Enterprise blockchain solution

We need to research and implement a blockchain that allows customers to verify the data the company provides. This also includes private channels which are uncommon for blockchain.

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Impact on society

What impact is expected from your technology?

What is exactly the problem? Is it really a problem? Are you sure?

Proving the data provided by Engie is valid and legit is a long and costly process.Therefore Engie wants us to implement a solution using blockchain which can automate this.

Are you sure that this technology is solving the RIGHT problem?

Since Engie provides custom contracts about facilities with certain conditions, for example water, lighting and electricity, they need to prove to their customers that they have delivered the agreed upon conditions in their facilities. This problem can be solved using external consultants that check the whole process but this is not really cost effective to do whenever a customer requires a checkup. Therefore they want to use the blockchain to decrease costs and improve transparency.

How is this technology going to solve the problem?

Blockchain is known for its immutable data, most of the time public, storing. In our case this is ideal because in order to create trust, the data should be immutable after putting it on the blockchain or any other data storing method. Because of how blockchain works, changing one record would invalidate the entire blockchain, thus alerting people that something is wrong.

What negative effects do you expect from this technology?

Since Blockchain is immutable the data that has been put on it will be available for ever. Which when data is incorrect or no longer needed can cause problems with customers.

In what way is this technology contributing to a world you want to live in?

Blockchain is a safe way to trade information, without a central authority and with the guarantee that the data is unaltered. This allows for trading without a middle-man, saving
people money and removing the possibility of this middle-man using your information illegitimately. This will improve the way we trade goods and information and makes it a lot safer.

Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.

Were still at an early stage of development, thus not everything is final, but were probably going to just store hashed data instead of the entire sensor data. Storing all the raw data would not only fill up the blockchain way too fast, but most data is irrelevant anyways. By just storing hashes, people can always check if the encryption of the provided data (this would still come from a traditional database) gives the same hash that is stored on the blockchain. If that isnt the case, then the data on the database isnt the same as the data stored the blockchain.
Additionally because the blockchain would only store hashes, even if someone unauthorized gains access to the data, the data are only hashes. And without the original input, the hashes arent usable.

Hateful and criminal actors

What can bad actors do with your technology?

In which way can the technology be used to break the law or avoid the consequences of breaking the law?

The only way to use our technology to break the law is either alter the data, changing the measured amount of energy used or to use the saved data to determine when there will be no people at a certain location. By using a blockchain we guarantee that the data is immutable and by using private channels we guarantee only the consumers and Engie have access to the data.

Can fakers, thieves or scammers abuse the technology?

The only way to (slightly) invade privacy with our technology would be for Engie to examine the energy use of a company, but since they are the ones providing the energy we dont see this as a infringement of privacy.

Can the technology be used against certain (ethnic) groups or (social) classes?

If pricing is too high, smaller companies might not be able to pay for this and risk that they dont get the services or product theyre charged for. And there wouldnt really be a way for those companies to prove that, because Engie could in theory just change data and proof that they did deliver on their promise.

In which way can bad actors use this technology to pit certain groups against each other? These groups can be, but are not constrained to, ethnic, social, political or religious groups.

If there are rules that companies for instance must be mandatory closed on national holidays, if one company is still running on that day and a different company would be able to see that (because they can see that there still was a high amount of electricity used), they could blackmail that first company.

How could bad actors use this technology to subvert or attack the truth?

The only actor which can subvert the truth with our technology is Engie, and only in case we decide to use a blockchain with a centralized authority, which would defeat the purpose of using a blockchain all together.

Now that you have thought hard about how bad actors can impact this technology, what improvements would you like to make? List them

below.
No we did not, since blockchain is designed to make it impossible for bad actors to alter data, meaning a lot of people have already put a lot of thought into these matters.

Privacy

Are you considering the privacy & personal data of the users of your technology?

Does the technology register personal data? If yes, what personal data?

Our technology does not directly register personal data only the data of energy consumed in a space. Which is in no way connectable to a single person.

Do you think the technology invades the privacy of the stakeholders? If yes, in what way?

If data was stored on a per person basis, then it could invade someone's privacy. Because people could for instance tell when and how long someone uses a lot of electricity. But because the data is per company it isnt really possible to trace back per person.

Is the technology is compliant with prevailing privacy and data protection law? Can you indicate why?

Our application uses sensor data gathered in facilities. This data only includes energy usage, lighting, warmth and other special services which should not be retracable to a single person. Therefore we dont use or store any personal data and should be in compliance with the GDPR.

Does the technology mitigate privacy and data protection risks/ concerns (privacy by design)? Please indicate how.

Our technology is based around security and does not collect any personal data, the only data collected is the energy consumption in a specific space and this data is only accessible by the ones consuming the energy.

In which way can you imagine a future impact of the collection of personal data?

Again, the only data collected is energy consumption of a space, no personal data. The only imaginable way of using this data is to determine when people are using the energy and thus when people are present, but the whole concept of our technology is to secure the data so that only the consumer can access it.

Now that you have thought hard about privacy and data protection, what improvements would you like to make? List them below.

No, not really as we don't use and store any private data.

Human values

How does the technology affect your human values?

How is the identity of the (intended) users affected by the technology?

The technology is in line with our ideals and is used to make the whole process of showing that Engie delivers their products more transparent and less prone to manipulation. Thus improving the overall quality of the product delivered. This is ofcourse in line with our ideals.

How does the technology influence the users' autonomy?

The technology should not influence any users ability to make decisions, it only records data in an immutable list. The technology does however make users dependant on the blockchain, should it somehow fail and lose all data they have a big problem. This should be impossible however if we implement blockchain in the correct way.

What is the effect of the technology on the health and/or well-being of users?

The technology does not affect the health and/or wellbeing of the user aside from the stress it could prevent giving the users certainty the data of their energy consumption is correct.

Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.

No, since our technology is for adding transparency and improving the overall process we already kept this in mind.

Stakeholders

Have you considered all stakeholders?

Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by answering these questions.

Name of the stakeholder
Engie

How is this stakeholder affected?
The project was their idea and they are going to use it.

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
Fontys

How is this stakeholder affected?
Fontys determines the grade for the project together with Engie

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
Project team

How is this stakeholder affected?
We as the project team need to deliver a good research and working prototype, we also needs to use this project to get a good grade for the semester.

Did you consult the stakeholder?
Yes

Are you going to take this stakeholder into account?
Yes

Name of the stakeholder
Engie Clients

How is this stakeholder affected?
The application is made for them and Engie in order for them to see that the services Engie provides meet their standards

Did you consult the stakeholder?
No

Are you going to take this stakeholder into account?
Yes

Did you consider all stakeholders, even the ones that might not be a user or target group, but still might be of interest?

Name of the stakeholder
Engie Shareholders

How is this stakeholder affected?
Our solution can provide them more revenue or more costs

Did you consult the stakeholder?
No

Are you going to take this stakeholder into account?
No

Name of the stakeholder
Clients and employees of Engie's Clients

How is this stakeholder affected?
They use the facilities and services provided by Engie and need to be satisfied.

Did you consult the stakeholder?
No

Are you going to take this stakeholder into account?
No

Now that you have thought hard about all stakeholders, what improvements would you like to make? List them below.
Not really

Data

Is data in your technology properly used?

Are you familiar with the fundamental shortcomings and pitfalls of data and do you take this sufficiently into account in the technology?

The data used in our project isnt subjective because theyre factual and come straight from hardware sensors. The biggest limitation of our data is that because it will get stored on a blockchain, all data will be persistent and thus increase the size of the blockchain.

How does the technology organize continuous improvement when it comes to the use of data?

The data we store on the blockchain can not be changed therefore this solution is not really viable for changing data and insights after they have been placed upon the blockchain. They can however be stored using the new data and insights on the existing blockchain without too many problems.

How will the technology keep the insights that it identifies with data sustainable over time?

Since no personal data is being used, the processing of data is legal. The data and algorithms used can be kept current and when the source of data is discontinued the data will still remain on the blockchain. Therefore our solution is quite future proof.

In what way do you consider the fact that data is collected from the users?

In our project user data isnt collected directly. Different sensors will collect data, while these sensors might be able to get linked back to a single person. This isnt direct user data and do go of the assumption a given person is always at the same place and same time, etc. Even still, this wont matter onces its stored as hash on the blockchain.

Now that you have thought hard about the impact of data on this technology, what improvements would you like to make? List them below.

No, we did not change our design.

Inclusivity

Is your technology fair for everyone?

Will everyone have access to the technology?

No, the technology will only be available to the clients of Engie, since they are the only ones affected by it. The only ones affected by this exclusion will be other energy companies that do not use blockchains and still need to spend time and money on validating the data.

Does this technology have a built-in bias?

Technically the system has a bias for Engie itself, because theyre the ones putting the data in the blockchain but also the ones maintaining the data in a traditional database. Thus if they wish to manipulate the data before putting it on the blockchain, it would still pass as validate data.

Does this technology make automatic decisions and how do you account for them?

Since everything one the blockchain is public and immutable everything is accessible and verifiable by everyone.

Is everyone benefitting from the technology or only a a small group? Do you see this as a problem? Why/why not?

The application has a pretty limited user base and thus will not affect the majority of the public in any way. This is not a problem since only the clients, who are benefitting from our technology, are the ones who should be able to view the data.

Does the team that creates the technology represent the diversity of our society?

We do not have a diverse team, we are four Caucasian males. This should not be a problem however, since our technology only needs to verify data.

Now that you have thought hard about the inclusivity of the technology, what improvements would you like to make? List them below.

No, not really.

Transparency

Are you transparent about how your technology works?

Is it explained to the users/stakeholders how the technology works and how the business model works?

Our users, the ones that need to verify the data, are already blockchain experts and therefore we dont need to explain our technology. We will include documentation on how to implement our specific blockchain.

If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?

Blockchain is a documented technology. We will also provide documentation.

Is it possible to file a complaint or ask questions/get answers about this technology?

No, because the only thing our technology will do is record data in a blockchain. There is nothing to complain or ask about. The only questions someone could have are about blockchain itself, which is documented on the internet.

Is the technology (company) clear about possible negative consequences or shortcomings of the technology?

We will deliver a research report and documentation in which we will document all consequences of using blockchain technology.

Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.

No.

Sustainability

Is your technology environmentally sustainable?

In what way is the direct and indirect energy use of this technology taken into account?

Blockchain is a new and rapidly growing technology and therefore we expect it to sustain for a long time. Our technology is also supposed to reduce the costs of validating data.

Do you think alternative materials could have been considered in the technology?

The consensus mechanism for blockchain is mainly done via either proof of work or proof of stake. Proof of work can cost a lot of energy, but only when the network is large. Our specific project isnt likely to run on a large scale peer-to-peer network, like Bitcoin for example. Therefore the environmental footprint likely isnt going to get big or even large enough to make any difference.

Do you think the lifespan of the technology is realistic?

Depending on the chosen consensus mechanism our technology could increase the use of energy a lot, since using proof of work for example requires miners to validate transactions, which requires computers to run.

What is the hidden impact of the technology in the whole chain?

This question has not been answered yet.

Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.

No we did not.

Future

Did you consider future impact?

What could possibly happen with this technology in the future?

This question has not been answered yet.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one utopian scenario.

In the future blockchain is the main financial system and provides stability and prosperity to all the people. Since there are now only global decentralized currencies payments are safe and without many fees. Our implementation is now trusted and seen as a robust and stable way of showing the data to the clients. Engie no longer has any problems in proving that the data they provide is correct.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one dystopian scenario.

In the future all interaction is done by blockchain, removing the need for human interaction all together. Customer service is not at all important anymore and businesses only have a presence on the web.

Would you like to live in one of this scenario's? Why? Why not?

Yes, scenario 1 since it includes safe and easy trading for all, increasing the amount of goods and services accessible to each human.

What happens if the technology (which you have thought of as ethically well-considered) is bought or taken over by another party?

When our technology is bought by another party it only means they adapt a blockchain technology too. Our technology is hard to use in the wrong way and needs to be rewritten in order to be used in a different way.

Impact Improvement: Now that you have thought hard about the future impact of the technology, what improvements would you like to make? List them below.

No they did not.