Blockchain Pilots: A Brief Summary

Blockchain technology is heralded as the next chapter of the information and network society and is perceived to have an enormous impact on our economy, trade and the public sector. As the UK Government Office for Science puts it: "[it] provides the framework for government to reduce fraud, corruption, error and the cost of paper-intensive processes. It has the potential to redefine the relationship between government and the citizen in terms of data sharing, transparency and trust." In this summary, we will briefly share the results of different pilot projects developed with and by Dutch governmental organisations. In addition, we have added our 12 recommendations to the Dutch government with regards to further development of its use cases as well as the implementation of Blockchain in government services.

BLOCKCHAIN

The internet is a global network, which we use for exchanging information. The internet is less useful for the exchange of value. For example: if you send someone a file, usually you send a copy. Both you and the receiver have the same file. It is fine with regards to information, but if you transfer money or the property document of your car, then it not appropriate. This is exactly what Blockchain makes possible: registering and transferring value in a tamper proof way.

A Blockchain is a worldwide network of computers, also called 'nodes'. These nodes have a copy of a database and manage this database collectively. Transactions are encrypted in a mathematically complex way. When the network agrees about the validity of the transactions, these are added to the database. This makes it impossible to commit fraud. By distributing the data over the entire network, the system becomes very robust: there is no person or organisation that has the authority that can be attacked.

BLOCKCHAIN PILOTS

A distributed technology that no longer needs a trusted third party is important to the government. Currently, in many cases, government agencies fulfill the roles of data manager/owner as well as trusted third party. In order to establish the exact opportunities and threats of this groundbreaking technology, the Dutch Public Service requested us to start pilot projects.

It is still early days for Blockchain. The current state of affairs is often compared to the early stages of the internet. We know what the Blockchain's core strengths are.

We are also aware that the technology isn't mature yet and a lot of work needs to be done before we can start building decentralised or distributed government services. At the same time, it is important to get in action. We have the chance to cocreate the future, which seems like a much better option than waiting for the future to be created for you. We have firm belief that it is crucial that we continue to create 'building blocks' that will help us to gradually develop these new services.

FIRST ROUND OF PILOTS (JUNE-NOVEMBER 2016)

The pilot projects took 4 - 5 months to complete. Each organisation selected a process or service that it wanted to modernise, improve or completely rethink using Blockchain technology. After doing our research and mapping the current process including its problems or inefficiencies, we matched technical experts and the public sector organisations. Together with these experts, we then developed a new - Blockchain based - process or service based on Blockchain.

Via this approach, we could fulfil two specific objectives: firstly, the participating organisations gathered valuable knowledge about Blockchain and its potential impact. Secondly, we developed a specific use case for each organisation. These use cases generated new questions - technological, legal and ethical - that are needed to be answered before these services can be further developed. It is important to underline the learning objective, since it resulted into taking Blockchain as a starting point of the pilot.

Informal networks
Since participating organisations would regularly meet, an informal Blockchain network was created within the government. We also ensured that the participating organisations got a clear picture of what the market and academic world have to offer at the moment. In addition to the government network, we invested in the creation of a government-business network that collectively will develop Blockchain applications. This network includes larger corporations, IT companies, universities and startups.

A BRIEF DESCRIPTION OF THE PILOT PROJECTS CONCLUDED IN NOVEMBER 2016

Digital Identity (Ministry of Interior Affairs)
The project team conducted research into the potential powerful combination of digital identity and Blockchain. Since (digital) identity is a broader and complex topic, the scope of the project was brought back to 4 user stories, one of them being age control while purchasing specific goods, such as cigarettes or alcohol. A particular advantage of Blockchain in relation to digital identity could be that it becomes easier to share specific information only in a specific context. Furthermore, each citizen would have control over which data he would share with whom (for obvious reasons, the exceptions can be made for governmental organisations). Going back to the age control, the owner of a shop only needs to know that the person in front of him is older than 18 years old, but currently (has to) ask for a document containing more data.

Next step: Building an application (prototype) for one of the user stories.

Execution of a judicial decision of juvenile court (Ministry of Justice)
In The Netherlands, minors can get a so-called HALT sentence for committing (minor) crimes. This sentence means that the minor has to do labour. When the work gets completed, the minor no longer has criminal record. The project team looked into the possibilities to use Blockchain for the registration of labour that has been completed. Blockchain would be an interesting technology for such a log, but important legal questions need to be resolved. For example, would it be legally allowed to store information on a Blockchain permanently if the point of getting a HALT sentence is that the minor can continue his life without a criminal record?

Next step: Building a prototype.

Information sharing during a criminal trial (Ministry of Justice)
The Police, the Prosecutor, the Judges and the lawyer of the accused share information before and throughout a criminal trial. For some of the information objects, the Ministry of Justice's IT systems are used. The project team desired to understand whether Blockchain could help create a log of what information was shared with whom at what time. The idea was that this could prevent proceedings from being paused as a result of the claim of one of the parties involved not to have received a piece of information. Blockchain would become a security/truth layer 'on top' of the existing systems.

Next step: Involving multiple stakeholders and determine viability of developing a prototype

Changing role because of Blockchain (Court of Audit)
The Court of Audit controls approximately 240 billion Euros of yearly expenditures by the central government. It checks whether the administration is being done properly and if policy is being executed as it was intended. In order to fulfil its role, the Court each year receives data packages from all central government organisations. If the central government started using a Blockchain based administration, the Court's role could change significantly. It could have realtime access to the data and intervene at an earlier stage. Furthermore, compliance could be built into the financial rules. The Court expects that its role will shift (partly) from checking by the end of each year to establishing compliance upfront and possibly intervening during the year.

Next step: to be determined

Authorisations in the healthcare process (Healthcare Institute)
The Healthcare Institute focused on authorisations in the healthcare process. The pilot project evolved around a fictional elderly person, who required care from different healthcare providers. Who can make arrangements when this person ends up in a (temporary) emergency situation currently is arranged in an informal way or at best registered in a notebook. Healthcare providers don't always know each other or aren't aware of specific arrangements. The Healthcare Institute sees Blockchain

as a technology that can create a clear overview of authorisations in the healthcare process. It has developed a prototype on Ethereum, which allows involved healthcare providers to get real time information on a need to know basis about their client/patient. The client/patient has more control over his data and can determine - via an application - which professional can get access to additional information.

Next step: Testing phase with prototype

Optimising the subsidy process (Province of Noord-Brabant)
The Province was one of the many organisations that wanted to look into the possibility of integrating Blockchain in the process of granting subsidies. The case it selected was a subsidy for the disposal of drug waste. Using Blockchain technology and smart contracts, it would be possible to reduce the time to get through the administrative and financial processes from 13 weeks to 13 minutes.

Next step: Do additional research into the judicial applications of a Blockchain driven subsidy process

FlashCompany (Chamber of Commerce)
Establishing a temporary foundation in order to collect money for a good cause is a time consuming administrative process. The Chamber looked into the possible benefits of establishing a temporary organisation (FlashCompany) on the Blockchain. It found out that for the registration process (online), opening a bank account (can be linked automatically) and selecting conditions for establishing and ending the temporary organisation, Blockchain would be a viable solution. In addition, using smart contracts for donations ("If this video has 1000 views, I will donate 100 Euro") could be interesting.

Next step: Develop a prototype of a FlashCompany

Registering a ship (Cadastre, Land Registry and Mapping Agency)
The Cadastre is responsible for registering ships. Currently, the (future) owner of a ship has to collect several documents from different organisations / companies and

send these to the Cadastre. The Cadastre then manually checks all information. In cooperation with TU Delft, the Cadastre has developed a use case for Blockchain based registration of ships. This system would result into a more user-friendly system

for the owner of a ship that only needs to fill in a registration form. Upon registration, a "file" on the Blockchain is created which triggers requests to, for example, the builder of the ship, who can add information to this file. The Cadastre doesn't have to manually check each set of documents, but gets a notification when data of the parties involved in the registration of a ship don't match.

Next step: Further develop this concept with TU Delft. The current technology needs to be brought to the next level in order to build the fully automated registration system.

Improving Request for Legal Aid (Legal Aid Board)
The Legal Aid Board wanted to verify whether Blockchain could create a faster, more secure automated process for the attribution of legal support. The Legal Aid Board has a register of trusted lawyers that can be matched with people who request legal support. In order to make this match, different information sources (including from other organisations) have to be checked, in particular the income of the person requesting legal aid. A lawyer cannot do unlimited work via the Legal Aid Board, which is why he can offer assistance as long as he hasn't used up his credits for the year. In order to understand what the added value of Blockchain could be, the Legal Aid Board has worked on a use case focusing on requests for legal support. The added value of Blockchain could be an error free log of available lawyers, making third party information sources (e.g. Tax Agency) is another challenge to overcome.

Next step: To be decided

Smarter Tax Revenues (Tax and Customs Administration)
The current system of collecting and redistributing income taxes is a complex system involving more than 600 organisations, wherein multiple similar or identical (financial) administrations coexist. The Tax Agency has created a use case that makes it possible to redistribute tax money as soon as it gets deducted from an employee's income. The most fundamental shift would be that entire data is combined into one dossier that is managed by the citizen involved. That citizen would have better understanding about who has (or wants) access to his/her data. Changing the income tax system with 135 billion Euros annually at stake requires further research.

Next step: Further research by the Tax Agency, mapping legal implications of a Blockchain based Income Tax System

Transport of toxic waste (Human Environment and Transport Inspectorate)

Transporting toxic waste from the Netherlands to another EU State in order for it to get disposed is a complex process that involves multiple stakeholders: the Human Environment and Transport Inspectorate (HETI), its foreign counterpart, the company that wants to dispose waste, a transport company and the company that will take care of the disposal. Currently, this is a paper-intensive process that requires all parties to have their own administration. During their pilot project, the HETI rethought the entire process. All notifications during this logistical process would go through different applications; approval for a transport could be automated based on a smart contract on the Blockchain.

Next step: the HETI will involve all stakeholders to build first prototype i.e. the smart contract on the Blockchain, including smartphone applications.

RECOMMENDATIONS

We are convinced that the Netherlands should invest more time and resources into Blockchain development. This technology could potentially change the role of the public administration, it is crucial to be part of that transformation. Our recommendations for a proactive approach by the Dutch government are briefly decribed here:

1. Follow the footsteps of the UK, Estonia and Dubai and get together with companies and universities to define the Dutch vision on a Blockchain based government. Be courageous as well as outspoken and define clear policies with regards to digital identity, value registration and critical personal data management.

2. Be transparent: share information regarding Blockchain projects and its results; positive and negative. To innovate successfully, you will have to be able to fail fast. Failing is part of any solid development process.

3. Set up a multidisciplinary Blockchain team. On behalf of the entire government, this team should coordinate Blockchain projects and collaborate with other governments, universities, research agencies and companies. Several Blockchain hubs have come into existence recently, for example banks, Philips and the TU Eindhoven, the Blockchain Competence CEnter and the Smart Services Campus in Heerlen. Through the Blockchain Team, the participation of the Dutch Public Sector, in these initiatives, can be coordinated. This minimum level of coordination is required to prevent that different governmental organisations are participating in all sorts of projects without keeping in mind the common goals / ambitions of the government. In an ideal scenario, the Blockchain Team dedicates 50% of its time to its own projects and the remaining 50% to support different organisations, for example in developing pilot projects and prototypes, knowledge sharing and organising workshops.

4. Establish rules and standards for Blockchain code that is created with government funding. This code should be completely open source. Make sure that vendor lock-ins aren't possible in any form (service contracts, apps built on top of open source code). This also requires from the public service that they make open, transparent and honest arrangements with all suppliers.

5. Make sure that all innovative companies can become a partner of the public sector, not only large IT companies and consultancy firms. Currently, financial regulations make it harder for smaller companies and startups to work with the government; they don't have the resources to dedicate a significant portion of their time to administrative procedures.

6. In order to be able to do a (technical) review of Blockchain services and applications, invest in Blockchain knowledge within the Blockchain team. This could be done in two ways: in collaboration with the government organisation i-Interim as well as by creating a network of technical experts from universities.

7. Don't start large Blockchain projects at this stage. The technology is still too immature and knowledge within the public administration should be enhanced. Start small: invest in knowledge and do small projects (experiments / creating the first building blocks).

8. Set up a Blockchain Lab in collaboration with the ICTU (IT Foundation that works for the Dutch government). Such a Lab would enable the Blockchain Team and governmental organisations to quickly transform use cases into working prototypes in a secure and trusted environment.

9. Invest in Blockchain knowledge within the public sector. Make sure that there are educational programmes for different fields of expertise, as done for legal experts by the Public Sector Legal Academy.

10. Invest in the development of the next generation Blockchain technology. A limited number of experts in the academic world and financial sector are working on next level Blockchain technology. Be part of these initiatives and ensure financial support in order to have access to the latest state of the technology.

11. Collaborate with student networks, for example via hackatons and challenges, where they can gain knowledge, projects or digital currencies in exchange of ideas, internships and small projects. Including students in the development of use cases has proven to be valuable. It was a great way to include young, talented people with an open mind and new ideas. Working with the next generation helps the government

in becoming more innovative as well as to get in touch with potential new civil servants at an early stage.

12. Last but not least... Allocate more buget for the development of Blockchain (services). If Blockchain is a priority for the public sector, then more financial investments should be made. These funds can be used for participating in different projects to create a proper basis within the administration (Blockchain team and lab).

FOR MORE INFO
Please contact us.

Koen Lukas Hartog:
KL.Hartog@Seedble.com
+31 6 17 47 3222

Marloes Pomp
marloespomp@gmail.com
+31 6 10 81 0308