulates the TD Core. All calls to read and write data flow through this layer. It allows the Fr8 Protocol to persist data on both the public blockchain and private repositories. By mapping crypto public keys to an entity or individual, a shipper can make sure that her shipment data is only shared with relevant parties in the ecosystem while still benefiting from the trust an immutable public ledger offers. FedEx can interoperate with the same system as UPS without giving away that they pickup 10,000 packages from a Victoria's Secret Ohio warehouse each week, so as not to reveal their guarded customer relationships.

Security Authentication is performed with Asymmetric Key Encryption (public/private keys and message signing). A user will be required to sign a secret, unique message with their private key to access the Fr8 Protocol. If the message is signed correctly, the user is identified and authenticated.

Verification Once a user is authenticated, the Permissions and ID layer confirms against the TD if the requested action is allowed by the user.

5.1.3 Interfaces Layer

The six interfaces of the Fr8 protocol provide connectivity for the outside world to interact with a shipment on the protocol. An interface conforms to an application programming interface (API) request format, data standard, and procedure to read and write data on the protocol. These six interfaces operate with either a Representational State Transfer (REST) API or message webhooks and blockchain events depending the function.

1. Document Interface This is the interface through which a shipment first enters the Fr8 Protocol. The Document Interface provides an interface and format

for creating shipments and related documents, and updating them throughout the life cycle of the shipment. Documents handled by interface include electronic data interchange (EDI), bill of lading, purchase orders, certifications, proof of delivery, and more.

2. Data Query Interface The Data Query Interface is a query engine to identify and export any data relevant to a shipment. This module provides for authorized counterparties to pull data about temperature, location tracking, inspections data, estimated and actual timelines, documents, and other data persisted by the TD Core. The TD core is a wide repository of proprietary data that becomes relevant to individual use cases through a powerful search tool.

3. Inspection Interface The Inspection Interface provides a format for posting data on a shipment and during an interchange. Governments and their regulatory bodies, insurers, and other stakeholders can automate the data flow resulting from inspections. Currently, fraud and error is curtailed by inspections whenever ownership of goods changes hands through the bill of lading. Necessary inspections and authorized inspectors are contained in a shipment's TD. The Permissions & ID Layer ensures that inspections are authentic and come from an authorized source. In order to modernize antiquated segments of the supply chain, the inspection interface supports multiple data types, including text, images, and video.

For example, when Maersk takes possession of a shipment, they need to validate standard data points of weight, temperature compliance, and the state of the container itself, ensuring a clean bill of lading before accepting the insurance and contamination risk of any given container.

If McDonald's is waiting for their Chicken McNuggets and an inspection overseas shows that temperature requirements had failed inspection, the shipper would know instantly and be able to adjust their supply chain to supplement the void of that shipment.

4. Transit Data Interface The Transit Data Interface enables applications and sensors to upload time-series data of a shipment. Examples of data include GPS location, temperature, humidity, speed, and accelerometer data. Devices will have their own identity and private keys; permission to write the data will be enforced.

5. Payment Interface The Payment Interface links a shipment to a payment event. The Payment Interface is capable of handling and routing on-chain token

payments and off-chain fiat payment services. This interface does not process payments directly, but emits payment events to a Payment Service. Once an event is emitted to a Payment Service, this interface waits for a result to store in the TD Core. Settlement amounts are derived from the terms and conditions locked in the TD Core. This interface is also capable of holding tokens in escrow, and releasing the payment when a shipment has reached a stage, or predefined criteria has been met as authorized by the payment service.

When a company building on the Fr8 Protocol needs to route payments to several parties, the required criteria for releasing payments, including calculating penalties, can be embedded into this interface.

6. Notification Interface The Notification Interface links a TD to an external notification service. The TD Core defines notifiable events such as state changes, departures, arrivals, and GPS location. The notification destination and acknowledgement requirements are also written into the TD Core. This component emits events to an external facing Notification Service. This can be emails, push notifications, and electronic data interchange (EDI) messages.

5.1.4 Services Layer

Services plug into interfaces to provide application-level functionality. Interfaces provide access and interaction to a shipment and its data. Services make this data accessible, useful, and meaningful to applications. Each service developed serves to expand the protocol's use and functionality.

The Fr8 Protocol empowers developers and businesses to create their own services to connect to the protocol. We encourage 3rd parties to create services that plug into our interfaces to suit their products and business needs. To kick off development, Fr8 Network is launching two services:

Payment Service A Payment Service is responsible for listening for payment events from the Payment Interface. Services compliant with the Fr8 Protocol will be capable of receiving the payment requests from the interface in the formats defined, acknowledging the request for payment, and responding once the payment has been processed. The Payment Service is capable of sending cryptocurrency tokens, supporting fiat payments, and settling letters of credit and various other industry-accepted means of payment. Upon completion or failure of the payment, this service stores the result via the Payment Interface.

Notification Service Notifications Services compliant with the Fr8 Protocol listens, schedules, routes, and ensures the integrity of notification events from the Notification Interface. Encrypted notifications will be sent to the Notification Service and packaged with an array of required and optional recipients. For required recipients, the Notification Interface will await a response acknowledging successful delivery. The Fr8 Notification Service will support SMS, email, Apple Push Notifications, Google Push Notifications, and EDI messages.

Coming Soon: A Data Export/Visualization and Analytics toolkit service is a powerful tool we are mapping out. This has far-reaching uses such as Business Intelligence, process optimization, and real-time data monitoring. Let's say a company, Tabula, already has a software package capable of connecting to databases or reading structured data. Tabula can create a service that communicates with the Fr8 Protocol Data Query Interface. Now their existing software can query the Fr8 Protocol and create visualization directly from the protocol itself.

6 The Fr8 Protocol Applied: U.S. Domestic Freight Industry

Fr8 Network will develop the initial suite of applications built upon the Fr8 Protocol. To display the power of the Fr8 Protocol to improve global logistics, we are starting with the US trucking industry. The trucking industry is the backbone of American commerce, with 80% of all cargo transported overland by trucks. In the U.S. alone, overland logistics spending exceeded \$700B in 2016⁵. Yet the market is still very inefficient. Take these two simple facts:

- Shippers (manufacturers) can't find enough available capacity to get their goods where they need to go⁸.
- Every year, carriers (truckers) drive 29B+ miles with partially or entirely empty trucks⁹.

Demand is exceeding supply, yet there are tons of empty trucks on the road. This huge discrepancy highlights a massively inefficient market by allowing a \$66B freight brokerage industry responsible for connecting supply and demand⁷.

⁸<https://www.trucking.org/article/New%20Report%20Says-National-Shortage-of-Truck-Drivers-to-Reach-50,000-This-Year>

⁹https://medium.com/@mbarlin_42335/potential-carbon-savings-of-trucking-deadhead-miles-eb09e230123b

Inefficiencies and frictions on display in the US Trucking market are symptomatic to all modes of transport globally.

7 Fr8 Marketplace

The Fr8 Marketplace will bring shippers, carriers, and brokers onto a comprehensive platform for coordinating, tracking and settling freight shipments.

Current logistics technology has not been well designed. Poor user experience and user interface development has left a gap in adoption of useful tools. With the average age of commercial truck drivers in the US of 55 years, addressing a population that grew without the presence of mobile technology is exemplary of the need to focus on user experience.

Another key issue preventing adoption of technology is cost. Shipping is a very low margin business¹⁰. In a steady race to drive costs to the bottom, logistics service providers forfeited budgeting investments in technology.

90% of trucking companies in the US consist of 8 trucks or less. With a small business-dominate industry, empowering the giant market of 1.5m trucking companies to adopt technology must not have the additional burden of excessive cost.

7.1 How will we do this?

7.1.1 Identity Management & Reputation System

A global shipment can pass through dozens of different organizations and interact with twice as many individuals. With this complex of a transactional network, Fr8 Network is developing a comprehensive identity management system. It will enable parties to seamlessly create profiles, upload necessary credentials, and validate identity to any other entity in the network.

Shipment “managers” (those who initiate a contract or are assigned the role) may easily determine who owns, permissions, verifies, authenticates, and transfers data about a shipment and associated information, such as payment terms, along its journey.

A history of behavior will create an objective ratings/reputational system based on criteria such as timely delivery while combining subjective, qualitative information like ease of communication. This overview into each stakeholder using our platform will inform future transactions and contracts without the need for an intermediary

¹⁰https://www.joc.com/maritime-news/container-lines/profitable-year-slipping-away-container-shipping-outlook-darkens_20180704.html

assuring a job will get done.

Gone are the days when a shady trucking company can close business and re-open under a new MC Number. Fr8 Protocol stores a history of performance tied to a cryptographic identity and punishes those who abandon their on-chain personas.

7.1.2 Pricing & Matching Algorithms

By combining machine learning and blockchain technology, shippers and brokers will have the option of using our matching algorithms to quickly find sufficient capacity and pricing to transport their freight. They will also be given options to indicate preferences for carriers they book, like choosing carriers with an on-time delivery percentage above 90%.

Carriers may use our pricing algorithms to set fees based on local/regional market conditions. They are also empowered to upload preference data like preferred commodities and lanes.

7.1.3 Quicker Access to Capital and Payments Processing

Being built on the Fr8 Protocol means dispute processing and payment settlement is faster than ever. Shippers can rest assured they are completely informed before agreeing to pay, since real-time and immutable shipment lifecycle data are stored on a blockchain.

Carriers will benefit from lower costs of invoice financing as banks and factoring services are exposed to less risk of fraudulent behavior.

Blockchain-based payment systems are still young, but settlement in cryptocurrencies are available for innovative Fr8 Marketplace participants. Smart contracts that govern the terms of a shipment can be programmed to pay upon proof of delivery submission, iteratively as a shipment travels closer to a destination, or partially based on milestones.

7.1.4 Lowest Cost Provider

The Fr8 Marketplace is a volume-driven provider of services. Committed to transparency and affordability, the marketplace will drive adoption through its affordability.

7.1.5 User Interface / User Experience (UI/UX)

Fr8 Network was born in the heart of Silicon Valley and the Fr8 Marketplace reflects a commitment to quality design and ease of use. The tools built under the

Fr8 Marketplace umbrella will be intuitive and simple for the users accustomed to doing business with paperwork and phone calls. Small businesses and enterprise alike will benefit from the powerful and rich features that come packaged in the Fr8 Marketplace.

8 The Fr8 Protocol Applied: The Fr8 Marketplace

The Fr8 Marketplace is designed as a platform to connect shippers with carriers with a robust and comprehensive set of digital services. It will offer suites of mobile apps of varying complexity and features, exhaustive developer tools for integrating and developing new digital services, and extensive web applications to give companies options to analyze and improve their businesses. To start, the Fr8 Marketplace will be two main applications:

8.1 Fr8 Board

Fr8 Board is an application for carriers and shippers to coordinate freight transactions through customizable smart contracts. Fr8 Protocol behind the scenes makes the Fr8 Board a powerful and trustworthy application for engaging service providers. Open to all carriers, suppliers, and brokers, Fr8 Board will give users full visibility into available capacity of drivers in the network as well as pricing data.

For those familiar, Fr8 Board works similarly to existing load boards. Users will register and create profiles describing their needs and preferences; the more detailed their initial profile, the better their experience.

Using a proprietary algorithm, Fr8 Board will combine publicly available data, peer reviews, and historical performance to match loads.

To encourage adoption and access to as much capacity as possible, the Fr8 Board will be accessible through API. Shipments can be booked and managed from existing industry software so new users do not need to leave their favorite apps.

Authorized users will track a shipment as it travels to its destination. Real-time access to ETAs will give warehouse managers ability to plan appointments and reduce wait times.

The Fr8 Board will integrate with major digital payment processors to keep users from having to compromise their user experience settling with a carrier.

Within the Fr8 Board, users will input details about their shipment and track its status once booked through Fr8 Board. Users log into the Marketplace to manage

payments, search for carriers, and access modules essential in managing shipments. Monitor the state of your shipments through interactive dashboards.

8.2 Fr8 Carrier App

Fr8 Network is providing a simple UI for drivers to keep counterparties informed of the status of a delivery. The Fr8 Carrier App is designed with ease of use in mind. Drivers can update their current status directly from their mobile devices. Consignees can accept deliveries through a quick-pin entry into the Carrier App and be on their way. Delivery documents can be uploaded directly from the device.

The Carrier App will give drivers information about their outstanding invoices and an in-app toggle to authorize others to review them.

9 Fr8 Token – Discount Token Model

“In brief, discount tokens are digital assets that give their holders a limited right to receive discounts on purchases of products or services from an organization – a company, a coop, or a blockchain network¹¹”.

In context of the Fr8 Network ecosystem, the Fr8 Token provides discounted, and at maximum free, access to services on the Platform.

The cost of using Fr8 Network services (like the Fr8 Protocol APIs or the Fr8 Marketplace) is a function of the amount of individual services consumed, the amount of Fr8 Token the user deposits into a license smart contract, and the total ecosystem service usage and token deposits. As more tokens are enabled in the ecosystem and subsequently more services are demanded by the ecosystem, the same number of tokens will access a greater number of features.

In a discounted token model it is possible to receive free access to services in the Fr8 Network ecosystem. Early users of the Fr8 Network suite of products will see increases in the amount of services a single unit of Fr8 Token provides. Should their demand for services be stable as the Fr8 Network grows, the excess token can be sold off to new users seeking discounts on logistics services in the Fr8 Network ecosystem.

¹¹<https://images.sweetbridge.org/main/WP-Sweetbridge-Discount-Tokens.pdf>

9.1 Example: Discount Token Model – Current State

Fr8 Network will offer SaaS solutions, digital brokerage and full service brokerage services to U.S. trucking clients. Shippers, carriers and brokers holding Fr8 Token will receive discounted rates on these services today and in perpetuity.

Sample Software Service	\$ Cost (t)	Token Cost (t)
Monthly Fr8 Network FTL Marketplace Membership	\$15	100
Hypothetical Shipping Cost	\$3100	-
Digital Brokerage Fee (2%)	\$62	-
Total	\$3177	-
Total w/ Tokens	\$3162	100

Table 1: Example cost of a shipment where $t = 100$ and represents current state *before* network growth.

9.2 Example: Discount Token Model - Future State

As the Fr8 Network ecosystem of shippers, carriers and brokers grows, each Fr8 token will provide greater utility, giving early adopters of Fr8 token access to more services as they are introduced.

Sample Software Service	\$ Cost (t)	Token Cost (t)
Monthly Fr8 Network FTL Marketplace Membership	\$15	80
Monthly Fr8 Network Marketplace Premium Features (i.e., Track & Trace)	\$5	20
Hypothetical Shipping Cost	\$3100	-
Digital Brokerage Fee (2%)	\$62	-
Total	\$3177	-
Total w/ Tokens	\$3162	100

Table 2: Example cost of a shipment where $t = 10,000$ and represents current state *after* network growth.

10 Conclusion

The Fr8 Network suite of tools consisting first of the Fr8 Board and Fr8 Carrier App will be powerful yet simple tools for engaging in digital logistics. These first applications constituting the Fr8 Marketplace are set to benefit from the industry-wide improvements generated through the Fr8 Protocol. The Fr8 Token acts as a discount token for services provided by the Fr8 Network Ecosystem. The tokens are intended to grow in utility as the network grows, offering early network participants the benefit of access to an expanding suite of tools.

11 Appendix

11.1 Fr8 Network Value-Add Features

11.1.1 Fr8 Developers Tools

Fr8 is committed to easy integration with core business software and air- or container-freight platforms. At present Fr8 is an iOS integration partner with Salesforce, allowing active users to plug directly into the Fr8 Marketplace. Other 3rd party developers can access price discovery, book carriers through the Board, access the carrier ratings, and more through a sophisticated set of APIs and a powerful SDK.

11.1.2 Fr8 Factoring

If a contract's terms do not offer immediate settlement, Fr8 Factoring offers a solution for actors needing to increase their cash flow via a peer-to-peer trade finance vehicle. This service closely resembles services available today, but when facilitate by Fr8's peer-to-peer marketplace instead of predatory lenders, participants will be able to access credit at a fraction of current market costs. Finance companies are incentivized to join the network and hold tokens for the purpose of lending to business on the platform as credit agents. Fr8 does not lend tokens itself but simply provides the token's utility as a means of exchange between counterparties.

11.1.3 Fr8 Rewards

Every trucker wants to maximize time on the road while reducing expenses. Fr8 Rewards establishes strategic partnerships with complementary product and service providers, leveraging the network to negotiate group discounts on fuel, lodging, personal benefits, and insurance, allowing independent operators the advantage of aggregated purchasing power.