

EUROPEAN BEST ENGINEERING COMPETITION

EBEC MOSCOW 2018

Case Study

There is blockchain in my steak!

Background of the task:

The Rosselkhoznadzor Office (Federal Service for Veterinary and Phytosanitary Surveillance) in Moscow, the Moscow and Tula regions appealed to the Arbitration Court of the Moscow Region with a claim to suspend the work of the Petelinsky poultry farm for 90 days or to impose a fine on the enterprise in the amount of 700,000 to 1 million rubles, reported the Rosselkhoznadzor. This poultry farm is part of the Cherkizovo group. The reason for the appeal of the Rosselkhoznadzor to the court was the fact that Salmonella and Listeria were re-discovered in parts of the Petelinka broilers distributed to the shops. In May 2018, for the same reason, the Petelinsky poultry farm was fined 300,000 rubles.

On October 3 Cherkizovo conducted an inspection at Petelinskaya Poultry Factory and did not reveal any violations, the company reported. Taking into account the fact that the selection of products was carried out in retail outlets, it is necessary to take into account the conditions of transportation and temperature storage at

retail - the quality of products directly depends on these indicators, emphasized Cherkizovo.

Earlier, the Rosselkhoznadzor revealed in the work of Cherkizovsky Meat Processing Plant JSC (ChMPZ, also part of Cherkizovo Group) violations of veterinary norms and fined the company a total of 800 thousand rubles. Another group enterprise, Mosselprom, was fined 700 thousand rubles for having salmonella in its products.

It is important to understand a few things. First, low-quality food products are extremely dangerous for consumers, considering that they are distributed in a large number of ways: from shops and catering places to pet food. Secondly, in addition to fines, companies also suffer losses due to the downtime of factories. Sometimes verification reveals that there are no violations at all in these factories, and they should be sought in other components of the supply chain. But because of the lack of transparency of the whole process, it is absolutely incomprehensible where exactly the failure occurred in this particular case and sometimes large cash investments flow in to where everything is already working at the proper level.

IT specialists and analysts come to the conclusion that the transparency of food supply chains, and therefore the quality and safety of products, can provide the use of blockchain technology.

What is blockchain?

Blockchain is a database that is stored simultaneously on multiple computers. New blocks in this database chain are constantly being created. Each newly created block contains a group of recently accumulated and ordered records (transactions), as well as a headline. When a block is formed, it is checked by other members of the network and then, if everyone agrees, is connected to the end of the

chain. The blockchain technology is used to protect important data in corporate systems, monitor compliance with contracts and other types of obligations, and regulate business relations without the involvement of intermediaries or trusted third parties. The principle of the blockchain is to create distributed databases, full copies of which are stored with the participants of the transaction or another process and serve to verify the correctness of the information. In such a system, none of the participants will be able to change the information, since the substitution will be revealed when compared with other copies.

Why blockchain?

Blockchain can help reach business goals around traceability, compliance, freshness and more by enabling a holistic ecosystem. A blockchain solution is not just about technology, it's about solving business problems that have been insolvable before due to the inability of the ecosystem to share information in a transparent, immutable and trusted manner. Unlike other systems of record, blockchain technology provides a trusted record of data.

Effect and areas of uncertainty.

Blockchain effect:

- Improving the security of the supply chain.
- Reducing the number of problem areas (certification by third parties).
- Reducing the number of errors due to the elimination of paper workflow.
- Increased efficiency

Blockchain uncertainty areas:

- Uncertainty about the level of adoption and implementation.
- It is unclear whether one or two prevailing solutions appear or many solutions competing with each other.

Every product has a story. Review on implementations of blockchain in food industry.

After 18 months of testing, IBM's blockchain-based food traceability platform is now live for global use by retailers, wholesalers and suppliers across the food ecosystem.

In September, retail giant Walmart announced that it would begin requiring its suppliers to implement the system to track bags of spinach and heads of lettuce.

Included in the first cohort of adopters are Carrefour - the French retailer which boasts 12,000 stores across 33 countries, cooperatives Topco Associates and Wakefern - which combine to represent more than 15,000 stores globally - and suppliers BeefChain, Smithfield and Dennick Fruit Source.

Monthly price of IBM Food Trust differs from \$100 to \$10 000 depending on annual sales of company. Also, companies have to pay 5 000\$ for a tutorial for experts who will operate the system.

Trace for Small Business	Trace for Medium Business	Trace for Large Enterprise	
See the provenance, location and status of food products on the supply chain. Built for small businesses (< \$50M). Starting at \$100.00 USD* per month Purchase now	See the provenance, location and status of food products on the supply chain. Built for medium businesses (\$50M - \$1B). Starting at \$1,000.00 USD* per month Purchase now	See the provenance, location and status of food products on the supply chain. Built for Large Enterprise customers (\$1B+). Starting at \$10,000.00 USD* per month Purchase now	gu n
Unlimited data upload	Unlimited data upload	Unlimited data upload	A s an
End-to-end traceability of supply chain	End-to-end traceability of supply chain	End-to-end traceability of supply chain	Fo op
Option to add Certifications module to upload and manage certifications	Option to add Certifications module to upload and manage certifications	Option to add Certifications module to upload and manage certifications	Op oni

There is also an alternative – a start-up called Provenance. But it is only available in UK and it is very vague about prices. Anyway, you can find information about their project here:



(<https://www.provenance.org/>)

These frameworks are available for distributors, manufacturers and retailers. And IBM actually has a tool on their web site, to calculate the benefits of implementation of their framework. Their tools promise quite impressive amount of profit, but they don't take in account specific of products supply chain in Russia, current

state of technical progress in our farms and so on. Also, it feels like their calculations look more like advertisement for IBM Food Trust, but not the real numbers. Anyway, they propose that you ought to have in your disposal these kinds of information, depending on what type of stakeholder you present:

Distributor	Manufacturer	Retailer
Annual sales	Annual revenue	Annual revenue
Number of facilities	Number of facilities	Number of warehouses
	Number of stores where their products are sold	Number of distribution centers
	Number of people working on traces	Number of people working on traces
	Number of traces annually	Number of traces annually
	Number of people managing certificates	Number of people managing certificates

But we understand that not all of this information is opened to public. So, we require from you not to gather and to process large amount of information, but to be creative and deal with information, which can be found on the Internet. And remember, that you can take in account factors, that were not mentioned here (e.g., salary of IT specialists in Russia, demanded for implementation of these systems in your company).

Task

Implement IBM Food Trust, Provenance or alternative blockchain technology into food supply chain.

Details of the task:

1. Choose one of stakeholder: Distributor, Manufacturer or Retailer. It should be the real company, who operates in European part of Russia. Now it is your company!
2. Then pick a farm who collaborates with your company.
3. Calculate the benefits and risks of implementing described blockchain technology into supply chain, taking in account current state of farms and factories in disposal of your company.
4. Describe how the technology will be working in your company, when it will be implemented.

P.S. If you don't believe that blockchain can be implemented in Russian farms, here is one link that shows their capability of new technology:



(<https://medium.com/signals-of-change/russian-farm-first-to-track-its-activities-on-blockchain-7ea21808cfa6>)

Evaluation

- Originality (20/100)
- Clarity, completeness of proposed implementation plan (20/100)
- Calculations and argumentation (25/100)
- Understanding of how blockchain technology works (15/100)
- Presentation (20/100)