OPERATIONS AND APPLICATIONS

Introduction

Ambrosus is building software layers, on top of the Ehtereum protocol layer, that are needed for the specific functionality of all of Ambrosus's core services. It will then be possible to build dApps, Web apps and Mobile apps, plugged into our API specifically designed on top of our core protocol, using buildings blocks and developer tools we created. Developers will then be able to answer the community's needs by delivering solutions in the form of additional software they'll have coded, with the incentive of receiving Ambers for transactions or usage of their products, allowing Ambrosus to become a community-driven ecosystem.

The dApps are set-up according to our operational team's instructions, which derived experimental designs according to our product applications listed below.

Product Applications

The solution provided brings value across the entire supply chain and therefore covers a wide range of its stages. To increase the success of the implementation, the process is performed in close collaboration with the stakeholders. In fact, the Ambrosus Company is considered as the fourth party logistics network (4PL). Overseeing the network, we act as a channel integrator and an interface between the retailer, its traditional third party logistics firms and logistics information technology suppliers. We support an effective synchronisation and cost efficient coordination among the chain members, and we have the potential to become the most efficient organisational mode in that type of operation. By creating numerous fully automated inter-organisational links between the retailer and its various logistics services providers, we are also in a position to reduce the overall transaction costs, even including those incurred by our new services.

The solution we provide covers a wide range of applications for almost any food commodity and product. The implementation is thus incremental and performed in function of specific use cases. Each use case is a new project and we support customers in selecting the solution fitting their needs best. We assist the client by setting up the specifics and accompanying him during all implementation stages; from designing specific solutions to close collaboration in order to enhance the rate of success.

At starting point, only one supply chain transaction is monitored and automated for one food product. Initial trials are performed using sensing systems already in place and complexity is gradually added to the testing procedures to reach the solution's full potential, hand-in-hand with the customer.

At Ambrosus, the operational team designs solutions for the following applications, whereas each use case will be detailed and strengthen into dedicated separated documents:

Food Safety and Contamination

In order to identify, manage, mitigate and predict risks of chemical contamination and fraud, a pan-European consortium performs risk assessments of different food supply chains. Let's take the red meat supply chain as an example. The assessment output helps to sort out key handling stages where efforts have to be prioritized. We are thus developing on-site sensing systems in order to characterize the key contaminants. Moreover, digital assets will be added to the sensing system and, combined with the physical item, they will both be handled throughout the supply chain, removing fraudulent manipulation and tampering opportunities.

Food Origins and Tracing

With our system, individual batches – even units – of food are tagged and traced in real time through a combination of locational and quality data. We remove the supply chain opaqueness by introducing sign-off contracts, whereby suppliers and distributors sign-off the batches of products by linking their individual identity to the signatures. This allows precise attribution of responsibility for quality assurance and prevents fraud.

Supplier, distributor, processor, warehouse owner and finally retailer are able to see the full history of a particular batch or product before putting their signature in the system. The party assuring quality of food products also stakes Ambers in the transaction to incentivize them to provide correct response. Thus, the reputation and financial incentives work towards ensuring the integrity of supply chain quality assurance, as mishandling and negligence also lead to immediate financial losses. Thanks to the smart contracts in place, they have convenient automatic tools to flag any issues based on readings from sensors. Before receiving the packages they can trace in real time their location, quality readings and see who is the responsible party ensuring the integrity of the shipment. Interactive tools, such as maps, estimated time arrival, dynamic assignment of distributors and management of food stocks are the modules that could be developed at later stages to make the system convenient.

Logistic Sustainable Improvement

Refrigerated supply chains where products have to be stored and handled below 6°C require good planning and adapted containers. Procedures have to be well established in order to assure good practices and that the food commodities will not partially defrost between two supply chain stages. The way to mitigate issues is either to use expensive EPS packs that have high environmental impact, or to associate frozen bottles, crushed ice or gas injection, to guaranty low temperature inside the box. This is due to the weakness of the measurement system, which is only able to assess the temperature of a large container and the item itself. The two sensing systems under evaluation are:

- Combination of temperature sensor and surroundings sensors to assess any container unusual physical parameter variation and bad exposure. Measurements at the container level are performed and alarms are triggered, informing the logistics directly.

- Insertion of RFID, temperature biosensors at the box level that communicate to a central command located inside the container. This information is also used to map the temperature's 3D profile inside the container in order to modelize hotspots and weak points. Therefore, the use of our solution for palette pack design, in addition to the transportation parameters, supports the integrative view the digitalization concept offers for the future of logistics.

As a consequence, consumers have direct access to the parameters related to transport conditions. They are thus informed of the transport conditions, good practices, quality of the service and improvement performed by the supplier.

The system is actually under test in the fish industry. More communication will follow soon.

Loyalty System for Customers

As an initial incentive to start using Ambrosus, early consumers buying products from suppliers or manufacturers submitting their production processes to an Ambrosus sensor system, will be rewarded with a Amber. The source of these Ambers will be producers who will use Ambers to record their production processes and quality assurance tests onto the system. Producers will also be able to reward consumers promoting their food products via social networks with a Amber, allowing the creation of affiliate marketing schemes. This in turn will further raise awareness of both the products promoted and Ambrosus, creating an organic growth of users who switch to Food Supply Chain 2.0.

Reputation System for Farmers/Producers

Ambrosus will set in place a rewarding system for farmers. It can be either a new system for countries like Germany, where the Amber would act as reputation point, or like in Switzerland, an enhancement of the existing system for information where consumers would use the Amber to reward good producers. Ambrosus is discussing the best approach with the Swiss union of farmers. More information will soon follow…

Food Delivery without the Middleman

Restaurants taking part in Ambrosus, serving meals verified by the Blockchain, may have customers wishing to order their food for takeaway. Nowadays, there are several services that aggregate food orders and then commission contractors to deliver the orders on bike or scooter. The problem is that the aggregators become the middleman and take a significant commission for every delivery whereas people working in the delivery get paid very low hourly rates. With Ambrosus, food orders with partner restaurants and cafes would be placed through the decentralised marketplace and customers would pay directly to the delivery people without the payment passing through the middleman. Ambrosus will provide the necessary infrastructure to make this solution operational and allow workers in the food delivery industry to get a fairer wage and conversely reduce profit capturing by the middleman. Increased usage of Ambers for these transactions will be the source of revenue for the team to maintain and upgrade the system while everyone else participating in food delivery markets will receive more utility and keep a higher financial value from the transactions. Following the execution of transactions, feedback can be left for the restaurant.

Decentralised Insurance Fund (DIF)

In any transaction, all parties to contract wish to be protected against adverse circumstances (e.g. crop sickness, lost shipment, breakdown of production lines, product recalls, etc.). Insurance funds typically need a significant amount of data and statistical insights to function. With Ambrosus, the level of insights into the supply chain and quality data from sensors in a unified system would be significant enough to determine the small fee that both parties would pay to the DIF for any transaction in exchange for insurance.
Similarly, the DIF also hedges against changes in commodity prices, giving more certainty to both the buyers and sellers about the expected prices despite the possible adverse shocks to prices. The small fees charged as part of transactions will be allocated to the fund to hedge against changes to commodity prices.

The whole insurance part will be a dApp build on top of the Ambrosus solution by developers with insurance knowledge. Ambrosus is looking how to engage now with this community.

Farmers' Fund

Future plans of Ambrosus will be to set-up a Farmers' Fund that will have a value of up to 2% of all Amber. This amount will be locked in a separate contract to which no one will have access. The purpose of the Farmers' Fund is for Ambers to serve as a collateral for micro-loans that could be provided to low-income farmers from developing countries, who normally do not have access to financial programmes. This could involve social lending or ethical financing aspects. Those farmers who will repay the loans will maintain or increase the value of the Farmers' Fund. If any farmer faces difficulties or is otherwise unable to repay, the debt can be restructured, or in completely adverse circumstances (death, disability, natural disaster) completely forgiven. In that case, a part of the Ambers will be sold in order to repay providers of finance. Replenishing of the Farmers' Fund can then be at the discretion of the Ambrosus community, who has the possibility to donate Ambers to the Farmers' Fund to enable its continued existence and provision for social purposes.

Developer Tools

The Ambrosus Ecosystem will provide smart contract templates to help developers in building secure applications. The Ambrosus protocol is open-sourced, giving developers the ability to modify, create, and develop applications that use the protocol. These applications, whether they are dApps, Apps, or Web applications, will be built on top of our API linked to our data storage infrastructure so that anyone in the community can use the data. Developer friendly libraries, APIs, and up to date documentation will make using our platform as simple as possible for developers.