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School of Design

Service Design and Blockchain For Digital ID



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Abstract

English

This project is about the connection and the possibilities that we, as a Service Designers have inside of the technological world, and how can we solve already existing problems finding a bridge between the parts involved and how far we can go inside unknown lands.

From this unknown lands, I started my desk research about Blockchain, trying to understand all the information in a common language and translating it into opportunities to improve and apply from the Service Design perspective, understanding the advantages and disadvantages and define how far I could go, during this part, I selected one of the three main development topics with Blockchain around the world: Digital ID.

When I discover all the potential inside Digital ID with Blockchain technology, I started to navigate into the deep sea of Digital ID and legal frameworks around the world, setting all the rules and requirements to arrive to a final conclusion.

Then, my research journey ended up in the analysis of already existing Digital ID solutions, some of them taken as an example for improvements and others just to evaluate why they are not really successful, in this detailed examination, I decided to start working on a improvement proposal of one of this examples, detect meaningful pinpoints and propose a solution involving all the previous collected knowledge.

At the end, I applied my Service Designer skills to bridge 3 different worlds with 3 different languages: Blockchain, Digital Identification and Service design and propose a solution that represent a clear improvement of an actual user experience following legal frameworks and Global standards around the world, that represent enormous advantages for the global economy.



Abstract

Italiano

Questo progetto riguarda la connessione e le possibilità che noi, come Service Designers, abbiamo all'interno del mondo tecnologico, e come possiamo risolvere problemi già esistenti trovando un ponte tra le parti coinvolte e fino a dove possiamo spingerci all'interno di terre sconosciute.

Da queste terre sconosciute, ho iniziato la mia ricerca su Blockchain, cercando di comprendere tutte le informazioni in un linguaggio comune e traducendole in opportunità di miglioramento e applicazione dal punto di vista del Service Design, comprendendone i vantaggi e gli svantaggi e definendo fino a che punto potrei arrivare, durante questa parte, ho selezionato uno dei tre principali argomenti di sviluppo con Blockchain nel mondo: Digital ID.

Quando ho scoperto tutte le potenzialità del Digital ID con la tecnologia Blockchain, ho iniziato a navigare nel profondo mare del Digital ID e dei quadri legali in tutto il mondo, stabilendo tutte le regole e i requisiti per arrivare ad una conclusione finale.

Poi, il mio viaggio di ricerca si è concluso con l'analisi di soluzioni di Digital ID già esistenti, alcune prese come esempio per i miglioramenti ed altre solo per valutare perché non hanno realmente successo, in questo esame dettagliato, ho deciso di iniziare a lavorare su una proposta di miglioramento di uno di questi esempi, individuare punti di riferimento significativi e proporre una soluzione che coinvolga tutte le conoscenze precedentemente raccolte.

Alla fine, ho applicato le mie capacità di Service Designer per collegare 3 mondi diversi con 3 lingue diverse: Blockchain, Digital Identification e Service design e propongo una soluzione che rappresenta un chiaro miglioramento di una user experience reale seguendo quadri legali e standard globali in tutto il mondo, che rappresentano enormi vantaggi per l'economia globale.



To the original Aura, because everything I am today is because of you, thanks from here to wherever you are right now.

To my sister, thank you for paying my Netflix, and almost everything else, couldn't do this without it, and her.

To Marc, and our ability to manage a long distance tutoring, thank you for believe in this from the beginning, looks like I did it!

And to all my friends, for all their patience and love with me during this crazy months, I couldn't have done it without them.

0.0 Introduction

“It is difficult and probably fruitless to try and attempt to predict what will happen in the relatively near future, it is better, rather to equip ourselves to construct that future, technology, of whatever kind is inherently neither good nor bad, on its own, it’s simply and instrument, a tool of the trade, that can produce different results according to how its makes uses it”

Carlo Napoli
Head of open innovation
Culture and project, Enel

Design & technology

Designers are the bridge between technology and user adaptation, we are one of the key factors that humanize concepts and technologies and turn them into human centered experiences.

Developers are launching updates and creating something new everyday and they need a figure to be present all along the journey and give shape and usability to their ideas; In the same way, designers needs technology as a tool to solve XXI century issues and make people's life easier.

Therefore, In a world where the experiences are the core of every product, we, as a Service Designers must start including in our agendas the upcoming technological developments that will have a huge human impact and will evolve with the need to be carefully designed in terms of adaptation, experiences, communication and behaviors, always with human centered values as a core to in fact, solve real needs, not just create more technology.

With this two big factors on my hands: **Technology and Design**, I started to analyse one of the main technological developments that has a strong presence

in both aspects: **Blockchain**. that is more than just cryptocurrencies and bitcoins, it contains some particular qualities that can be the core to design solutions in different areas of our society, with Blockchain we can talk about exchanges between everybody, everywhere in the world without a central figure, the option of storage the records of this exchanges in a transparent and verifiable way that can improve actual processes like global shipping, parts tracking, digital identity, healthcare among others.

Taking into consideration that the demand of more information about the goods and services that the clients are purchasing is increasing in a considerable way, services

are obligated to offer higher standards of data security; Blockchain can act as an answer to many of these aspects, even though the transition needs to be also carefully designed because of the change of system structure, Design for trust will be for sure one of the main elements of any Blockchain system and we need to prepare ourselves thinking...

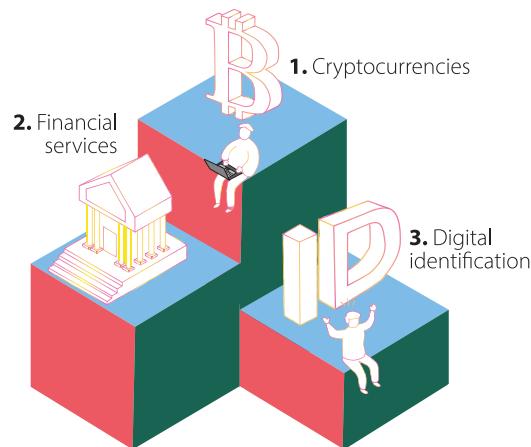


Figure 1: Scale of developments inside Blockchain technology, 1 cryptocurrencies, 2 financial services and 3 Digital identification.

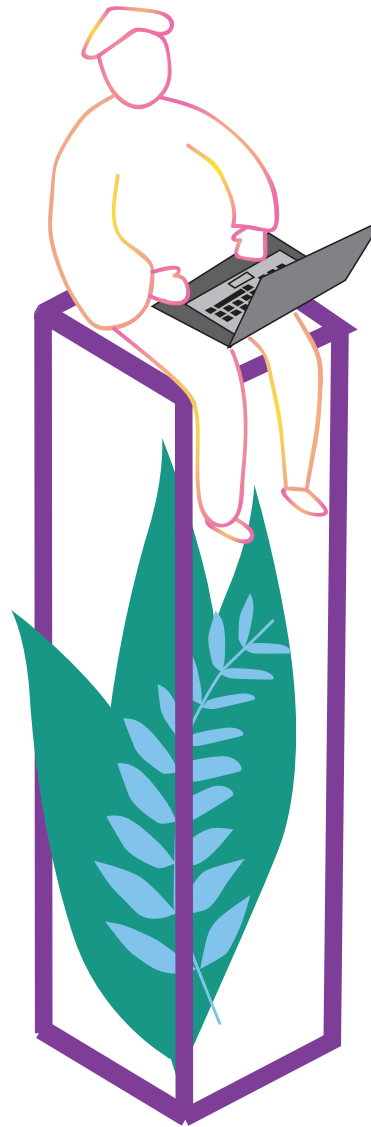
how might we design for more transparent interactions? How will this factor affect human interactions? How can we communicate the usability of the systems in a common language to our users?

Thesis Structure

This thesis project started from my own curiosity about Blockchain and the possible scenarios that a Service Designer can work on involving the technology.

I went to Paris last year to participate in a competition about the development of a new user experience in banking with bitcoins and the central topic was how the perception of money will change in the near future and this starting point made me realise the importance of **being informed and start preparing ourselves for the already happening technological changes.**

During this journey, I had the opportunity to interview experts both from Digital ID and Blockchain, participate in a Jam related with the design of public services in Barcelona and of course it has been a discussion topic among my colleagues, all this journey is wrapped up in the **following chapters:**



1

ABOUT BLOCKCHAIN

Description about the basis of Blockchain, to design a system based on a technology is really important to understand advantages and disadvantages to define how far can we go.

2

ABOUT DIGITAL ID

Behind the design of a Digital ID system, there are a lot of Legal considerations and standardization that a new system should follow, understand this was essential to arrive to the final conclusion.

3

IMPROVING DIGITAL ID SYSTEM

In this chapter I wanted to evaluate an actual ongoing Digital ID solution and I found SPID in Italy, I applied the Service Design tools to understand painpoints and possible improvements scenarios.

4

MY PROPOSAL

The most practical way that I found to communicate all the collected knowledge was through the improvement of an actual Digital ID system, in this chapter I explain how the system would be if it's designed solving actual pain points with blockchain bases.

5

CONCLUSIONS

This chapter summarizes the final thoughts and the general findings.

Roadmap

0.1 About Blockchain:



When?

January - May 2018

Activities

- Digest information about the technology
- Create a common language
- Watch videos about the topic
- Interview with Expert

Results

- General understanding of Blockchain technology
- Clusterization of the information in topics
- Blockchain mindmap

0.2 About Digital ID:



When?

March- June 2018

Activities

- Understand the importance
- Understand legal frameworks
- Analysis of cases of study
- Review of European context

Results

- Set several implementation rules
- Evaluate possible solution scenarios
- Insights from cases of success

0.3 Improving Digital ID system

FIELD & USER RESEARCH

When?

June - July 2018

Activities

- Interviews with actual users
- Survey about usability of the service
- Interview with service provider
- Participation in Barcelona GovJam 2018

Results

- Deep understanding of the actual service
- Insights from the Public administration perspective
- Definition of pain points

0.4 My proposal

SERVICE DESIGN

When?

July- September 2018

Activities

- Analysis of cases of success
- Design of a new solution
- Review with experts from service design and Blockchain technology

Results

- New journey map
- New storyboard
- Design of touchpoints involved
-

0.1 About Blockchain

Why I started my project with Blockchain?
because of my own curiosity about the
possible scenarios that a Service Designer
can work on involving the technology.

*“Design is human centered, it may integrate
technology and economics, but it starts with
what humans need or might need, what
makes life easier? more enjoyable, what
makes technology useful and usable?”*

Tim Brown
IDEO CEO

0.1.1 What it is

Let's start explaining that Blockchain should be understood in 3 dimensions¹:

Technical

Backend database that has a distributed ledger, like for accounting.

Business

It's an exchange network for transferring value between peers.

Legal

It's a mechanism that validates a transaction and can make it valid from a legal point of view as well. It doesn't require someone in the middle to validate the transaction.

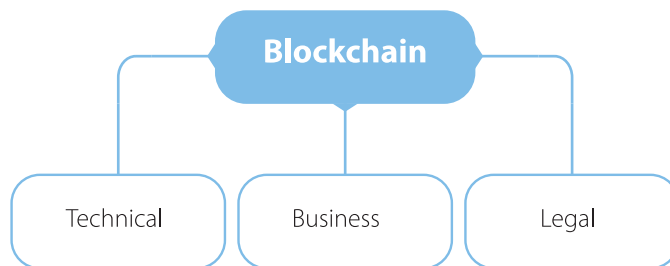


Figure 1: Tree Blockchain dimensions

1. (2018). Retrieved from <https://www.forbes.com/sites/jasonbloomberg/2018/02/24/dont-let-blockchain-cost-savings-hype-fool-you/#70a3600c5811>

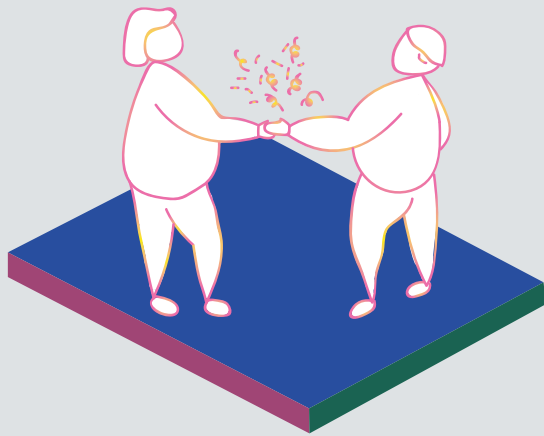
“Basically, a blockchain is a network across a large number of nodes, each participant needs a node, which is the entry point into the blockchain”

Bernard Golden
Vice President of Cloud Strategy
Capital One

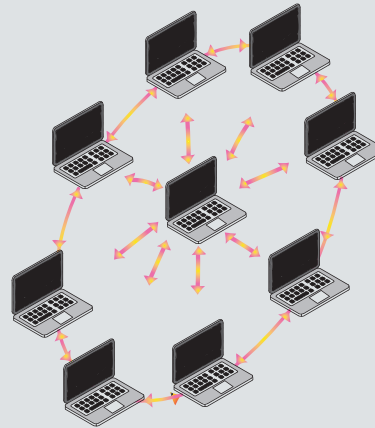
How does it work

The process described in basic terms starts with the need of someone to make any kind of transaction, this transaction is performed by a peer to peer network, this network is called Nodes and the activity that this network execute is verify, validate and approve the veracity of the information related with the transaction using known mathematical algorithms, this process is called mining, and the result of this approval is called block.

Once the transaction is verified, validated and approved by the network, a new block is then added to the existing blockchain (in a permanent and unalterable way) creating a new approved transaction.

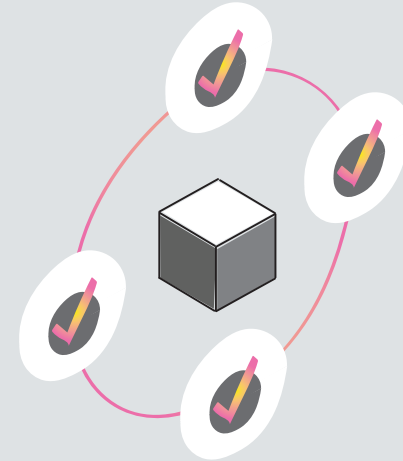


1. Someone request a transaction.



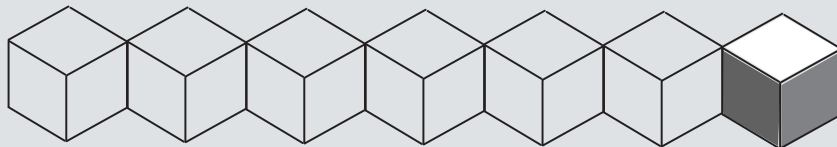
2. The requested transaction is performed by a P2P network consisted in computers known as a nodes.

Node: Server
Mining: Process

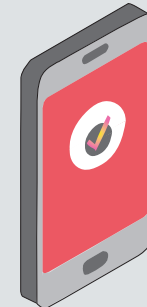


3. **Validation:** The network of nodes verifies, validates and approves the transaction using known algorithms,

Block: representation of the transaction online.



4. The new block is added to the existing Blockchain in a permanent and unalterable way.

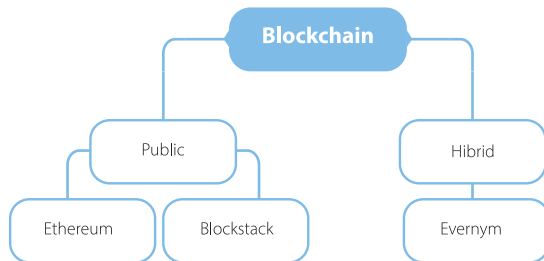


5. The transaction is approved.

2. Flieswasser, K., & Flieswasser, K. (2017). What Is Blockchain? A Brief Introduction. Retrieved from <https://www.topbots.com/what-is-blockchain-brief-introduction/>

Figure 2: Blockchain for dummies²

0.1.2 Types of Blockchain



0.1.3 Technology advantages and disadvantages

As a consequence of being an ongoing development, Blockchain system offers multiple features for management of the information stored but this features are way too new to fit completely inside of the existing systems and can represent problems in terms of legal adaptation.

In the next paragraphs I'll explain the main advantages and disadvantages that the system has at the moment, and the initial costs that the migration to this system can represent.³

3. Fauvel, W. (2017). Blockchain Advantage and Disadvantages - nudjed - Medium. Retrieved from <https://medium.com/nudjed/blockchain-advantage-and-disadvantages-e76fde3bbc0> (Fauvel, 2017)

Advantages & Disadvantages of Blockchain Technology. (2016). Retrieved from <https://blockchaintechology.com.wordpress.com/2016/11/21/advantages-disadvantages/>

4. Alex Preukschat, E. (2018). Identidad digital y 'blockchain': como llave al cambio del mundo. Retrieved from https://retina.elpais.com/retina/2017/06/05/tendencias/1496646930_763686.html

Advantages

1. Information security

Each miner provides a mathematical proof when is adding a block to the existing chain and this proof acts as a guarantee, if this proof exists, the block must be valid, the proof of validity is made through mathematical algorithms and the history of the processes is maintained and verified through the network to prevent falsification.

Validity of documents stored in blockchain as a possession or existence:

at the moment, every documentation requires a previous verification process before its inclusion inside of the blockchain service.⁴

The identification identities are those tools that allows to verify that the ciber user is really the person that owns that personal data.

In this sense, several identification mechanisms have been developed, such a pin number, SMS with code and electronic signature among others, whose implementation depends on the type of services offered by the entity or company and the level of security needed.⁵

[com/retina/2017/06/05/tendencias/1496646930_763686.html](https://retina.elpais.com/retina/2017/06/05/tendencias/1496646930_763686.html)

5. ¿Qué significa identidad digital y qué derechos están asociados a ella?. (2017). Retrieved from <https://blog.signaturit.com/es/mas-alla-de-la-reputacion-online-que-se-entiende-por-identidad-digital-y-que-derechos-estan-asociados-a-ella>

What is the eIDAS Regulation?. (2018). Retrieved from <https://ico.org.uk/for-organisations/guide-to-eidas/what-is-the-eidas-regulation/>

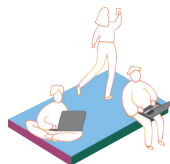
2. Information security

The level of security can be defined following the type of solution that is going to implement the technology, in the cases of high level needed, the system will allow users to access government, financial and health services, and talking about low levels, the users will have access to email accounts and basic profiles.⁶

In the cases where the high level of security is needed, the system can ask for two or more pieces of evidence about the identity of the user in order to continue working; usually, Biometric recognition can be a really useful component of this attribute.⁷

3. Against cibercrime

Because of the decentralization of data, Blockchain is definitely not a valuable target for hackers, it ensure integrity of data stored for example in Government repositories and protect it against insider threats, It can also be part of the system a fraud detection algorithms, manual auditing and internal decision engine.⁸



6. PAe - CTT - General - Política de Firma Electrónica y de Certificados. (2017). Retrieved from <https://administracionelectronica.gob.es/ctt/politicafirma#WvCPm9OFOV4>

Regulatory and policy trends impacting Digital Identity and the role of mobile. (2016). [Ebook] (1st ed.). London. Retrieved from <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/Regulatory-and-policy-trends-impacting-Digital-identity-and-the-role-of-mobile.pdf>

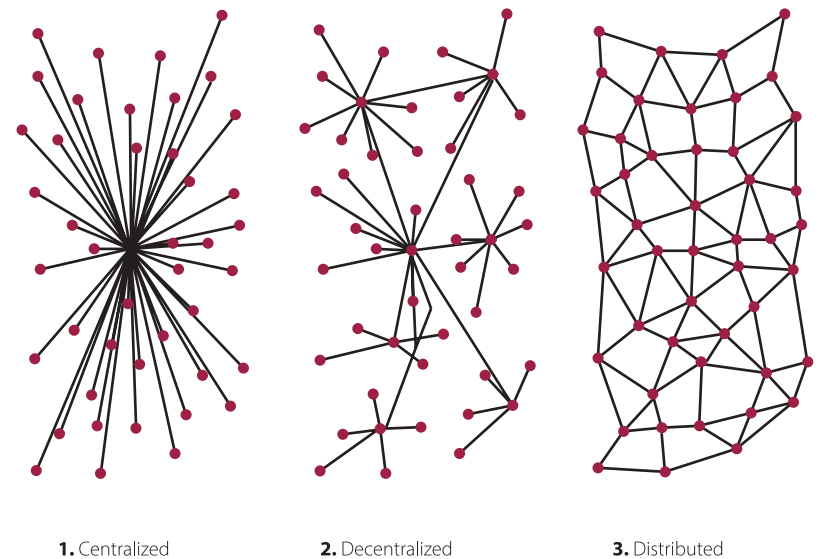


Figure 3: Distributed ledger technology⁹

Distributed system is a model in which components located on computer networks communicate and coordinate their actions by passing messages, with this explanation, a decentralized is also a distributed system.

4. Data control

82% of consumers worldwide would like to know when personal information and what type is being collected

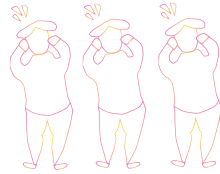
7. Multi-factor authentication. (2018). Retrieved from https://en.wikipedia.org/wiki/Multi-factor_authentication

8. Civic Secure Identity Platform (SIP) - Decentralized via Blockchain. (2018). Retrieved from <https://www.civic.com/products/how-it-works>

9. Blockchain - Distributed Ledger Technology Application Benefits?. (2017). Retrieved from <https://bitcoindexchangeuide.com/blockchain-distributed-ledger-technology/>

74% of EU consumers wants to give their specific approval before any kind of data collection.

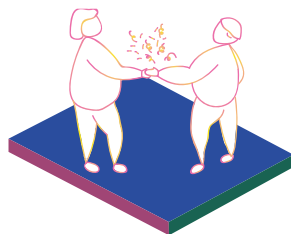
Just 18% feel in control of the info shared.¹



Blockchain is a user centric system, it allows them to control their data as they want, they have the opportunity to select what they want to share and specify with who, holding and providing the minimum necessary data to complete the transaction, returning the identity ownership to individuals.

5. Decentralized

Without the central administrator, Blockchain allows to make transactions between parties that doesn't know each other, the system enables a database to be directly shared, eliminating third party intermediaries and upper costs for exchanging goods, making the costs of the transactions cheaper.



10. Digital identity as a key enabler for e-government services. (2015). [Ebook] (p. 3). Retrieved from <https://pdfs.semanticscholar.org/presentation/00dc/0039683df1c2fdc61e6375aed7c8b5b2d43f.pdf>

11. Fauvel, W. (2017). Blockchain Advantage and Disadvantages – nudjed – Medium. Retrieved from <https://medium.com/nudjed/blockchain-advantage-and-disadvantages-e76dfde3bbc0>

Disadvantages

Principal problems

This part is called **Blockchain VS legal framework**, and more specifically VS Digital ID framework.¹¹

- Blockchain network is close to impossible to modify, overtime becomes harder and harder, this means that the technology is immutable, consequently the right to be forgotten can't be applied and this represent a big problem inside of the Digital ID legal framework.
- The lack of geographical location of the ledgers is also a representative problem, they can be produce and verified from anywhere, giving them not specific location and generating another problem against legal frameworks.
- Time is another problem, the decentralized databases will always be slower, Blockchain is restricted to handling 7 transactions per second, at the same time, Visa handle 56.000 per second, the transaction takes a lot of time because two constraints in the creation of the block in terms of dimension and time, "You can build just a limit amount of blocks for an hour let's say, you have a limited amount of transactions per hour and because of this, you can't handle thousands of thousands of transactions per second" says Stefano Leone,
- Manager of Blockchain Lab in Deloitte Italy.¹²

12. Leone, S. (2018). Blockchain and Digital ID [In person]. Deloitte Italy.

0.1.4 Interview with the expert



Stefano Leone

**Manager
Blockchain lab
Deloitte Italy**

29/06/2018

The interview with Stefano Leone was realised in Deloitte offices in Milan, Italy, with the purpose to understand how the technology behaves inside of a Digital ID system and what are the possible solutions for the legal problems that Blockchain is confronting nowadays.

Following 10 questions based on blank spaces from the desk research, the information collected was really helpful to understand the situation from an expert point of view.

13. Leone, S. (2018). Blockchain and Digital ID [In person]. Deloitte Italy.

“We say that on the Blockchain you have a trilema problem, if you take a triangle and on the vertex you have scalability, security and decentralization, you can have a maximum of two characteristics at the same time, so if you want a system perfectly secure and decentralized, you will not have a scalable system”

Stefano Leone
Manager Blockchain lab
Deloitte Italy

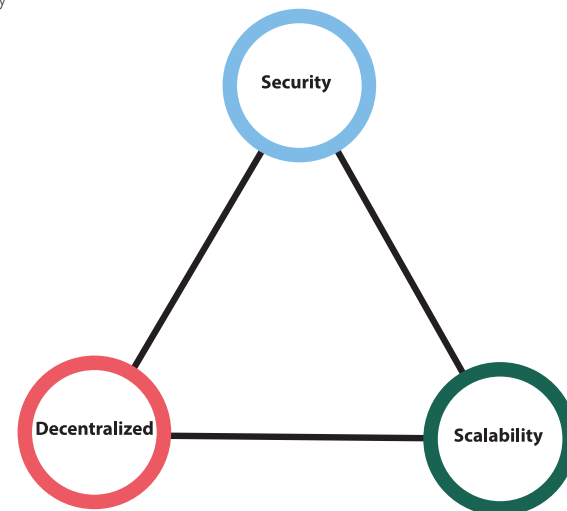



Figure 4: Blockchain trilema problem¹³

“We have a technique to improve the amount of transactions that we can have and other kind of group of solutions of the offchain”

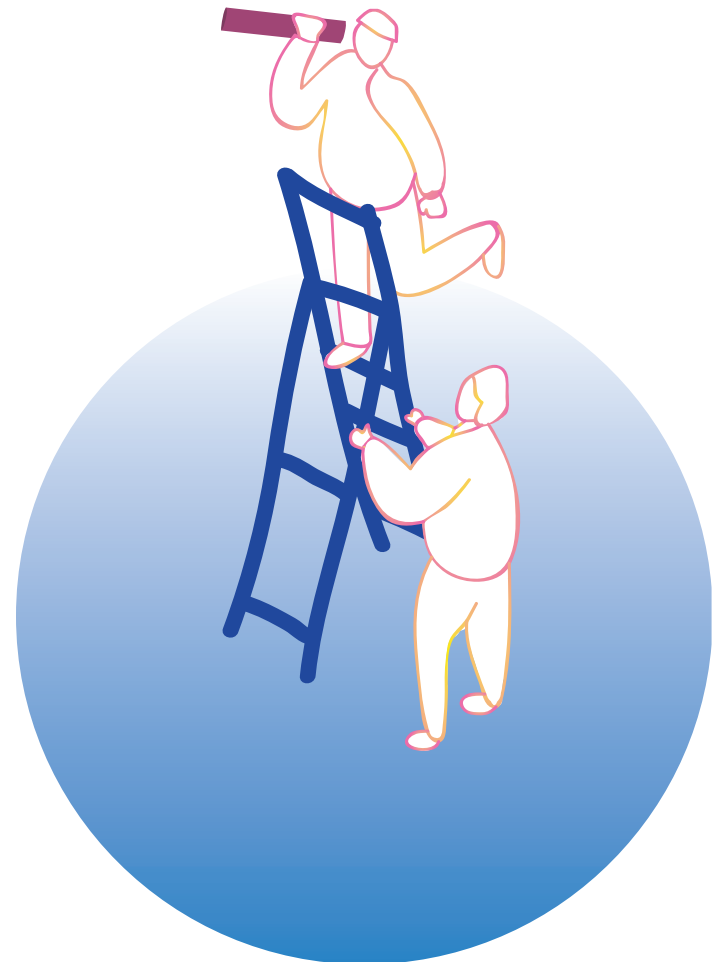
Explains Stefano, they build an ecosystem of several blockchains and spread the problem among them to create scalability, is something that the Blockchain community is still trying to solve.

 **The regulatory status remains unsettled, adding a huge lack of supportive legal framework for blockchain developments.**

And speaking about Verification of the information...

“A way to verify information with Blockchain is through distributed authority that for example, you can have 100 people that says that my name is Stefano Leone, and if all those people reach a consensus of my identity, there is a high percentage that this information is true, other option is build my identity linking other ones that I have around, for example Facebook, linked In,etc”

This interview was a key element for the development of the final solution, Stefano participated also in the definition of the final journey map, giving his insights from the technology perspective and behavior.



0.1.5 Blockchain Legal Framework

Currently, there is a huge need of alignment between public and private sector to ensure proportionality between cost/efficiency with Blockchain system, European countries have the responsibility of redesign and re-orientate their legal systems to achieve new regulations and actual development programs.

1. Immutable technology

If the technology is immutable and there is no way back inside of their processes, the “Right to be forgotten” can’t be applied and can be a conflict of interests; the EU regulators are still deciding if they are willing to make some exceptions for Blockchain applications inside of the European territory; this situation can cause a setback for the development of blockchain initiatives.¹⁴

2. Territory

The blockchain initiatives inside of the European territory have the responsibility of redesign and re orientate part of their systems in order to achieve the new regulations, creating for example databases outside of the chain, with all its implications.¹⁵

14. Legislación europea podría castigar a empresas Blockchain. (2018). Retrieved from <https://www.crypto-economy.net/legislacion-europea-podria-castigar-a-empresas-blockchain/>

15. Alex Preukschat, E. (2017). Identidad digital y 'blockchain': como llave al cambio del mundo. Retrieved from https://retina.elpais.com/retina/2017/06/05/tendencias/1496646930_763686.html

3. Legal framework related to the place place of creation

There is not specific localization of the ledgers, that's why the territoriality can be a problem, because each node can be attached to a different law and there is not “central part” that belongs to any nationality that can be attached to a specific normativity.¹⁷

4. Legal framework for Blockchain cross border flow of data and protection

The solution must take into consideration the proportion of information that each party can access to, also the different frameworks of the countries where the information is going to be use.

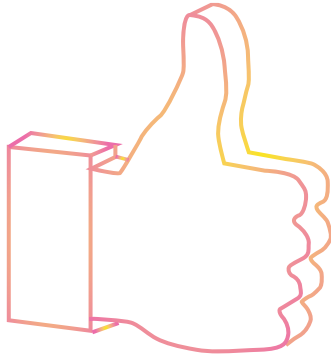
5. Costs

The biggest costs for the implementation of blockchain are mainly about storage, energy consumption and volume of transactions; Blockchain database must storage data indefinitely, even for years, and the right to have this cyberspace availability can be an important initial investment.

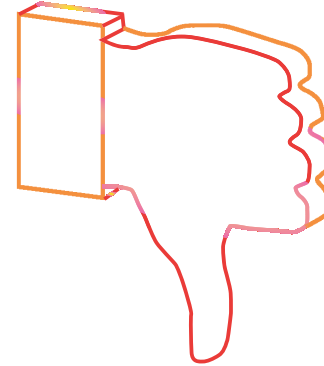
Blockchain also uses substantial amounts of computer power, and the energy costs may rise as the transaction volume increase, the costs of transferring data from one node to another also increase costs per transaction.

17. Encaja Blockchain en los marcos jurídicos actuales?. (2017). [Ebook] (p. BBVA.com.es). Madrid. Retrieved from <http://www.bbva.com.es>

0.1.6 Takeaways

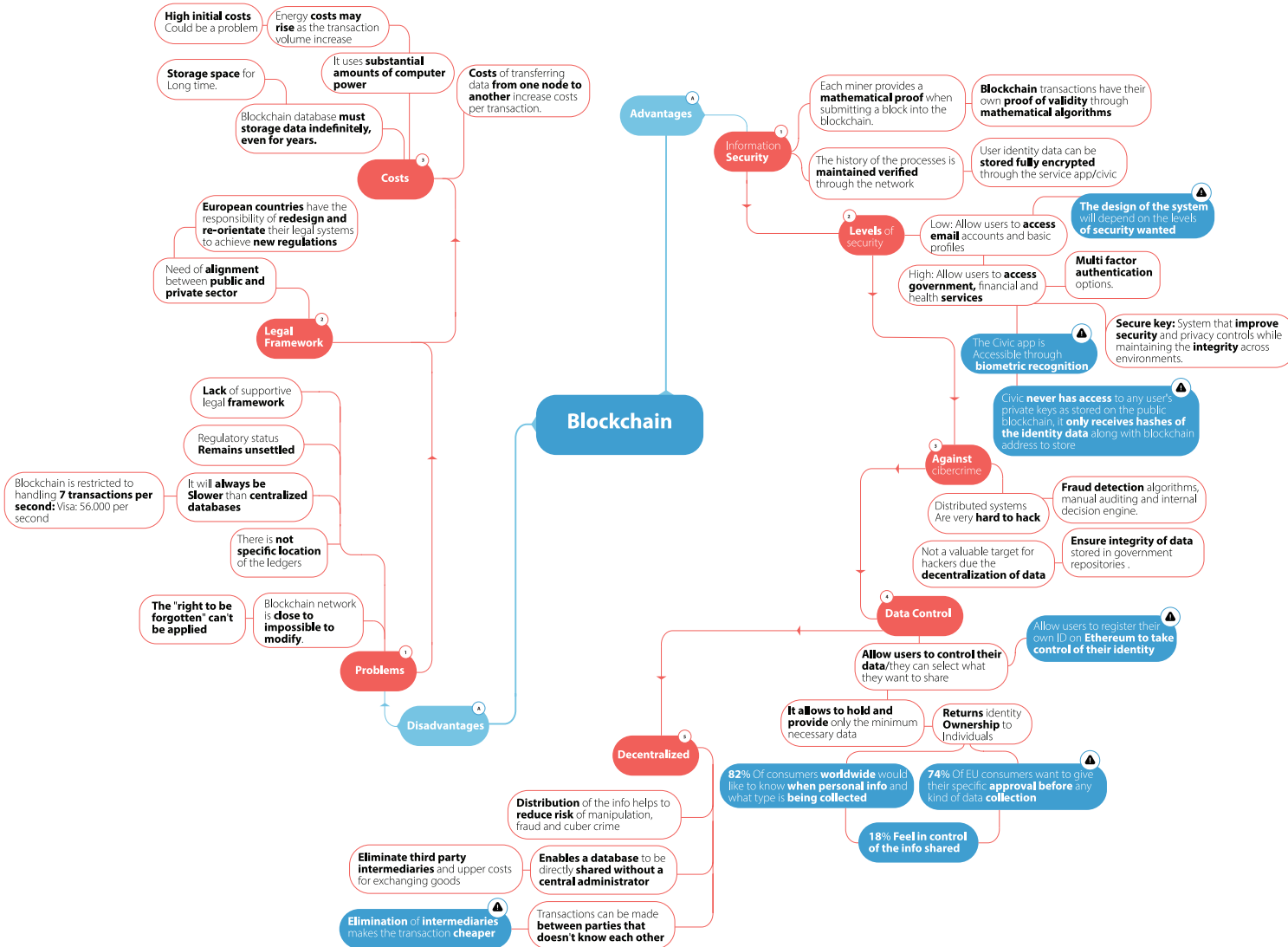


- 1.** Falsification is easily traceable because of the proof that miners provides every time they add a chain in the block, and hackers will have a hard time because of the decentralisation of data.
- 2.** Transactions between parties that doesn't know each other can be possible because the lack of central administrator, this can also reduce the cost of the exchange.
- 3.** It offers several security levels that can be applicable depending on the type of service/solution we are designing
- 4.** The system was designed to give back to people the control of their data, they can select what and with who to share their personal information, this is one of the main requirement for Digital Identity systems.



- 1.** Blockchain structure makes information impossible to modify and this represent a big contradiction with the Right to be forgotten of Digital Identity systems.
- 2.** Geographical location of the ledgers represent a legal problem, because the information is everywhere and from nowhere, there is not a legal framework that can cover them.
- 3.** The system is slow, it can handle 7 transactions per second, Visa does 56.000 per second.
- 4.** Storage availability for indeterminate amount of time and capacity costs a lot, also energy power that the system needs to operate.

0.1.7 Blockchain recap



0.2 Digital ID

From the 3 more developed sectors inside Blockchain technology, I selected Digital ID because of the big impact that a well designed solution can have in the Global Economy.

"In times of change, we need new alternatives, new ideas, and in these times of change, we need these new choices because our existing solutions are simply becoming obsolete"

Tim Brown
CEO IDEO

0.2.1 What it is

Is the **electronic equivalent of a person's identity**, it can be business or individual and they can present a Digital ID electronically to prove their identity and right to access information and services online²¹.

In order to ensure the accuracy of the digital ID, a secure authentication process is needed, authentication is done by testing what a person has (passport, driver license, bank account) what a person knows (answer to a secret question) and/or what a person is (fingerprints, face recognition, iris scan) , depending on the case, two or more of this authentications are combined.

.....

A strong, secure and privacy enhancing digital ID and authentication framework will enable citizens from all around the world to interact online, just as they would in person and it has the potential to create new opportunities in a digital world.

.....

21. DIACC Digital ID for Canadians. (2017). [Image]. Retrieved from <https://diacc.ca/videos/>

22. Financial identity: Will the success of BankID in Norway ever be replicated elsewhere? – Signicat. (2018). Retrieved from <https://www.signicat.com/eid/financial-identity-bankid-norway/>

Legal and regulatory concerns of Digital ID implementation: Swimming in a deep sea of uncertain rules.



Let's dive a little bit into the deep sea of Legal framework of Digital ID systems, it was not easy to define the most important regulations and rules, because is still under development and new ones emerge almost everyday, and if the solution is related with some kind of technology, the updates comes much faster.

.....

First of all, the key to a universally accepted identity system is collaboration, this partnership between meaningful stakeholders led by an industry body trusted by all²².

.....

0.2.2 European legal framework for Digital identification systems



1.

E-Government declaration

All the European Union Member states (28 Schengen area countries) and EFTA countries (Iceland, Liechtenstein, Norway and Switzerland) (European free trade association) signed the E Government declaration that drives to a **new political commitment at EU level** on significant priorities towards ensuring **high quality, user centric digital and public services for citizens and cross-border public services for business**²³.

The following characteristics are fundamental to ensure the successful implementation of this new digital priorities:

23. Ministerial Declaration on eGovernment - the Tallinn Declaration. (2018). Retrieved from <https://ec.europa.eu/digital-single-market/en/news/ministerial-declaration-egovernment-tallinn-declaration>

24. What is the eIDAS Regulation?. (2016). Retrieved from <https://ico.org.uk/for-organisations/guide-to-eidas/what-is-the-eidas-regulation/>

- Determine the types, extend and use of information collected under digital ID schemes
- Safeguard the privacy of personal data
- Craft new primary legislation on rules to avoid unintended consequences

Wrap up about critic considerations:

- **Supportive legal framework**
- **Trust of each country's residents**
- **Incentives**
- **Technology**

2.

EIDAS regulation

European regulation on electronic identification and trust services for electronic transactions in the internal market, is a regulation that allows to create the necessary rules for trust Digital ID systems, it creates a set of European assurance levels and sets an interoperability framework, it has direct effect in UK law and automatically applies in the UK²⁴.

The aim is to set out rules for electronic identification and trust services, EIDAS principal topics are:

- Help verify the identity of individuals and businesses online of the authenticity of electronic documents.
- Enhance trust in electronic transactions between businesses, citizens and public authorities by providing a common legal framework for the cross border recognition of electronic ID and consistent rules on trust services across the EU.
- Provides a framework which will allow European citizens to use electronic ID to access online public services in other EU member states.

3.

Cross border recognition

Society is more and more internationally mobile than ever before. There is continuously huge trade in goods and services across borders.

Whether ordering goods or engaging with a foreign service provider, the ability to carry out business across borders is increasingly important in a globalised economy. The ability to make mobile payments abroad or to borrow from abroad are obvious examples²⁵.

25. Regulatory and policy trends impacting Digital Identity and the role of mobile. (2016). [Ebook]. London. Retrieved from <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/Regulatory-and-policy-trends-impacting-Digital-Identity-and-the-role-of-mobile.pdf>

3.1

Cross border restrictions

Some countries place cross-border restrictions on data delivery, storage, and processing in order to protect their citizens from having their data moved without their consent to a jurisdiction having weaker protections²⁵.

As a result, requirements in one jurisdiction may not apply in another where similar activities are being carried out and where interoperability and cross-border services would be economically efficient and promote consumer safety. Or there may be direct conflicts between requirements in two different jurisdictions. These may require duplication of systems that could otherwise serve multiple countries and unnecessarily increase cost and fragmenting data, identities and credentials.

4.

General EU rules of data protection (RGPD)

Is a complete guideline published the 4th of may of 2016 that contains all the general rules to create a system that requires data protection, the document has 5 main topics:

26. Chakma, T. (2017). The General Data Protection Regulation (RGPD), what is it?. Retrieved from <https://medium.com/@blogwriterplus/the-general-data-protection-regulation-rgpd-what-is-it-367afcd99ac5>

PAe - CTT - General - Política de Firma Electrónica y de Certificados. (2018). Retrieved from <https://administracionelectronica.gob.es/cct/politicafirma#WvCPm9OFOV4>

1. Right to be forgotten
2. Right to data portability
3. Explicit consent of the interest parties
4. Data protection laws
5. Delegate of data protection

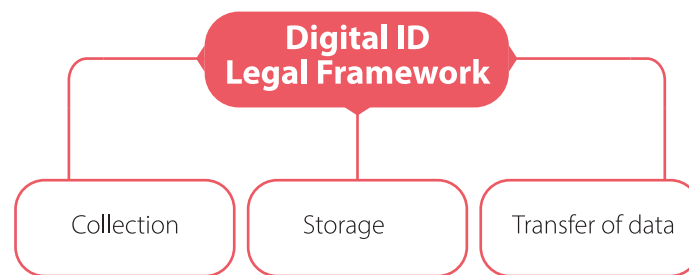
The main objective of the RGPD is to “Give back to the citizens the control of their personal data while simplifying the regulatory environment of companies”²⁶.

Inside of the general rules document, there are also some technical specifications, standards and procedures:

- **About standardisation:** Is a central element of the design of digital identity systems, consistent standards should be established.
- **Collection, storage and data sharing:** Personal attributes collected in identity registration process, or used in identity authentication processes represent the kind of information that data protection and privacy policies, laws and hosts of regulatory agencies are concerned to protect, and the most important thing, which citizens expect will be protected.
- **Trust frameworks:** In countries where laws and regulatory agencies are not well defined, they need to be established as

matter of priority for digital identity to emerge, in countries where these are already established, the priority is to ensure accountability, impartial adjudication and ability to adjust to changing conditions.

- **Data protection laws:** this one covers collection, storage and transfer of data for the purpose of identity systems, and cover the broad use of personal data.



Globally, a large number of countries have adopted data protection legislation, the need of generate trust according to the United Nations Conference on Trade and Development (UNCTAD), made

180 of their member countries have implemented totally or partially data protection laws, while the other 30% are still on their way²⁶.

- **Privacy laws:** General Data Protection Regulation (GDPR) Applies to the processing of professional data by data

controllers or data processors located in the EU or of data subjects in the EU.

And some other rules and regulations for the Digital ID implementation panorama worldwide:

- **Anti money laundering laws:** Anti-money laundering (AML) require banks and other financial institutions to conduct KYC (know your customer) diligence to verify a customer's identity.
- **Biometric laws:** the Biometric information privacy act establishes rules governing businesses collection and use of biometric data.
- **Laws governing online identities at death:** the Uniform Fiduciary access to Digital assets act (UFADDA) in 2016 supplement existing laws regarding probate, guardianship, trusts and powers of attorney to allow fiduciaries to handle digital assets just as they would handle physical assets after a person's death.

Several large social media companies permit a person authorized to act on a deceased individual's behalf to request deactivation of the applicable account²⁵.

- **Blockchain and online identities at death:**

Regarding the recorded information in Blockchain, there are

25. Regulatory and policy trends impacting Digital Identity and the role of mobile. (2016). [Ebook]. London. Retrieved from <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/Regulatory-and-policy-trends-impacting-Digital-Identity-and-the-role-of-mobile.pdf>

several ways that this issue can be addressed, people or institutions could issue declarations that this person is no longer alive and the software can be programmed to deactivate digital identities after a certain period of time.

Also, control of the private keys for the digital identity of a dependent such a child, or deceased person that cannot control its own private keys, it can be managed by a guardian or tutor, In this way, the information can be protected after the person's death.

5.

Levels of security of a Digital ID system

Depending on the need and the dimension of the service, the levels of security can be designed to be proportionate to the security needs of the treated situation²⁵:

- **Low levels of authentication security:** Access to email accounts, profiles
- **High levels of authentication security:** Access to government, financial and health services, in this case a multifactor authentication option can be implemented.

26. Chakma, T. (2017). The General Data Protection Regulation (RGPD), what is it?. Retrieved from <https://medium.com/@blogwriterplus/the-general-data-protection-regulation-rgpd-what-is-it-367afcd99ac5>

PAe - CTT - General - Política de Firma Electrónica y de Certificados. (2018). Retrieved from <https://administracionelectronica.gob.es/cct/politicafirma#WvCPm9OFOV4>

0.2.3 Digital ID: Global opportunity for governments, inter-governmental forums and other stakeholders

1. Empower citizens allowing them to **share their data as they want**.
2. Build more connected digital society both in developing and developed countries.
3. Governments around the globe are leading a digital transformation through digital identity, because **they have until 2030 to implement it**.
4. Methods of proving identity **remain fragmented and fail to address core citizen's needs** (Unlock the value of the digital economy globally).
5. The adoption of digital identity solutions across governments performance a delivery and promote a **more connected society both at national and cross border level**.

0.2.4 The importance of involving the citizen and the public administration employees during the process: Barcelona Gov Jam 2018

During the research phase of my project, I was invited to participate in the Barcelona GovJam in June 2018 and we had the task to design or improve a public service from the region of Catalonia, we spent **48 hours of "Bureaucracy escape room"** and this activity was relevant for the development of my thesis project because I could understand **how the interaction with the real public administration works**.

The activity was developed together with real public administration workers and I had the opportunity to visualize the problems from a different perspective, to understand the implementation obstacles from their point of view and to realize the **importance of the co creation between designers and public administration entities**.

From a more complete understanding of the problems from the designers and public workers point of view, to involve the final user during the design process: the co creation stage is one of the most important factors to generate a positive implementation of the service, to understand the context where you want to introduce the service and to reach the right problems with the accurate tools.

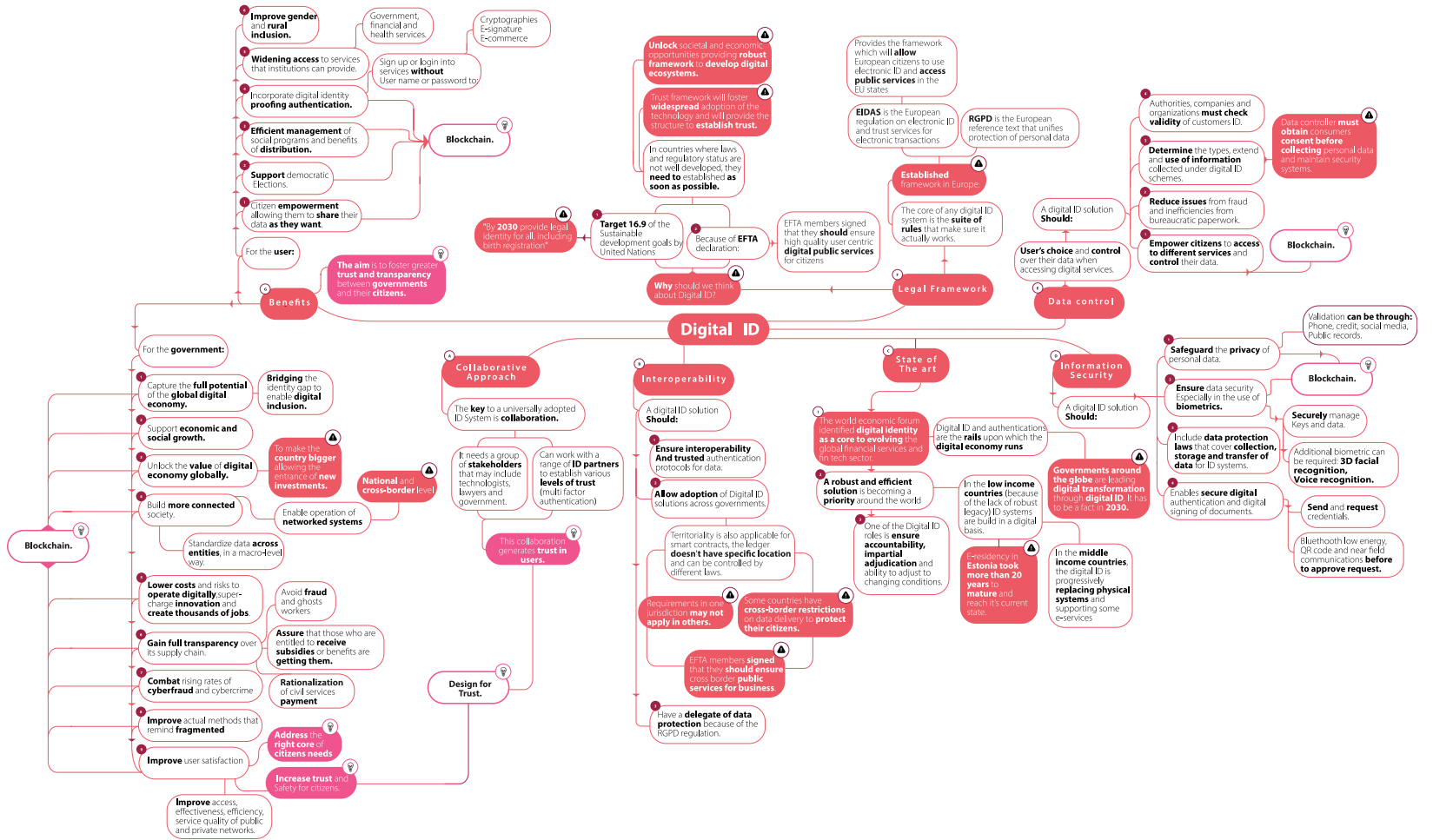


Picture 1: Service prototyping of a public service proposal on the streets during the Barcelona GovJam June 2018.

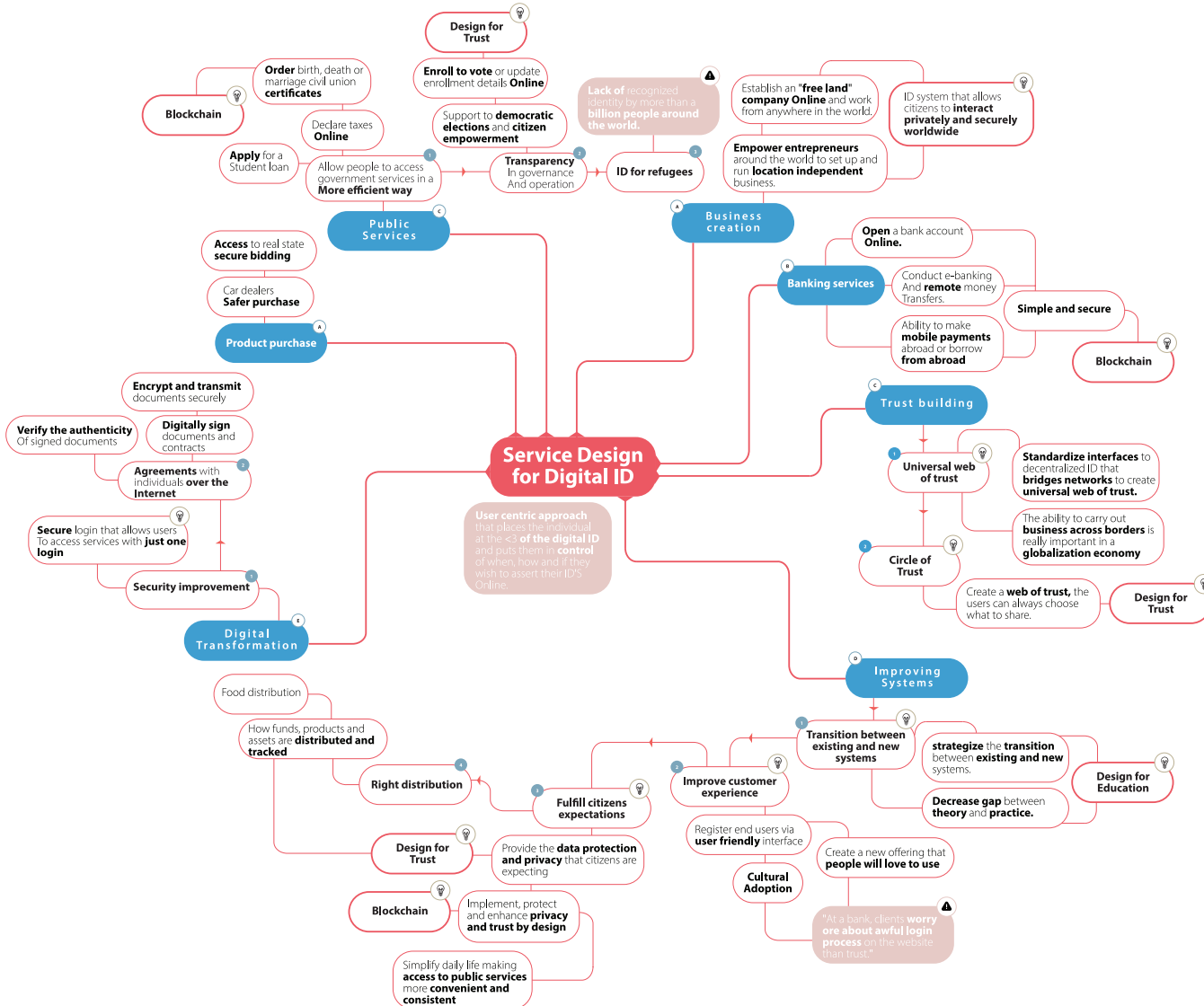


Picture 2: Service prototyping of a public service proposal with Public employees Barcelona GovJam June 2018.

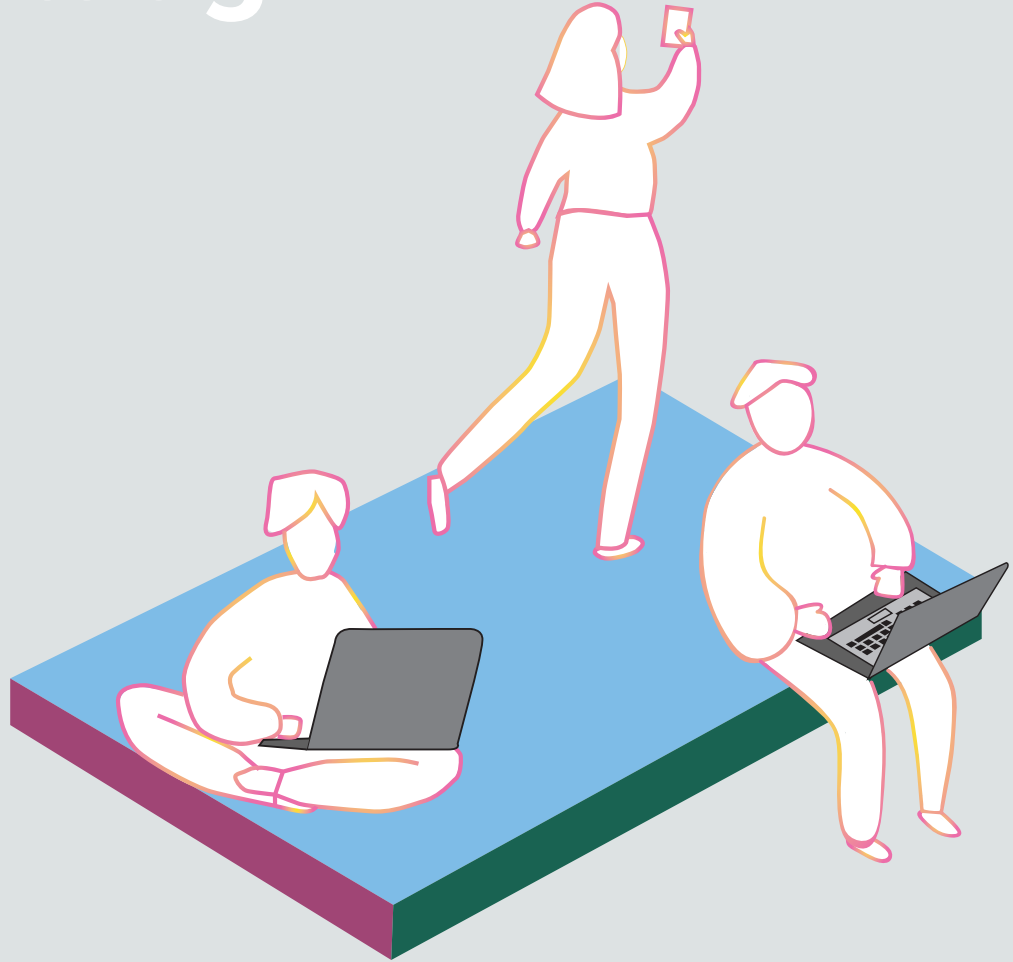
0.2.5 Digital ID recap



0.2.6 Service Design opportunities inside Digital ID world



0.2.7 Cases of study



0.2.7 Digital ID cases of study

Case of study: ID2020

“A Digital Identity for everyone on earth”

Where: Based in NY City

Utility: Access to basic services

Target: Asylum seekers

What it is

ID2020 alliance is an example of the Digital ID panorama worldwide, this case of study is still in prototype and research phase but with very strong goals, playing an important role in the modern world²⁷.

The ID2020 is a global partnership between governments, NGOs and the private sector, working to address the lack of recognized identity by more than a billion people around the world with no official documents, in accordance with Target 16.9 of the Sustainable Development Goals.

The aim is being able to provide an identity platform worldwide by 2030, from 2017 and 2020 the project will be on development phase, following development and testing the

27. Home. (2018). Retrieved from <https://id2020.org/>

28. ID2020: Global Digital Identity Blockchain Technology Program?. (2018). Retrieved from <https://bitcoinechangeuide.com/id2020/>

best technological solutions for digital identity and working with different governments to implement them.

Is possible that the solution will be growing around Blockchain technology, because of the security, immutable and decentralized dataset characteristics, the system will have an application programming interface (API) allowing developers to design different services on the platform²⁸.

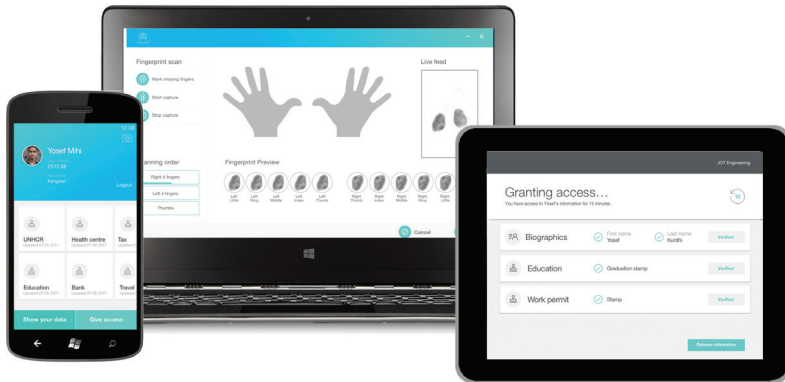
“Our perspective is that, at the end of the day, this isn’t about an election of a single facet of technology, but creating the institutions and government infrastructure to create a collective community as technology continues to evolve.”

Dakota Gruener
Executive director
ID2020



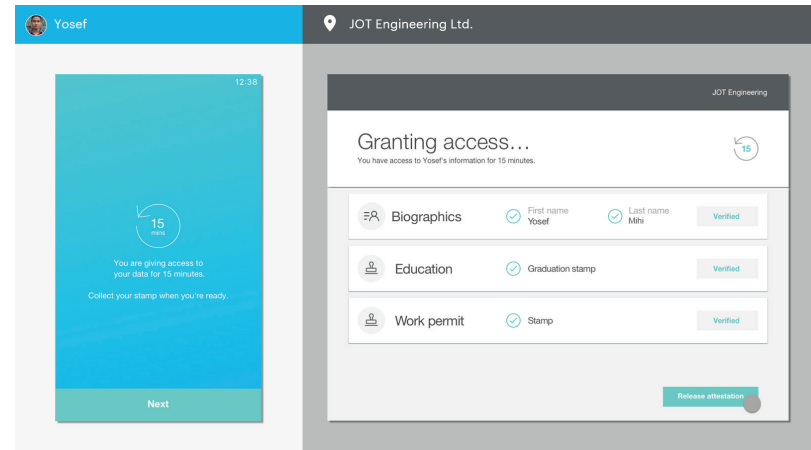
Accenture's and Microsoft output for ID2020:

The output is working towards a personal, private and a portable unique service identity platform to display a biometric system that can manage fingerprints, iris scans and other data²⁹:



The platform combine biometrics and blockchain technology to provide a worldwide solution, right now is the hearth of Biometric identity management system currently used by the United Nations High commissioner for Refugees (UNHCR) which has enrolled more than 1.3 million refugees in 29 countries across Asia, Africa and the Caribbean, This system is expected to support 7 million refugees from 75 countries by 2020²⁸.

29. ID2020: Digital Identity with Blockchain | Accenture. (2018). Retrieved from <https://www.accenture.com/us-en/insight-blockchain-id2020>



The platform combine biometrics and blockchain technology to provide a worldwide solution, right now is the hearth of Biometric identity management system currently used by the United Nations High commissioner for Refugees (UNHCR) which has enrolled more than 1.3 million refugees in 29 countries across Asia, Africa and the Caribbean

This system is expected to support 7 million refugees from 75 countries by 2020.

The role of Social Media

One of the suggested possibilities for the program is to use an already used digital identity that is part of our daily lives: Facebook.³⁰

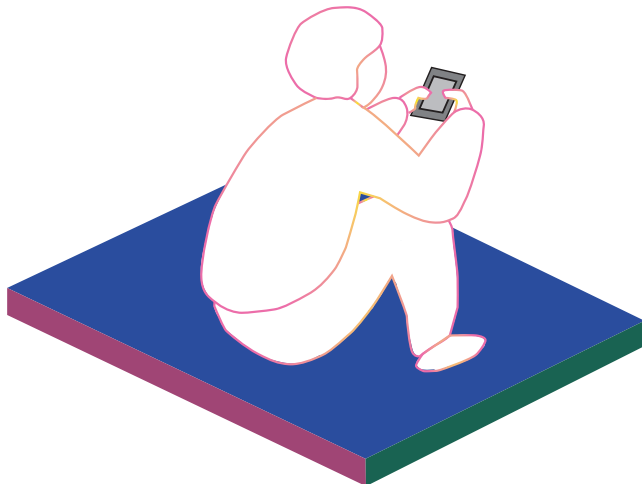
30. Gorey, C. (2018). How big a task is giving everyone on Earth a digital identity?. Retrieved from <https://www.siliconrepublic.com/enterprise/digital-identity-id2020>

Just to check some numbers, more than 2bn people on the planet uses Facebook and 1bn without a formal type of digital ID, in the African nation of Malawi just 2pc of its inhabitants have birth certificates, 4pc have facebook account.

“There’s an opportunity to find how identity can be integrated and [used] to reach people. We don’t want to say that Facebook owns digital identity for everybody as that seems like a really, really bad idea but I think [we can’t ignore] they’re already playing a role here.”

Dakota Gruener
Executive director
ID2020

The organization right now is working In Malawi giving to the children an identity through vaccination distribution, trying to reach the goal to give everyone over 16 in that country a national ID card.



0.2.8 Digital ID cases of study that uses Blockchain technology

Case of study: CIVIC

The security Identity ecosystem

Where: San Francisco, USA

Utility: Personal online identification

Target: USA Citizens

What it is

Civic secure identity platform is a Blockchain system used for a real time authorization to allow a third part to access a user’s identity without usernames or passwords³¹.



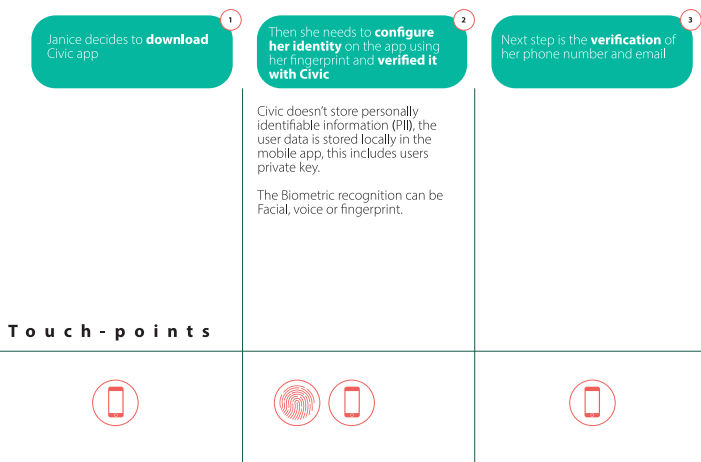
Civic uses Blockchain for identity verification.

31. Civic Secure Identity Platform (SIP) - Decentralized via Blockchain. (2018). Retrieved from <https://www.civic.com/products/how-it-works>

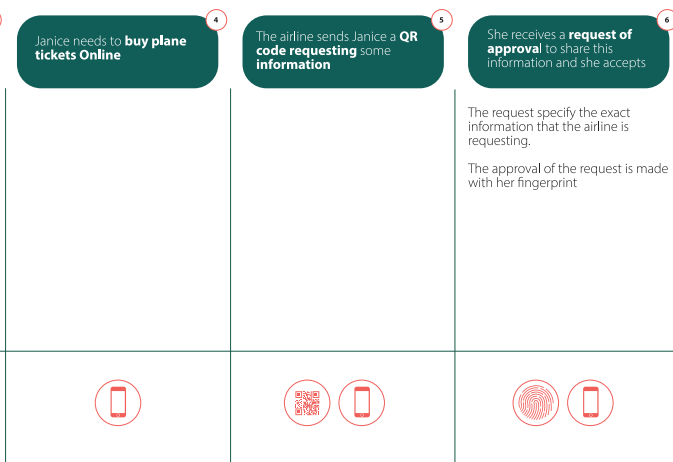
How does it works



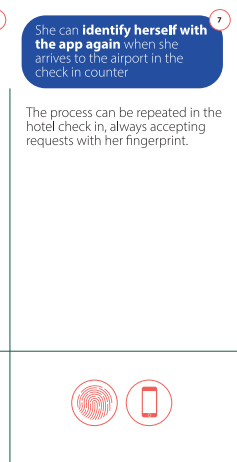
Before



During



After



Information Verification system

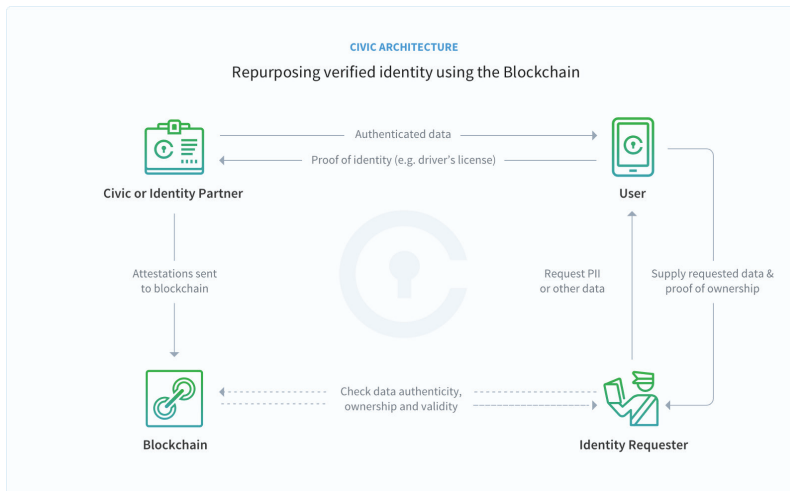
When a third party, in this case the airline is authorized to access the user's identity, in this case Janice, the identity data is send through blockchain and various validators have to agree that the user is who they say they are, this check uses a range of public records like social media or contact information.

This validators can be the Government, supplying information from driver licenses and passport and financial institutions using real time authenticated identity data.

One Civic's central ideas, is the reuse of identity, where companies no longer need to verify identities from scratch every time. This reduces fees and processing time.

Their aim is to rethink how trust relationships are established between consumers and websites³².

Vinny Lingham, Civic CEO explains that **these next generation relationships will be less formal and complicated than those that dominate our online experience today.**



Case of study: E-Residency

A Digital Nation

Where: Tallin, Estonia

Utility: Companies' online identification

Target: Digital nomads, Freelancers, Startup company, EU company

What it is

"E-Residency is a new digital nation for global citizens, powered by the republic of Estonia, the idea is to create a country without borders³³"

Is a government issued digital Identity that empowers entrepreneurs around the world to set up and run a location-independent business all of it online, remotely and without complications.

The main idea is to make life easier for freelancers, digital nomads, business owners, international partners allowing them to register and manage EU based company, access a marketplace of service providers and network with the global e-residency community and log into online services in Estonia such as government portals and online banks.

32. Anonymous Login? Civic Goes Live With Blockchain Authentication Service - CoinDesk. (2018). Retrieved from <https://www.coindesk.com/anonymous-login-civic-goes-live-with-blockchain-authentication-service/>

33. What is e-Residency | How to Start an EU Company Online. (2018). Retrieved from <https://e-resident.gov.ee/>

The reason why open a business based digitally in Estonia is because this country has minimal bureaucracy, fewer administrative difficulties and an infrastructure that is easy to use remotely.

Estonia became the first country in the world to introduce the concept of E-residency in december 2014, turning into the world leader in digital governance³⁴.

Blockchain is the ground of all Estonia's digital identity services, **in E-residency the technology is being used for securing citizen information, a scalable Blockchain technology was developed by the service to ensure integrity of data stored in government repositories and to protect it against insider threats³⁵.**

E-residency had generated \$17.2 million in revenue since the program started 3 years ago, says a study conducted by Deloitte³⁶.



34. Alender, A. (2018). What is Estonian e-Residency and how to take advantage of it? | LeapIN. Retrieved from <https://www.leapin.eu/articles/e-residency>

35. Garner, B. (2018). Estonia E-Residency & Blockchain Governance, Explained - CoinCentral. Retrieved from <https://coincentral.com/estonia-e-residency-blockchain-governance-explained/>

36. Deloitte: E-residency brought €14.4 million to Estonia in first three years. (2018). Retrieved from <https://news.err.ee/646254/deloitte-e-residency-brought-14-4-million-to-estonia-in-first-three-years>














How does it works



REPUBLIC OF ESTONIA
E-RESIDENCY

Before

During

<p>1</p> <p>Deniz fill up the E-residency Online application form</p> <p>Required documents:</p> <ul style="list-style-type: none"> -Copy of a government issued ID -Passport digital photo -Motivation statement -Payment method <p>Touch - points</p>	<p>2</p> <p>He makes the Online payment of €100 state fee</p>	<p>3</p> <p>Deniz has to wait for an E-mail with the approval</p> <p>Estonian police and border guard-board check and notify to the user via email, the process can take between 6-8 weeks.</p>	<p>4</p> <p>Once he receives the approval, Deniz goes to the Estonian embassy in Istanbul</p> <p>The collect of the physical card can be in any Estonian embassy, consulate or other service point, the place is previously selected in the application form.</p> <p>He has to take all the documentation that he specified in the Online form.</p>	<p>5</p> <p>Deniz has to go Online to activate his card, download the card software and select a office provider</p> <p>He has to register his company with the office provider selected.</p> <p>This card enables him to use Estonian public and private sector services and resources, sign documents remotely and encrypt files.</p>	<p>6</p> <p>Online payment of state fee for €190</p>	<p>7</p> <p>Finally, he can open an account for business banking and payment processing</p> <p>Now Deniz can run his company remotely from Istanbul, have his clients in EU, choose from the list of trusted service providers offering tailored services for business needs:</p> <ul style="list-style-type: none"> -Virtual office -Banking -Payments -Relocation services -Public e-services
<p> </p>	<p> </p>	<p> </p>	<p> </p>	<p> </p>	<p> </p>	<p></p>

Case of study: Uport

The wallet is the new browser

Where: Zug, Switzerland

Utility: Personal or company Digital ID

Target: Zug residents

What it is

uPort ID is a 360° digital representation of a Person, app, organization, device or bot that allows them to make statements about their identity, interacting with smart contracts and other uPort identities³⁷.

“This ability to make statements about themselves, without relying on centralized identity providers, is what makes uPort platform for self-sovereign identity³⁸”

Pelle Braendgaard
Engineering lead
uPort

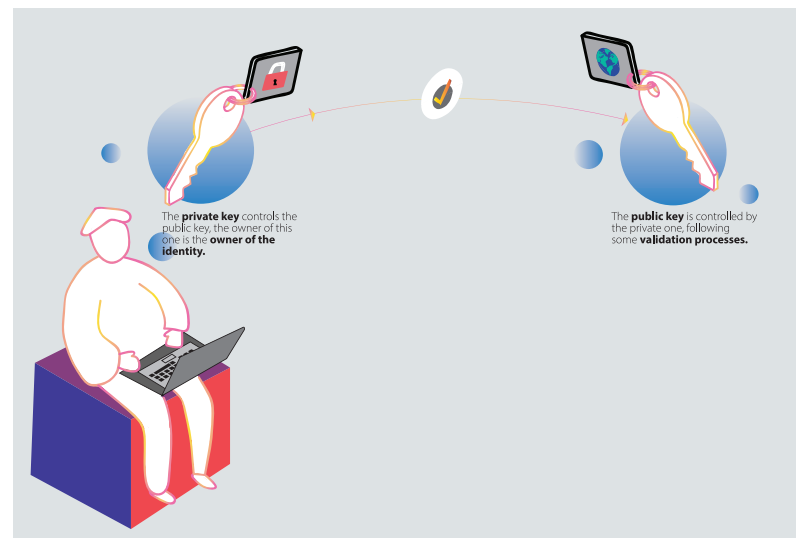
37. uPort.me. (2018). Retrieved from <https://www.uport.me/>

38. Braendgaard, P. (2017). What is a uPort identity? – uPort – Medium. Retrieved from <https://medium.com/uport/what-is-a-uport-identity-b790b065809c>

uPort identity is an **Ethereum address** (Open software platform based on Blockchain technology that enables developers to build and deploy decentralized applications), it also allows apps and their users to exchange information privately, while still backed by security of the Ethereum Blockchain.

“In a public key cryptography system, public keys represent identities. The ownership of this identity is determined by possession of a private key that controls the public key. This public/private key model has many beneficial properties that have been used in cryptographic identity systems for years. Not much infrastructure is needed to verify a signature, you just need access to the public key³⁸”

Through electronic documents that use a digital signature to relate a public key with an identity, the certificate is used to confirm that a public key belongs to a specific individual.



The problem about this model is that if the owner lose his private keys, the identity is lost, Uport uses an Ethereum identity that can be programmed to support various methods of key recovery logic, this feature allows cryptographic identities to become more user friendly.

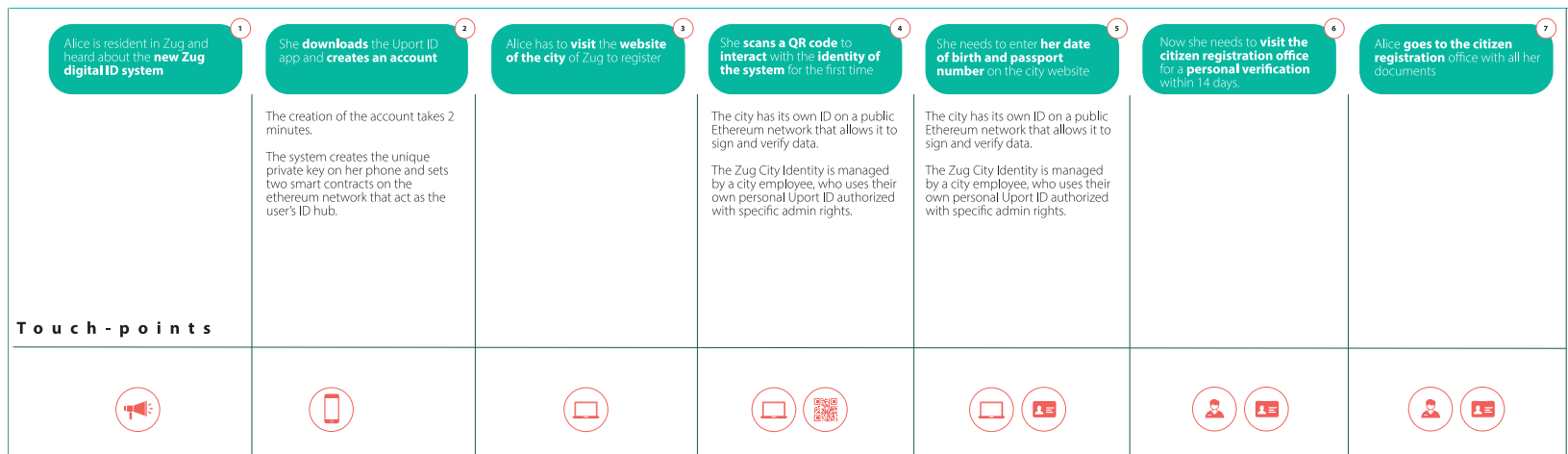
Zug is also known as the crypto valley, is the global leader in exploring Blockchain use cases for its government and citizens.

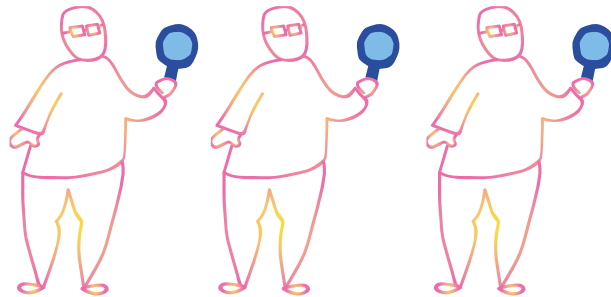
This system requires low infrastructure, it doesn't need to host its own nodes or maintain huge databases of user credentials, the use of the service is currently free.

How does it works



Before





0.2.9 Government secure login case of study

Case of study: RealMe

NZ Digital ID Government

Where: New Zealand

Utility: Government security log in

Target: New Zealand residents

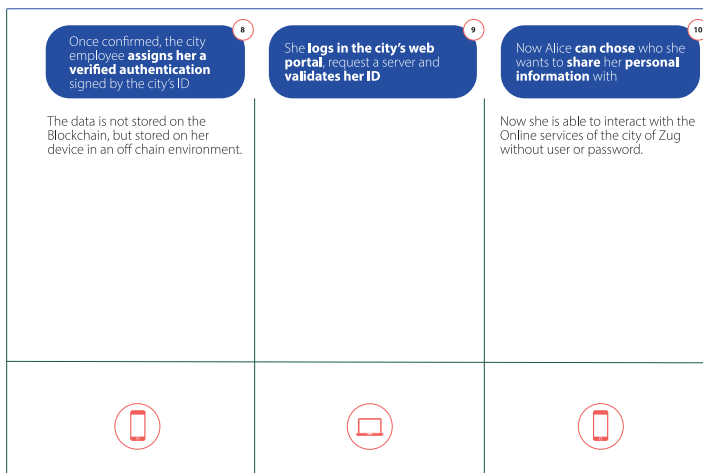
What it is

This is a service backed by the New Zealand government to allow people to access basic government services in a more efficient way, the use is free and it offers two different accounts, its variation depends on the level of identity verification, it can be login or verified³⁹.

The solution only ask for a proof of identity and address once and offers to share personal information securely, it has been created to build trust and confidence by adhering to New Zealand Government security, identity and privacy legislation⁴⁰.

39. Home. (2018). Retrieved from <https://www.realme.govt.nz/>

40. What is RealMe? - Work and Income. (2018). Retrieved from <https://www.workandincome.govt.nz/online-services/what-is-realme.html>

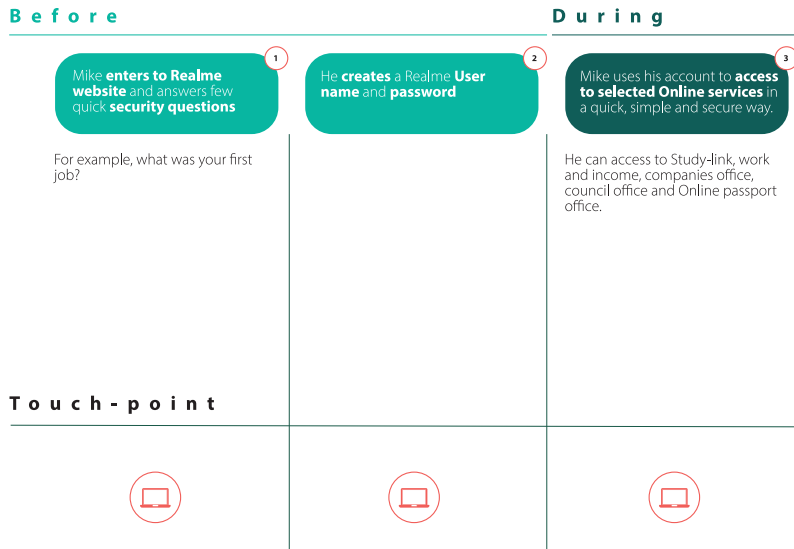


The use of the service allows agencies and organizations to reduce duplication, data errors and costs associated with manual identity checking processes, to reduce risk of ID fraud and save money re using existing technology, just integrating identity authentication⁴¹.

How does it works



Login account:



41. RealMe. (2018). Retrieved from <https://www.digital.govt.nz/standards-and-guidance/identity/realme/>

42. Leone, S. (2018). Blockchain and Digital ID [In person]. Deloitte Italy.

Verified account:

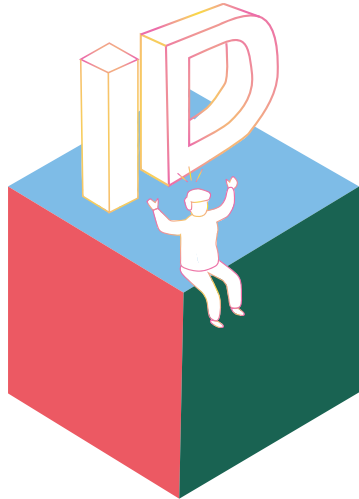


In the verified account, the information should be renewed every 5 years, Blockchain allows to program the update of the information every certain period of time⁴².

“In general the process is really really easy, 100% online, of course after the registration is much better, who likes to insert a long list of data?”

Sergio Garcia
New Zealand Citizen
RealMe User

0.2.10 Blockchain and Digital Identity



Digital ID systems are not an option anymore, they are mandatory because:

“By the end of the decade, its goal is to work on the technologies for digital identity and with governments in particular, some of which have already expressed an interest”

Target 16,9 of the UN'S Sustainable Development solutions network.

- Because of the global agenda, international call¹⁸:

The World bank group, in collaboration with other development partners and key stakeholders launched the identification for development (ID4D) to “making everyone count” by “providing an identity and delivering digital ID-enabled services to all”

Digital Identity is becoming a priority also in developing countries as a primary source of identification and an opportunity to drive digital inclusion implementation through authentication systems and other trust services.

1.5 BN Unregistered people who lack access to formal identification are socially, economically and politically excluded.¹⁸

40% of births in Africa and Asia are unregistered

.....

There is a huge need of alignment between public and private sector to ensure proportionality between costs, efficiency, scale and adoption.

.....

Although the concept of Digital Identity is universal, it plays somehow different roles context and the goal changes depending on the country.

18. Home | Identification for Development. (2018). Retrieved from <http://id4d.worldbank.org/>

If the country has a high income, Digital ID represents an upgrade and the goal is transform actual services into more efficient and convenient e-services. (Canada, Belgium, France, Singapore, South Korea).

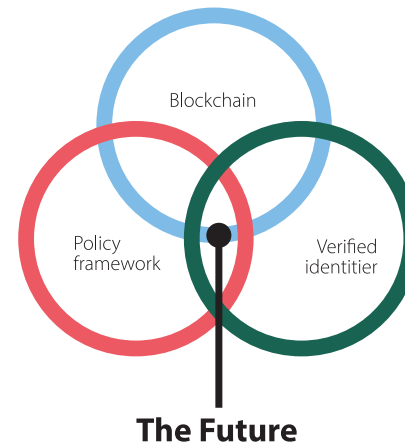
If the country has a middle income, Digital ID represents a progressively changing physical identity service (Estonia, Moldova) and for Low income countries they have to start from the beginning, the lack of legacy ID systems allows them to build their new ID systems on a digital basis. (Bangladesh, Kenya, Guinea).¹⁹

0.1.8 Why governments have to implement a Digital ID system?

Governments around the globe are leading a digital transformation through digital identity because they have until 2030 to implement it.

The world economic forum identified digital identity as a core to evolving the global financial services and fintech sector, a robust and efficient solution is becoming a priority around the world.¹⁹

19. The world bank. (2015). WDR16 Spotlight on Digital Identity [Ebook]. Retrieved from <http://www.worldbank.org/en/topic>



The initiative of build national identity systems promises a lot of benefits in terms of:²⁰

- Improve the actual identification methods that remain fragmented and **fail to fulfill core citizen's needs.**
- Empower citizens allowing them to share their data as they want, **building trust and awareness.**
- Drive transformational change for citizens, businesses and public administrations.
- Build a better connected digital society.
- Lead digital transformation through a digital identity system.
- The implementation of Digital ID improves the government performance, delivery and promote a more connected society at national and cross border level.
- Reduce losses from fraud and inefficiencies from bureaucratic paperwork.

20. Regulatory and policy trends impacting Digital Identity and the role of mobile. (2016). [Ebook]. London. Retrieved from <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/Regulatory-and-policy-trends-impacting-Digital-Identity-and-the-role-of-mobile.pdf>

0.3 Improving a Digital ID system through Blockchain

The analysis of cases of study led me to find SPID, the Italian public identity system that faces some implementation problems.

“Customers enjoy an improved experience that saves them time and money, with a much more personalized relationship”

Vinny Lingham
Co Funder and CEO Civic

0.3.1 Italian Digital ID system: SPID

What it is

SPID is a service implemented since 2016 in Italy, it allows users to access to public services in a simple, safer and faster way with just one username and password, it allows to access to more than 400 types of services from the Italian public administration, almost all the services available online area accessible through SPID⁴³ and **it has been used for more than 2.5 million citizens out of 60,6 m.**

With SPID, users have access to services like National institute for insurance against labour accidents (INAIL), National institute of social security (INPS), Driver and vehicle licencing agency (ACI).

One of the main goals of SPID is enable access to digital services of all EU state public administrations, open to private service providers, and in march 2018⁴⁴, the path started for converting old online credential into SPID identities.

Identity providers

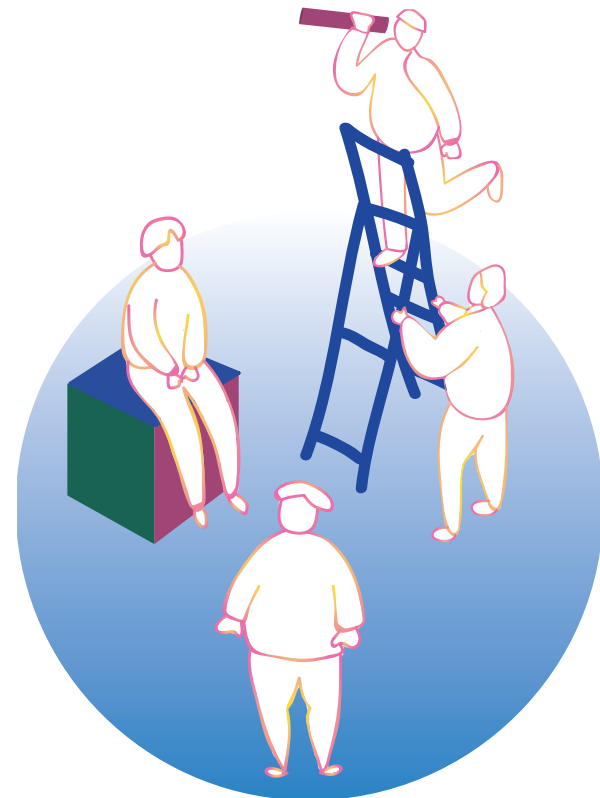
SPID has 8 identity providers, the biggest one is Poste italiane” (Italian postal service) says Valerio Paolini, technical project manager of SPID, the difference between them is the prices, because the methods of identifying users are almost the same from provider to provider¹.

43. Home | SPID - Sistema Pubblico di Identità Digitale. (2018). Retrieved from <https://www.spid.gov.it/>

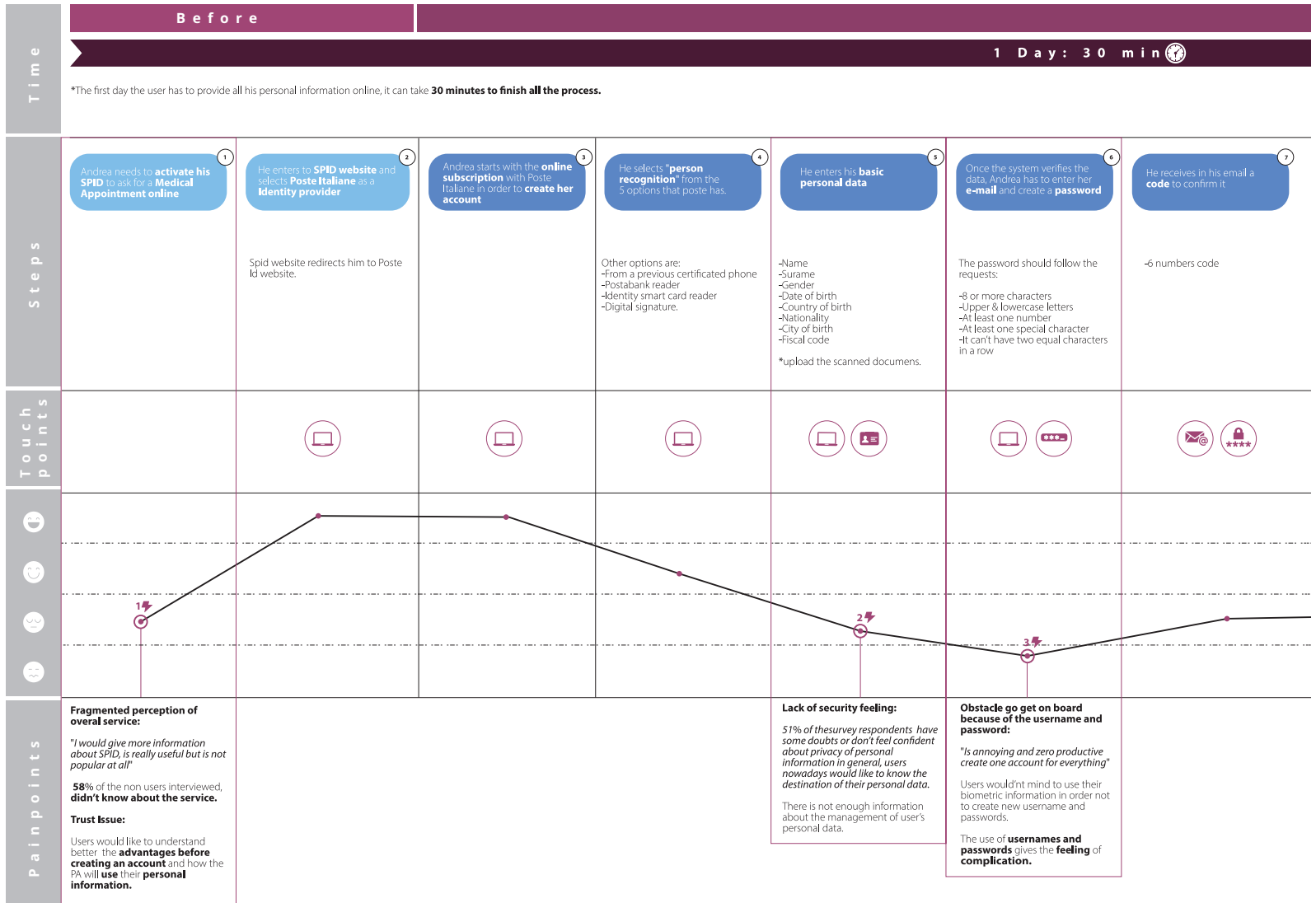
44. Paolini, V. (2018). Interview about SPID service [In person]. Agenzia per l'Italia digitale.

How does it works

The following customer journey analysis in the next spread was made based on the Poste Italiane activation process because is the most used identification provider and almost all the survey respondents selected this option for the identification step:



0.3.2 Journey on board SPID AS IS





*This will happen the day that the user decides to go to the post, he has **30 days**.

*This will happen **sooner** if the user activate the service in **Milan**.

<p>8 Andrea goes back to Poste website and enters the code and the password that he created before.</p>	<p>9 Once the email has been confirmed, He has to introduce more personal data</p> <p>-Phone number were he will receive the confirmation and the document that he will use for the recognition process. -Document type -Document number -Issued by -Place -Address in Italy</p>	<p>10 He selects the option to go personally to the post to do the recognition</p> <p>there are 2 options: -Go personally to the post office: free -Home delivery that costs €14,50</p>	<p>11 He receives a mail with the pre-registration confirmed and a code to go to the post</p> <p>-10 Number code -He can go to the post any day without an appointment, the code will be active for 30 days.</p>	<p>12 Andrea goes to the post office and present all his documents.</p> <p>The process can take from 10 to 20 minutes, he has to show: -Tessera sanitaria -Document that she used for the registration -Copy of the document -Copy of the fiscal code</p>	<p>13 Days after, he receives an e mail that confirms that his SPID is ready to use.</p> <p>The mail has 2 different 12 number passwords: -First one for level 1 of security -Second one for level 2 of security, to use with the Spid ID app</p>	<p>14 He can finally access to ATS Milano website log in with SPID account and ask for his medical appointment</p>

Obstacle to get on board because of the physical appointment:

"Bureaucracy in Italy is a nightmare, specially for foreigners"

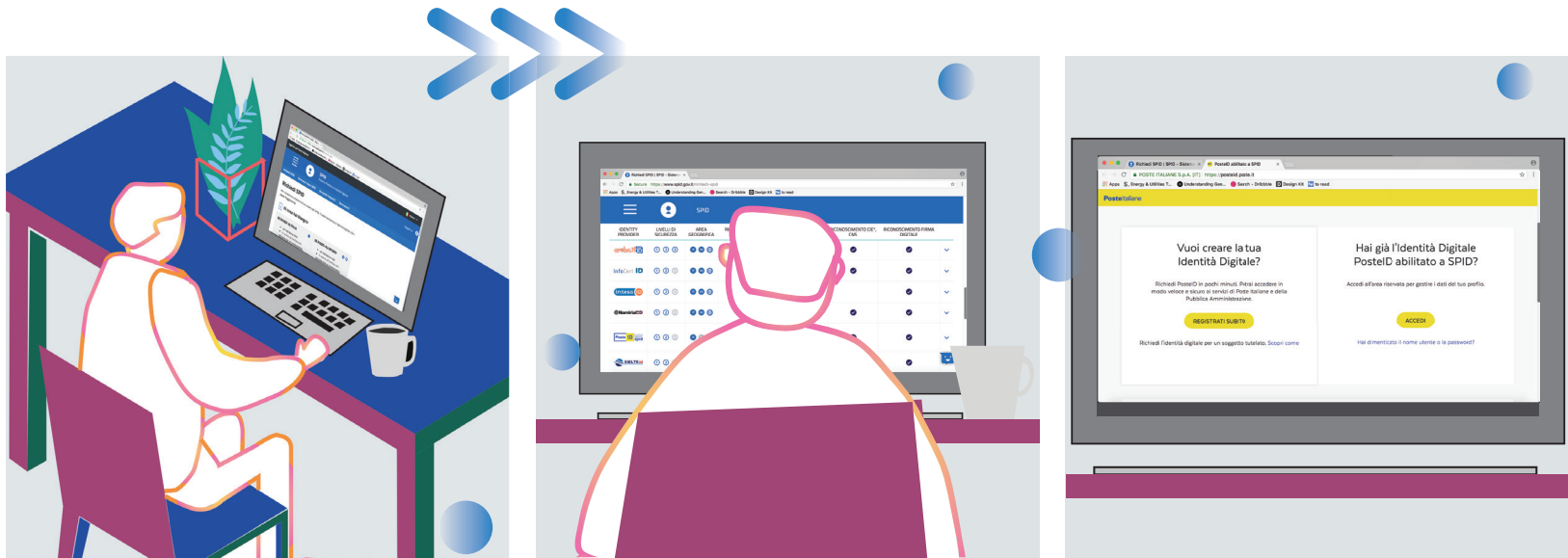
"I would speed up or skip the process in the post office"

Users are looking for simple services, bureaucracy is annoying enough.

Communication issue:
Language and instructions issues

Website	App
Physical ID	SMS
Password	Email
Code	Post Staff

0.3.3 Storyboard on board SPID AS IS

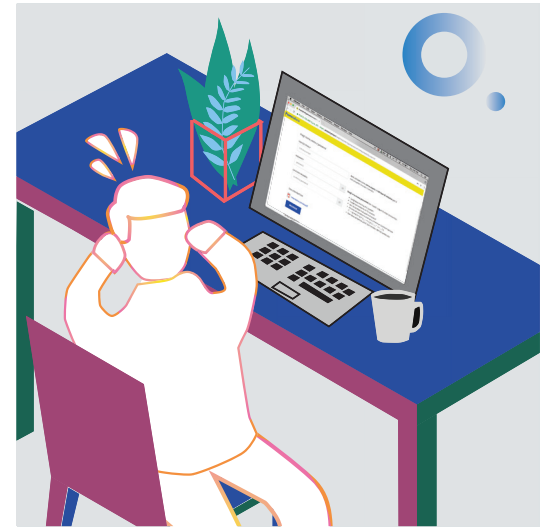
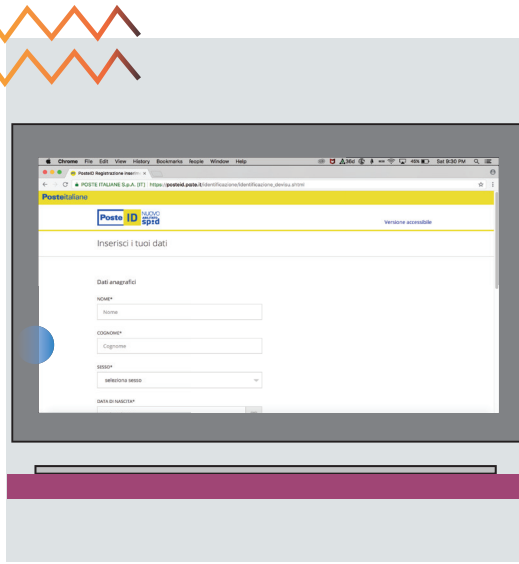


1. Andrea enters to the SPID website and decides to create an account.

- **Fragmented perception of the overall service, Andrea doesn't understand easily how can he use SPID login**

2. He selects an identity provider from the 8 available options.

3. Andrea enters to the ID provider website, in this case Poste ID and selects to create an account.



4. He selects physical appointment as a recognition method

5. He enters his basic personal data

- **Lack of security feeling, users doesn't feel comfortable giving personal information**

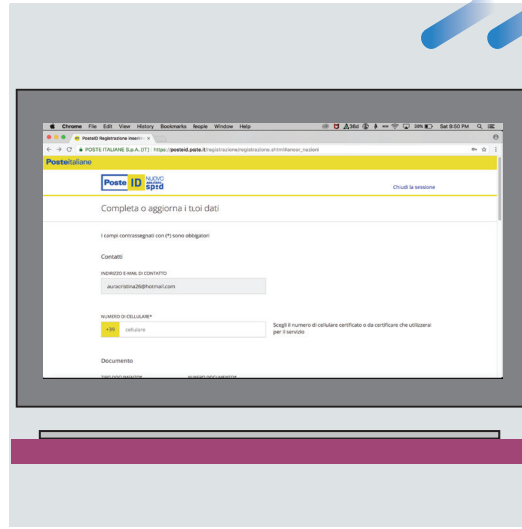
6. Once the system verifies the data, Andrea has to enter her e-mail and create a password

- **Negative perception of the creation of a new username and password**

0.3.3 Storyboard on board SPID AS IS



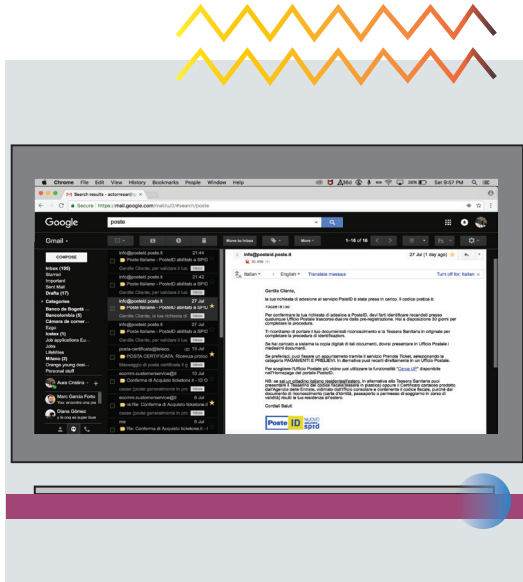
7. He receives in his email a code to confirm it



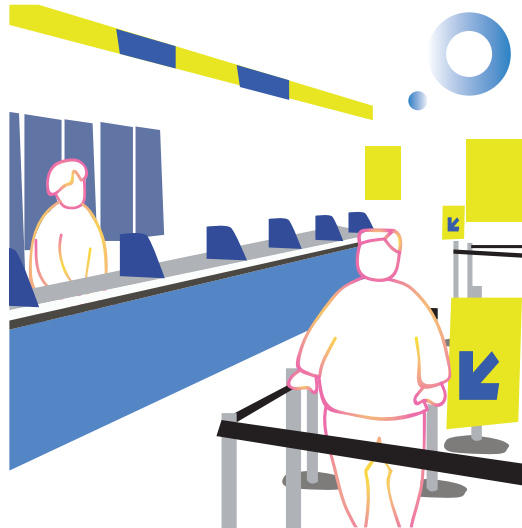
8. Andrea goes back to Posteid website and enters the code and the password that he created before



9. Andrea once again, has to select the method of identification.



10. He has to go back to his email and find a code to show at the post office



11. Andrea goes to the post office to make the personal verification, he has to take all his documents.



12. He receives the next day a mail confirmation with the activation of the service.

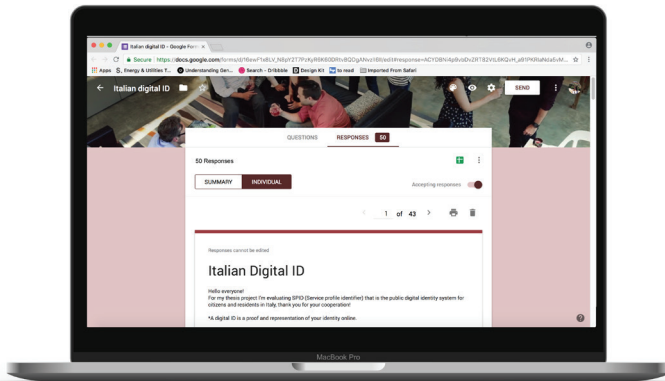
- **Some of the users might not even finish the step go to the post, people don't feel comfortable having the need to go somewhere else.**

0.3.4 User Research

During July and August 2018, I published a Customer research online survey⁴⁵ to 50 residents in Italy, 25 foreigners and 25 Italians in order to understand different priorities of different types of user, if they knew about the service, if they were already users and why they were not using it.

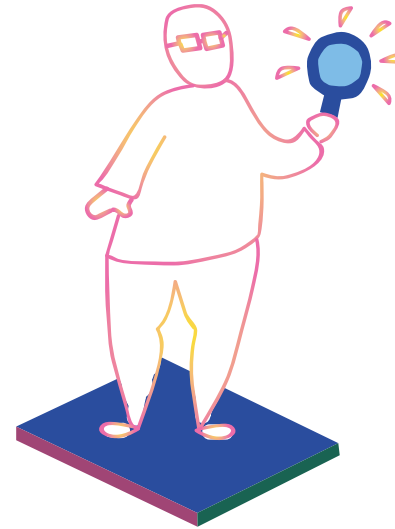
The survey was divided in two sections, the first one was for SPID users, 10 questions about the actual experience with the service and open questions to comments and concerns, the second section was for non users, 10 questions about their actual knowledge about Digital ID systems for Governments and reason why they were not using the service at the moment.

This survey was crucial to re define the journey map as is and to detect the main pain points to build the solution proposal.



45. Digital ID system in Italy. (2018). [In person]. Google survey.

0.3.5 Interview with the expert



Valerio Paolini

Technical project manager

Team per la trasformazione digitale

27/07/2018

The interview with Valerio Paolini was made via Skype, based on 10 questions about the development and implementation of the service and the future plans that the Agenzia have for SPID.

This interview was also fundamental to understand the real situation between SPID and the Public Administration and the problems that they have been having during all the project.

“Maybe in 2 of 3 years we can switch to just one legacy ID system”

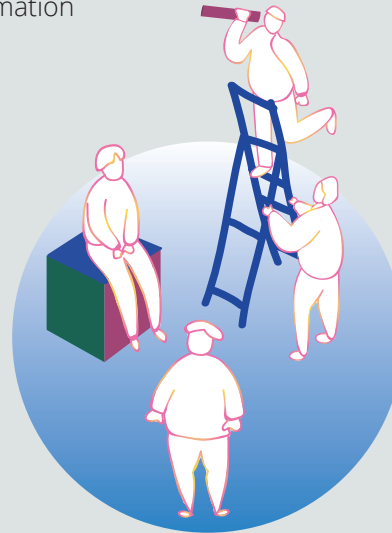
Blockchain was the topic of one of the questions, he shared his vision and the internal opinion of the agencies about this topic, basically they are not convinced that Blockchain is an actual solution, He says that is a “solution” in search of a problem and he affirms that the Italian Government is not ready to invest in a technology that didn't reach certain level of maturity and adaptation.

0.3.6 Detected Painpoints

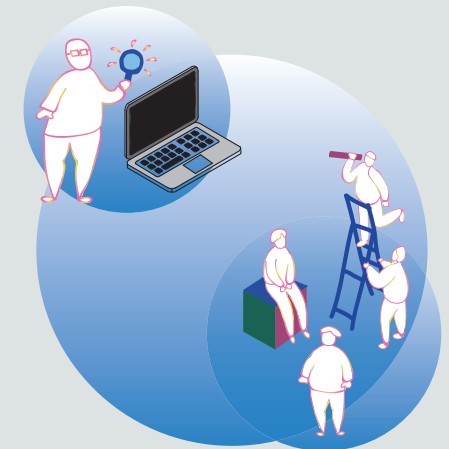
The detected pain points were defined following the information collected from the interview with the technical project manager of SPID, Valerio Paolini, the survey to 50 potential SPID users residents in Italy, 25 foreigners and 25 Italians and the evaluation of the actual Journey map of the service, these 3 key sources of information were crucial to define the following problems:




1. Expert interview + Desk research




2. User research



Painpoints detected



Obstacle to get on board because of the physical appointment



Obstacle of complexity because of use of password



Lack of security feeling



Fragmented perception of overall service

Actual situation

71% of the interviewed selected infopoint appointment because is the free option, nevertheless this is the biggest pain point that is affecting the acquisition of new users⁴⁷

Because of the use of an old protocol, SPID system is not really user/mobile friendly, they are trying to work on the UX to improve it².

There is not enough information about the management of user's personal data⁴⁶.

"We are trying to change SPID project from certain rules to a complete product" - Valerio Paolini²

Need

A system to make the ID verification easier and faster, avoiding as much as possible physical appointments.

A way to create an account and interact with the service in an easier way without the need to use passwords and usernames.

Promote identity services that allows users to feel in control of their data.

Perception of an overall Public administration service that was designed to facilitate interactions between users and P.A

Perception of bureaucracy

65% of the interviewed think that the actual interaction with the P.A is really bad¹.

⁴⁶. Digital ID system in Italy. (2018). [In person]. Google survey.

⁴⁷. Paolini, V. (2018). Interview about SPID service [In person]. Agenzia per l'Italia digitale.

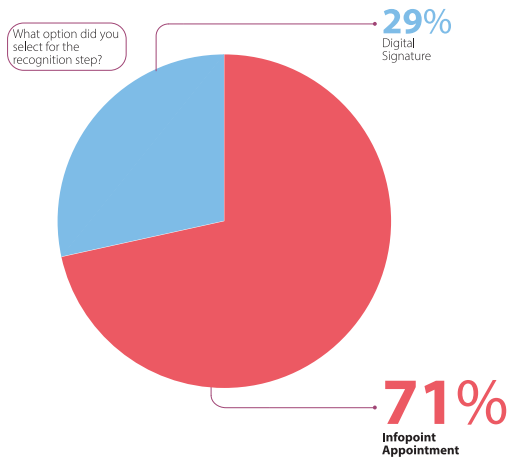


Obstacle to get on board because of the physical appointment

Actual situation

How is the system now

71% of the interviewed 7 (users) selected info point appointment because is the free option, nevertheless this is the biggest pain point that is affecting the acquisition of new users⁴⁸.



48. Digital ID system in Italy. (2018). [In person]. Google survey.

49. Paolini, V. (2018). Interview about SPID service [In person]. Agenzia per l'Italia digitale.

“The boarding process of SPID is our main UX problem” says Valerio Paolini, “The initial step is quite complex but once you do it, you have a fully operational tool to do everything⁴⁹”.

Valerio Paolini
Technical Project Manager
Team per la trasformazione Digitale

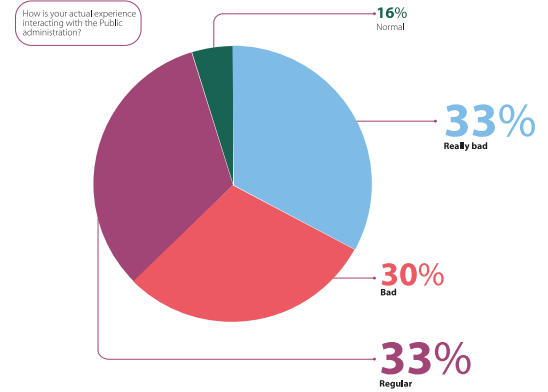
User’s thoughts

Perception of **bureaucracy in Italy:**

66% of the interviewed think that the actual interaction experience with the public administration in Italy is not user friendly and definitely not efficient⁴⁸.

“Bureaucracy is a nightmare, especially for foreigners” - SPID user⁴⁵

50. Ministerial Declaration on eGovernment - the Tallinn Declaration. (2016). Retrieved from <https://ec.europa.eu/digital-single-market/en/news/ministerial-declaration-egovernment-tallinn-declaration>



What I’ve learned

About Digital ID system Collaboration

The Government declaration says that **the key to a universal adopted identity system is collaboration⁵⁰**.

In order to design a successful Digital ID system, there should be a **strong partnership between stakeholders**, for example Government, banks, private sector, etc, at the same time, this collaboration generates trust among users.

In conclusion, there must be an alliance between different institutions inside and outside of the country in order to make their Digital ID system work properly.

Standardization

Standardization is a **central element** for the Design of **digital ID systems**⁴.

A robust and efficient solution is becoming a priority around the world, one of the main goals of the E government declaration is **promote a cross border** public services for business, that's why every country has to work hard to make their ID services works perfectly⁵⁰.

The design of the ID system must be planned in order to be valid and compatible all around the world.

About Blockchain

Information validation

Validation of the information can be through phone credit, social media, public records,

ID2020 is considering the idea of using social media for the recognition, platforms like Facebook can be helpful to double check identities of people, playing a big role nowadays.⁵²

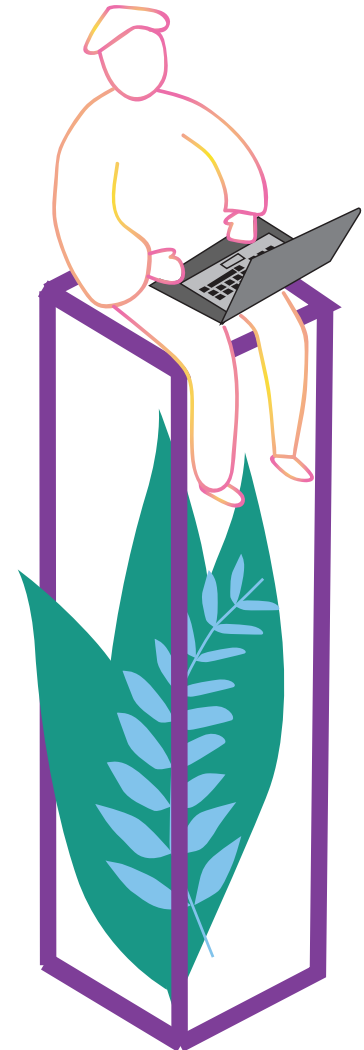
One of the main CIVIC ideas is to re-use already existing identities avoiding the need to verify the ID of their users from scratch, it uses Blockchain technology to make this possible⁵³.

In E- residency, the information of verified accounts has to be renewed every 5 years, Blockchain systems allows to set times when the information needs to be renewed in order to continue working successfully.⁵⁴

Data storage

Energy and available space for storage information can have **high costs** in a **Blockchain system** but sometimes is not necessary to store all data in the system, it can be located in the citizen's mobile device, when for example just checking specific information is enough, like date of birth or driver license⁵⁵.

Civic store user data in the user's mobile devices⁵³.



51. Financial identity: Will the success of BankID in Norway ever be replicated elsewhere? – Signicat. (2016). Retrieved from <https://www.signicat.com/eid/financial-identity-bankid-norway/>

52. Alliance. (2018). Retrieved from <https://id2020.org/partnership/>

53. Civic Secure Identity Platform (SIP) - Decentralized via Blockchain. (2018). Retrieved from <https://www.civic.com/products/how-it-works>

54. What is e-Residency | How to Start an EU Company Online. (2018). Retrieved from <https://e-resident.gov.ee/>

55. Fauvel, W. (2017). Blockchain Advantage and Disadvantages – nudjed – Medium.

Retrieved from <https://medium.com/nudjed/blockchain-advantage-and-disadvantages-e76dfde3bbc0>

For security, privacy and space of data management, is possible to create a Blockchain system that storage personal information inside user's devices.

In the case of SPID, the time can be improved with the collaboration agreement between government identity providers.

Transaction time

The system is slow, it can handle 7 transactions per second, when visa does 56.000, but there is a solution for that, **Stefano Leone, Deloitte manager of Blockchain lab Italy** says that it is possible to build an ecosystem of several Blockchains and spread the problem among them in order to create scalability.

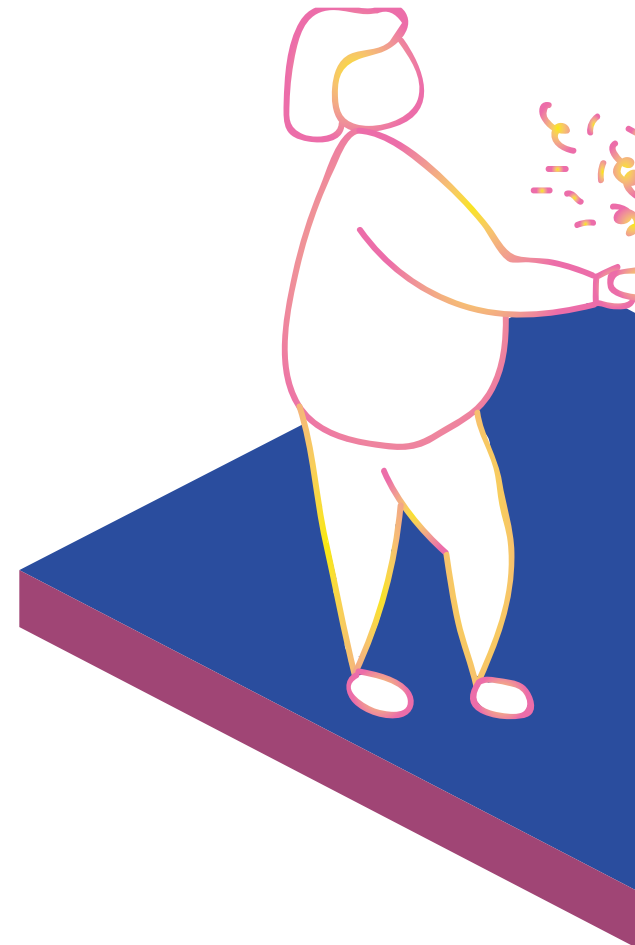
The elimination of the intermediaries (collaboration) makes the transactions **faster and cheaper.**

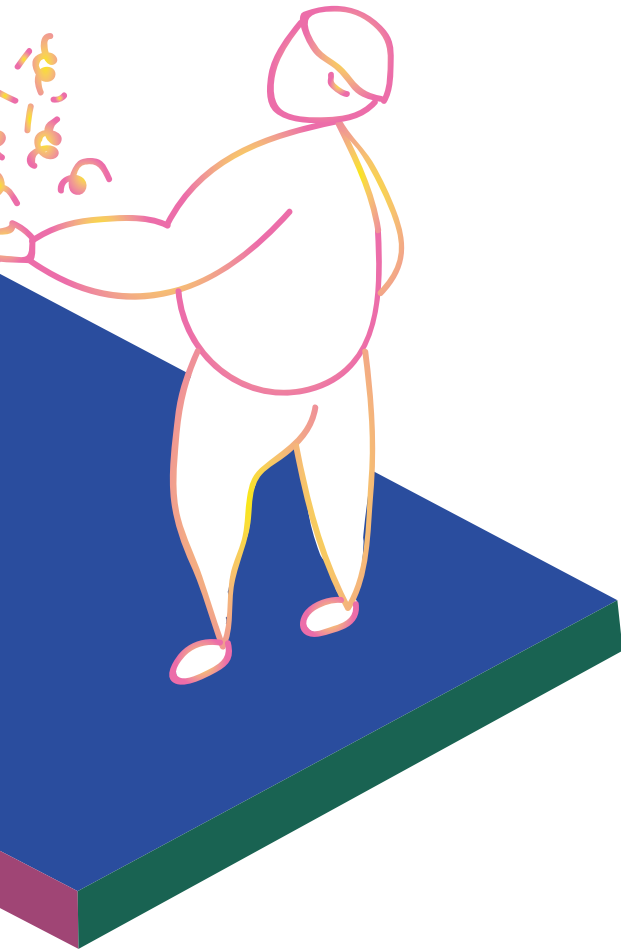
Uport service is a self-sovereign digital identification because of the use of Blockchain and its decentralized feature.

Civic service created a decentralized global digital identity platform and to access the service, a **fingerprint** is everything you need⁵³.

! To take into consideration

Data protection laws covers collection, storage and transfer data for ID purposes.





My solution proposal

A Blockchain system that **integrates the electronic Italian passport, Electronic ID card and Permesso di Soggiorno databases** to make the verification step easier and faster.



Deliverables

Redesign of the app that allows to follow the new identification process.





Obstacle of complexity because of use of password

Actual situation

How is the system now

“Because of the use of an old protocol, SPID system is not very user and mobile friendly, we are working on the UX interface to improve it” says Valerio Paolini from SPID, definitely the need of create every time a different user and password, gives the feeling of complexity.

User’s thoughts

“Is annoying and zero productive create an account everytime, it would be really useful to reuse an already existing ID, something that we all have for sure”

-Survey Interviewed

Users are willing to scan their biometrics in order to avoid the creation of a new username and password.

What I’ve learned

About Digital ID system

A successful digital ID should **empower citizens to access to public services** in an efficient and easy way, and create ecosystems that allows them to feel secure.

About Blockchain

Make transactions easier

E residency is a government issued ID designed to empower entrepreneurs around the world, and one of the main reasons of their success is because they offer **minimal bureaucracy**, making easier to use the ID system **remotely**.

The ID solution should empower citizens making the systems easy to follow.

.....

Efficient

Real me allow people to access basic government services in a more **efficient way**, following the main objectives of the successful creation of a Digital ID environment, the service allows agencies and organizations to reduce duplication, data errors and costs of manual ID checking processes.

.....

The ID solution has to create user engagement facilitating the onboarding and during service processes.

.....

User friendly

Uport uses the public key cryptography system improved with Key recovery logic, making the system more user friendly because it allows users to recover their passwords in case of losing them or the device.the successful creation of a Digital

ID environment, the service allows agencies and organizations to reduce duplication, data errors and costs of manual ID checking processes.

In E-Residency, the user doesn't need to go to Estonia to pick up the ID, the embassies around Europe are available for that.



My solution proposal

Information **verification through Blockchain technology with 2 single personal details: Name and number of passport**, this information will connect Blockchain databases of Italian passport office, Digital Identity card and Permesso di soggiorno, this partnership will allow users to **create an account using already existing ID'S**, the app log in will be through fingerprint recognition and the interaction with the websites through QR codes.

Deliverables

Mobile app that allows user to create, access and approve transactions through biometric recognition and QR codes.



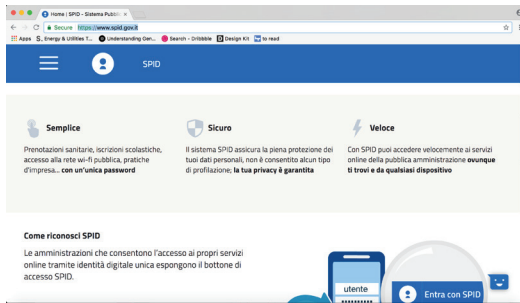


Lack of security feeling

Actual situation

How is the system now

There is **not complete information** about the management of user's personal data, the system promises **data security** but the communication is not really clear or deep⁴⁸.



56. Regulatory and policy trends impacting Digital Identity and the role of mobile. (2016). [Ebook]. London. Retrieved from <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/Regulatory-and-policy-trends-impacting-Digital-Identity-and-the-role-of-mobile.pdf>

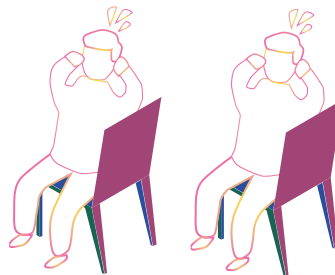
The actual SPID system offers 3 levels of security:

- Username and password
- Username, password
- Temporary code and smart card provided by SPID²

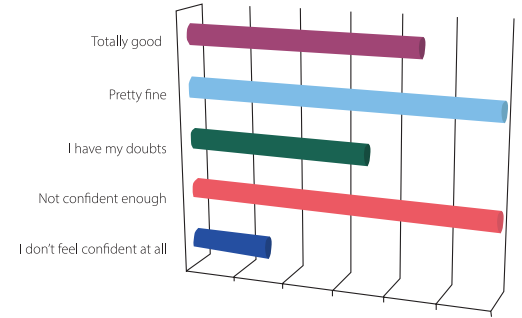
User's thoughts

51% of the interviewed people have some doubts or don't feel confident about privacy in general, users nowadays would like to know the destination of their personal data.

-Survey SPID users



Do you feel confident giving personal information to create an ID to access government services?



However, the problem is more serious around the world, in a study made by GSMA in EU in 2016 says that⁵⁶

- **82%** of consumers worldwide would like to know when personal information and what type is being collected.
- **74%** of EU consumers want to give their specific approval before any kind of data collection and...

• **Just 18% feel in control of the shared information.**

What I've learned

About Digital ID system

Data security

Safeguard personal data and create trust of each country resident is a must in the design of a digital system, also ensure data security, especially in the use of biometric information.

Empower citizens

E-Government declaration⁴⁸ asks for ensure high quality and user centric and user centric digital public services for citizens, one way to achieve this is giving back to them the control of their data, while simplifying the regulatory environment of companies

A successful digital ID system should rethink how trust relationships are established between customers and websites.

Giving to the user the control of their data creates a big percentage of customer engagement.

About Blockchain

Ask for approval

Civic asks what you want to share before doing anything through Bluetooth low energy, QR code and near field communications⁵¹.

Information verification

If the account is associated with one social number, it means that this person can't duplicate his identity.

Blockchain is capable of create secure, immutable and decentralized databases.

Information verification

If the account is associated with one social number, it means that this person can't duplicate his identity.

Security

Multifactor authentication options offer different levels of security, Blockchain

protects data from insider government threats.

Realme success is based on the integration between security, identity and privacy legislation.

Blockchain was designed to give back to people control of their data.



My solution proposal

Blockchain QR code system that asks for the user's authorization before sharing any information with the public administration.

Deliverables

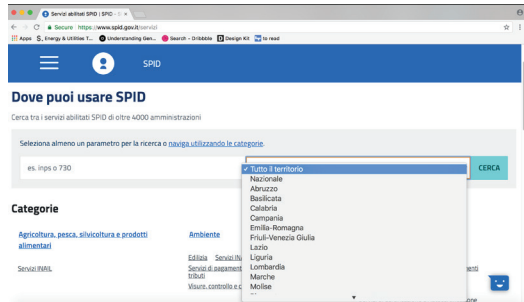
Mobile app and website that will allow users to interact with the public administration through QR code system.



Actual situation

How is the system now

To promote SPID, they use traditional channels like TV commercials, radio and website, this happens twice a year and every public service has to promote it on their own, the overall of the offering is available to explore in SPID website.

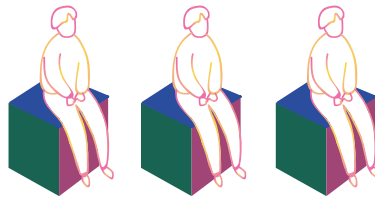


“Almost all the public services are there, SPID allows you to do almost everything online”

Valerio Paolini
 Technical Project Manager
 Team per la trasformazione Digitale

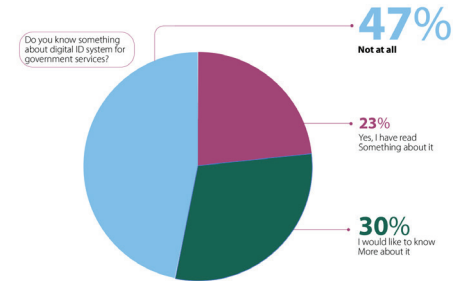
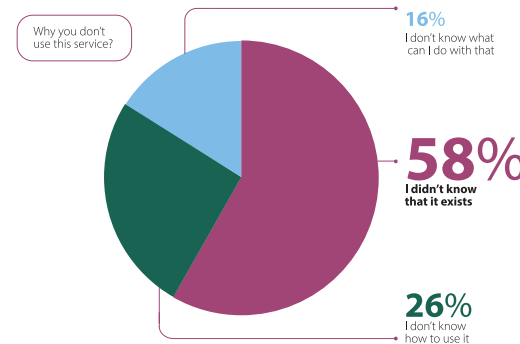
The information that is displayed in the search section requires a previous knowledge of all the Public services, it doesn't solve any question.

There is a fragmented perspective of the overall service, the promotion of the available services doesn't create any need⁴⁸.



User's thoughts

58% of the non-users (43) didn't know about the service before but 53% are interested to know more about it and learn how can they use it, this 53% are potential users⁴⁸.



About the login with SPID only, just the 14,3% of the interviewed people got to know the service because of the unique login, that can come from a friend or from a personal experience, however if they don't need to use this specific service, they are not interested at all.

“I would give more information to the users about SPID, is really useful but is not popular”

-Survey SPID users

What I've learned

About Digital ID system

Empower citizens

One of the main objectives of the creation of a successful digital ID environment is to empower and facilitate the access to citizens to different services⁵⁰.

The next generation of interactions will be less formal and complicated.

About Blockchain

E- residency has generated \$17.2 million in revenue since the program started 2 years ago, the EU inclusion can be also important to increase Italian economy.

If foreigners perceive that the bureaucracy steps to access to services in the country is easy to manage remotely, it can raise the level of investments, this vision helps to change the negative perception of bureaucracy.

.....
The simplification and the right communication of the system will the potential of the service.
.....



My solution proposal

Visualization of the service offering and benefits in a **more personal way, showing different user's profile** and the exclusive offer that SPID has for them.



Deliverables

Website and app that communicates to the users the exclusive offering that SPID has for them with defined user profiles and most common uses.



0.4 My proposal

Is essential for us as a Designers to consider this technological/social areas from now on, and show a projection of what we believe will happen to prove to the governments and the involved parties the importance of investment and implementation of change.

Blockchain is a solution that is growing and improving really fast, however, this technological implementations still require some time to mature and align with the legal frameworks inside and outside the countries, this is the reason **why my proposal is a concept about what is going to happen with the Digital ID in 5 to 7 years; it requires a general implementation of the technology inside of the Italian Government and the different identity providers inside it**, let's remember that the key to a universally identity system is collaboration, the partnership between meaningful stakeholders led by an industry body trusted by all.

Design Question:

How might we make SPID more accessible and secure?

Before to start and to recap, is crucial to understand and remember **why a Government should invest in a Digital ID solutions**, and is because:

0.4.1 Why Government should invest in a Digital ID solution

1.

Sustainable development goals by sustainable development solutions network (SDSN) and United nations launched in August 2012 the Target 16.9 that:

.....
Is a goal to work on technologies for digital identity with governments in particular, because this solutions must be fully implemented by 2030.¹

2.

Because of the World bank identification for development (ID4D) global agenda and international call that:

.....
They are promoting Digital identification as an opportunity to drive digital inclusion implementation through authentication systems and other trust Services.

And why should they **modify their legal framework** to let this happen?

1. United nations. (2018). Retrieved from <https://www.un.org/sustainabledevelopment/sustainable-development-goals/> <http://indicators.report/targets/16-9/>

2. Home | Identification for Development. (2018). Retrieved from <http://id4d.worldbank.org/>

3.

Because of the eGovernment declaration, where all the European Union Member states (28 in Schengen area countries and EFTA countries (Iceland, Linchestain, Norway and Switzerland)

.....
They signed to a new political commitment at EU level on significant priorities towards ensuring high quality and user centric digital and public services for citizens and crossborder public services for business³

4.

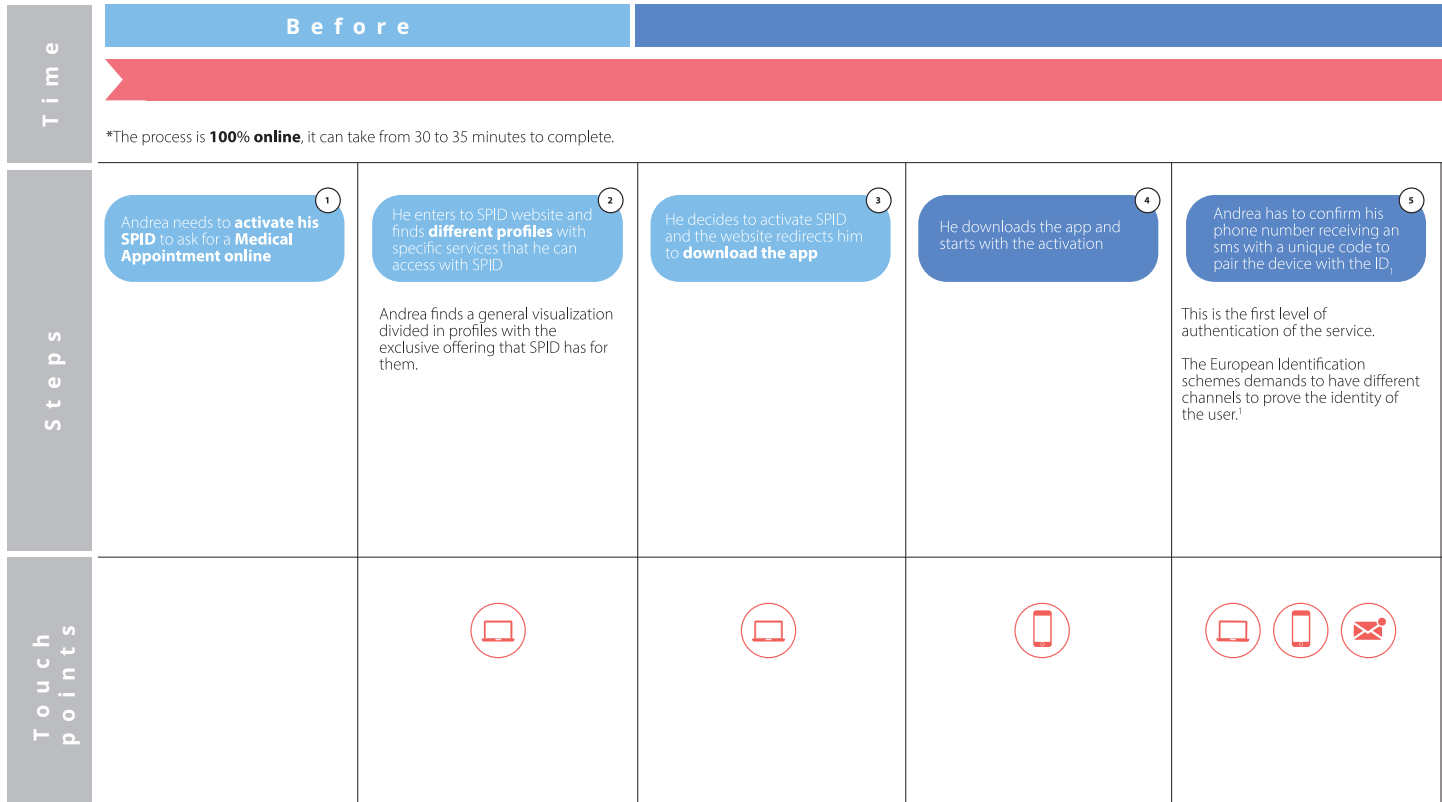
Because inside of the legal implementation of Digital identity systems, the EIDAS regulation:

.....
Demands to help verify the identity of the individuals and businesses online, enhance trust in electronic transactions between businesses, citizens and public authorities and the most important part, provide a common legal framework for crossborder recognition of electronic ID and consistent rules on trust services across the EU⁴.

3. Ministerial Declaration on eGovernment - the Tallinn Declaration. (2016). Retrieved from <https://ec.europa.eu/digital-single-market/en/news/ministerial-declaration-egovernment-tallinn-declaration>

4. eIDAS Regulation (Regulation (EU) N°910/2014) - FUTURIUM - European Commission. (2014). Retrieved from <https://ec.europa.eu/futurium/en/content/eidas-regulation-regulation-eu-ndeg9102014>

0.4.2 Journey on board SPID proposal



1. eIDAS Regulation (Regulation (EU) N°910/2014) - FUTURIUM - European Commission. (2014). Retrieved from <https://ec.europa.eu/futurium/en/content/eidas-regulation-regulation-eu-ndeg9102014>

2. The General Data Protection Regulation (RGPD), what is it?. (2018). Retrieved from <https://medium.com/@blgwritterplus/the-general-data-protection-regulation-rgpd-what-is-it-367afcd9ac5>

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Regulatory and policy trends impacting Digital Identity and the role of mobile. (2016). [Ebook]. London. Retrieved from <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/10/Regulatory-and-policy-trends-impacting-Digital-Identity-and-the-role-of-mobile.pdf>

3. Leone, S. (2018). Blockchain and Digital ID [In person]. Deloitte Italy.

4. The General Data Protection Regulation (RGPD), what is it?. (2018). Retrieved from <https://medium.com/@blgwritterplus/the-general-data-protection-regulation-rgpd-what-is-it-367afcd9ac5>

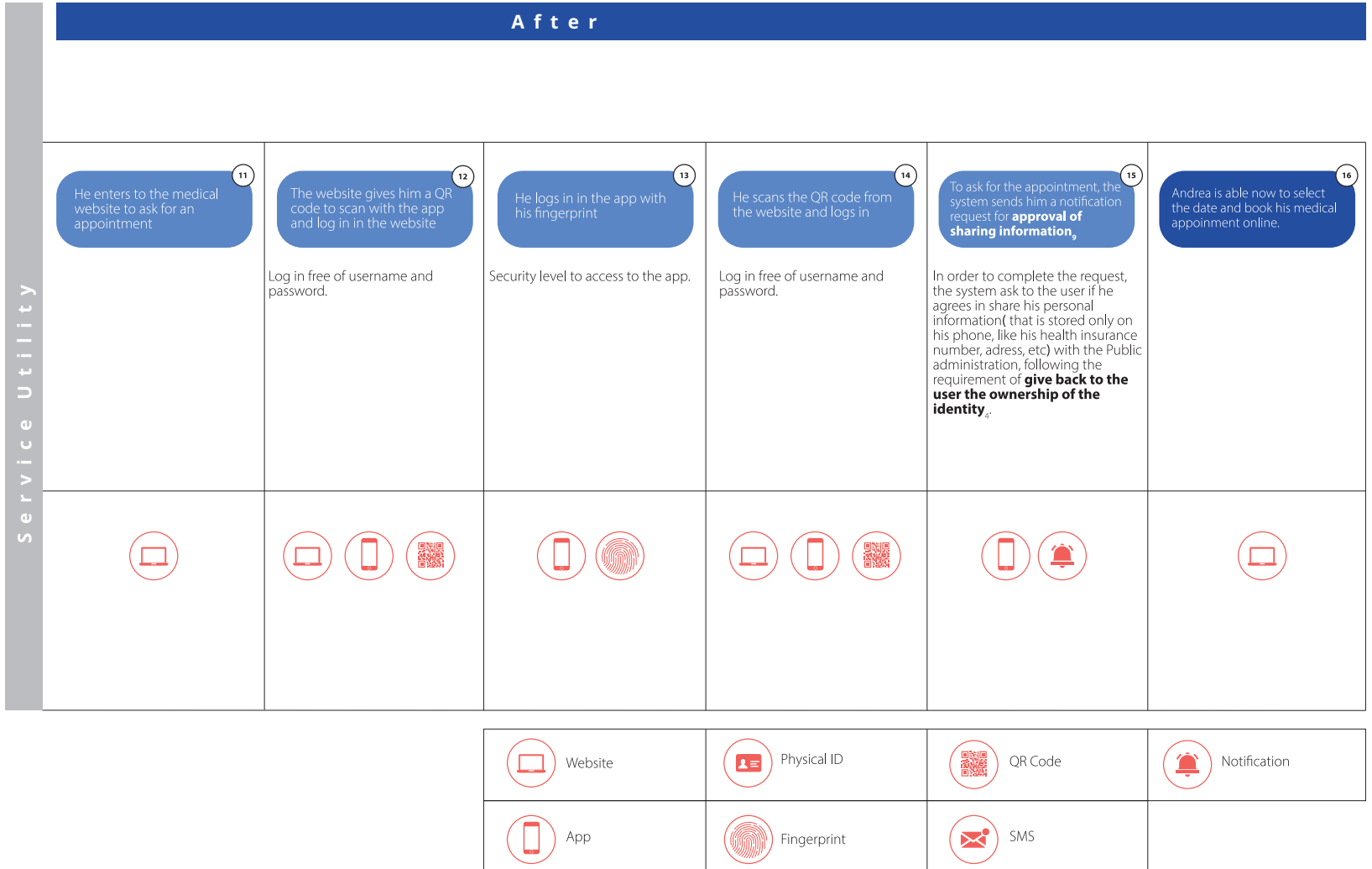
During

1 Day : 30 min 

<p>6</p> <p>He selects with which ID provider he wants to associate his account₁.</p> <p>In this step is where Blockchain appears and connect the information that is inside of the Public Administration with the one that the user is giving, just a few important details are stored on the Blockchain, for identity protection laws₂, and just for verification purposes, this details are Name and number of passport.</p>	<p>7</p> <p>He inserts his name, date of birth and document number₃.</p> <p>This is the second level of authentication.</p> <p>The user only has to insert only name and passport number inside of Blockchain₃, to verify the information with the one that is stored in the public administration databases.</p>	<p>8</p> <p>And then he has accept a pop up notification accepting that he is sharing information with PA Blockchain database₄.</p> <p>One of the regulations for the implementation of a Digital ID system is give back to the user the ownership of the identity₄, following this, the user has to accept the fact that he is sharing information with the public administration blockchain database in order to verify his identity.</p>	<p>9</p> <p>Now, Andrea has to set his fingerprint in order to log in to the app in a more secure way₅.</p> <p>Secure log in: User fingerprint.</p> <p>Inside of the regulations for the implementation of a Digital ID system is also important the implementation of several levels of security to access and to protect user's information, in this case, the user has to set his fingerprint in order to access the app, this biometric information is storage only on his device, not on the Blockchain₅, to respect privacy laws.</p>	<p>10</p> <p>His account has been verified and activated with 2 authentication factors and one secure login₁.</p> <p>At this point, the system used 2 levels of authentication (phone number and passport) and name and one security level with his fingerprint.</p>
	 	 	 	

0.4.3 Usage of the service

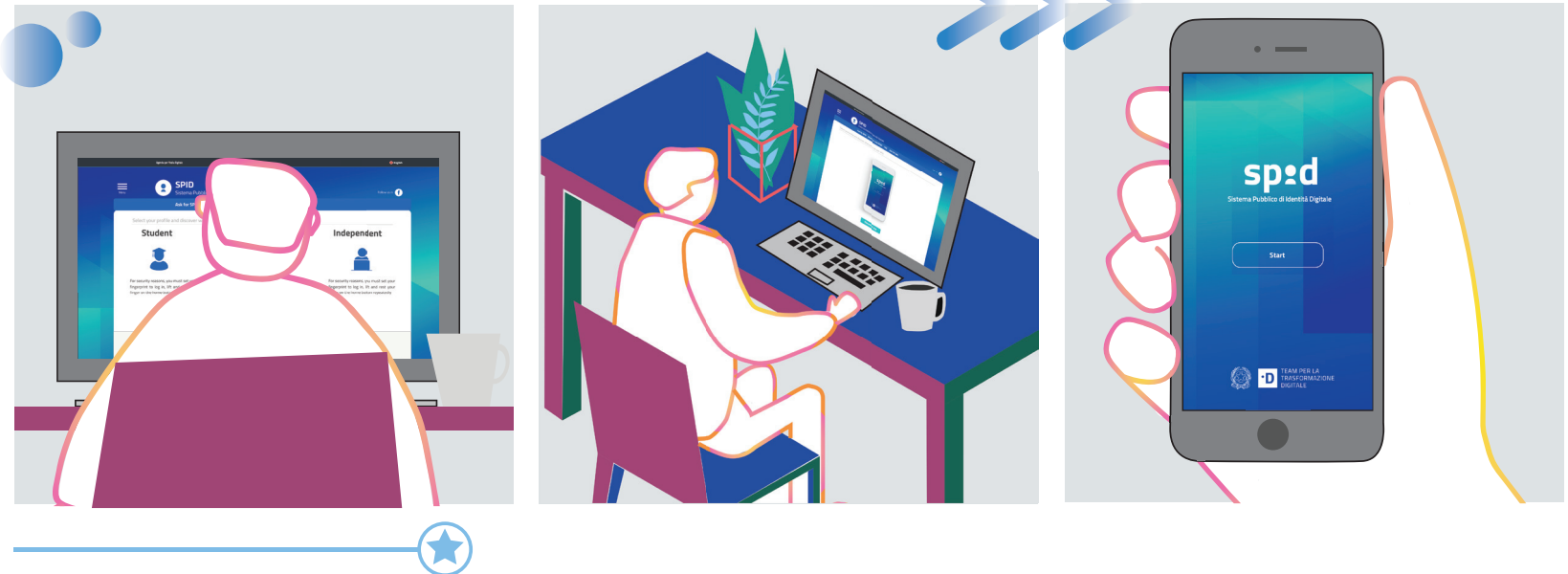
To explain better the situation, I used a case in where Andrea needs to book a medical appointment online, once he does the activation of the ID, he has to enter to the medical website, select the option of login with SPID, scan a QR code, accept some sharing information request and finally he can book his appoinment 100% online.



0.4.4 Storyboard solution proposal

The next storyboard will explain in a more graphic way the interaction between Andrea and the new service, that is basically through 2 main touch points: the website and the app.

Storyboard

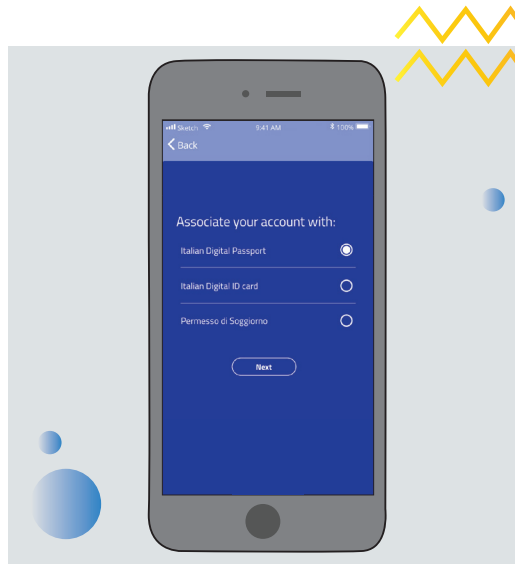
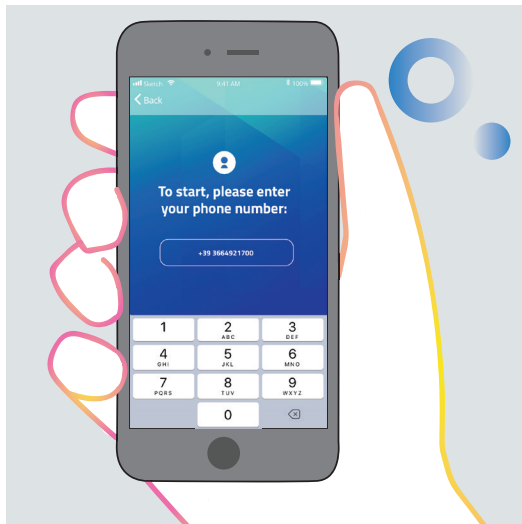


1. Andrea enters to SPID website and discovers that he can ask for medical appointments online using SPID login

2. The website redirects him to the page to download the app

3. He downloads the app on his phone and starts with the activation

- **Andrea finds a general visualization divided in profiles with the exclusive offering that SPID has for him.**



4. Andrea has to confirm his phone number receiving an SMS with a unique code to pair the device with the ID

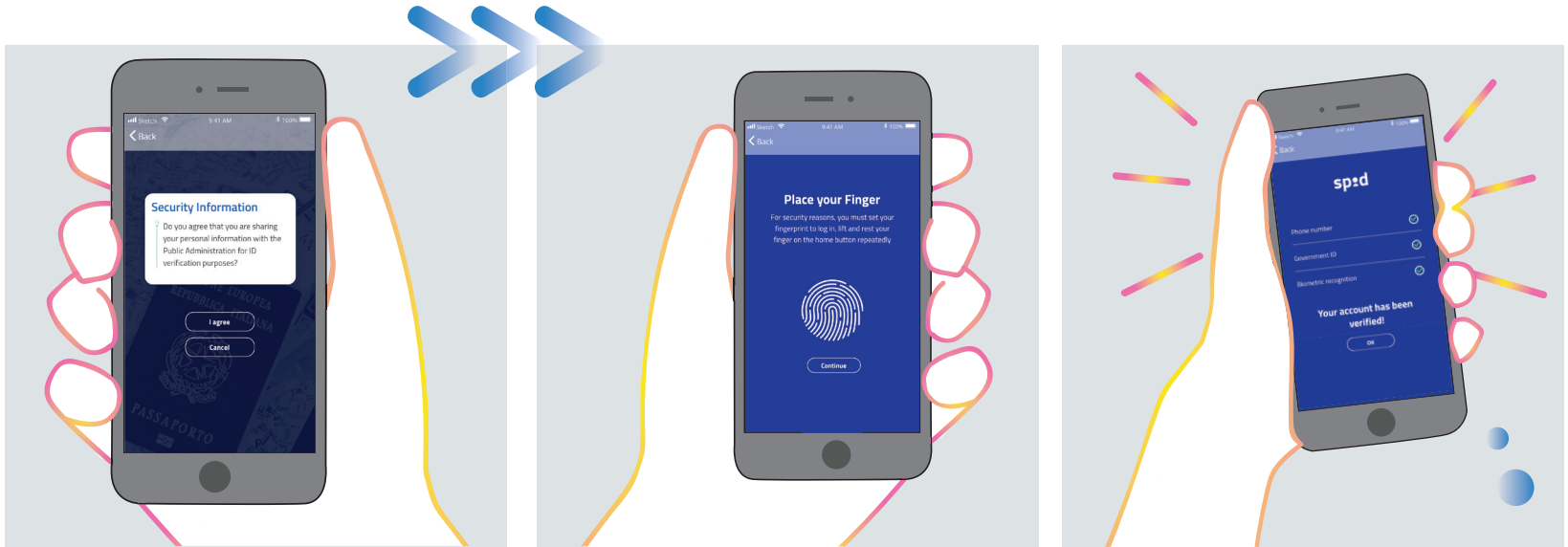
- **The European Identification schemes request to have different channels to prove the user identity.**

5. In the next step, he selects with which ID provider he wants to associate his account.

- **In this step is where Blockchain appears and connects P.A information with user's information to confirm ID.**

6. He inserts his name and number of passport

- **The user has to insert just the necessary details to verify the ID, the system compares it with the one in the P.A blockchain database.**



7. And then he has to accept a pop up notification accepting that he agree to share his personal information with the P.A Blockchain database

- Give back to the user the ownership of the id is one of the regulations for the implementation of digital ID systems.

8. Now, Andrea has to set his fingerprint in order to log in to the app in a more secure way.

- In this case, the user has to set his fingerprint to access the app, this biometric information is stored only on his device, not on the blockchain, to respect privacy laws.

9. His account has been verified and activated with 2 authentication factors and one secure login.

- The 2 levels of authentication are the phone number and the passport, and the fingerprint is the secure factor.

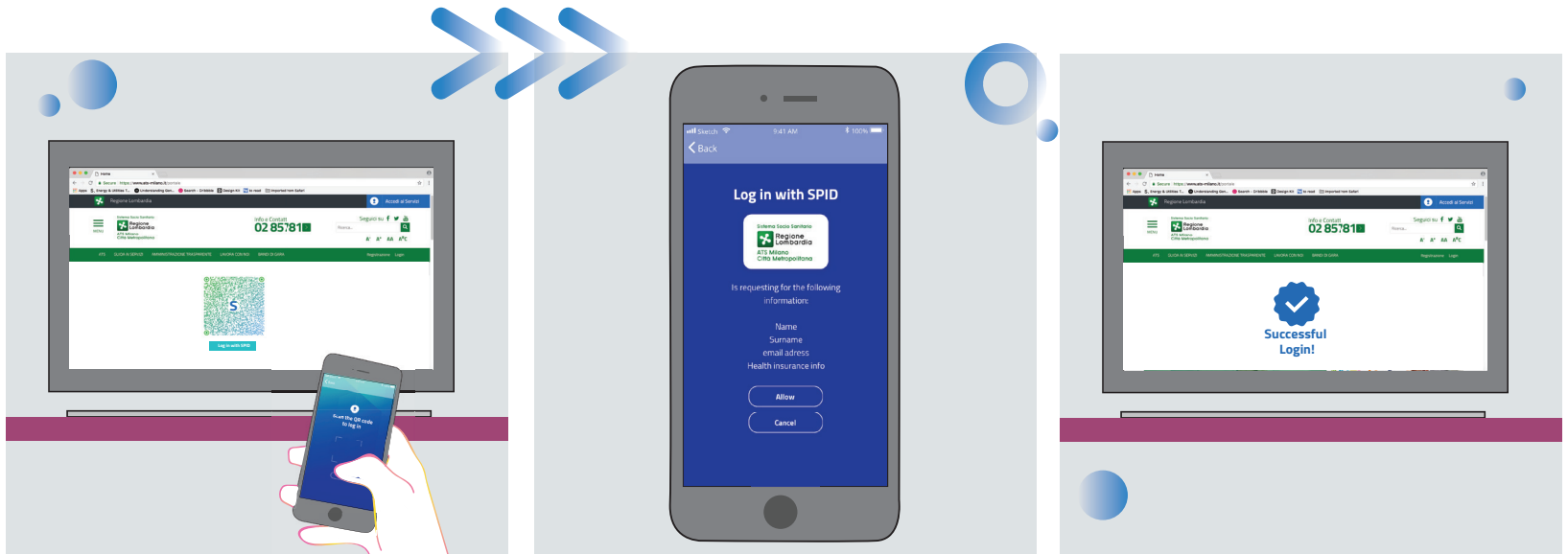


10. He enters to the medical website to ask for an appointment

11. The website gives him a QR code to scan

12. He logs in on the app with his fingerprint

- **This feature allows an experience login free of username and password.**
- **Security level to access the app**



13. He scans the QR code from the web site

- **This feature allows an experience login free of username and password.**

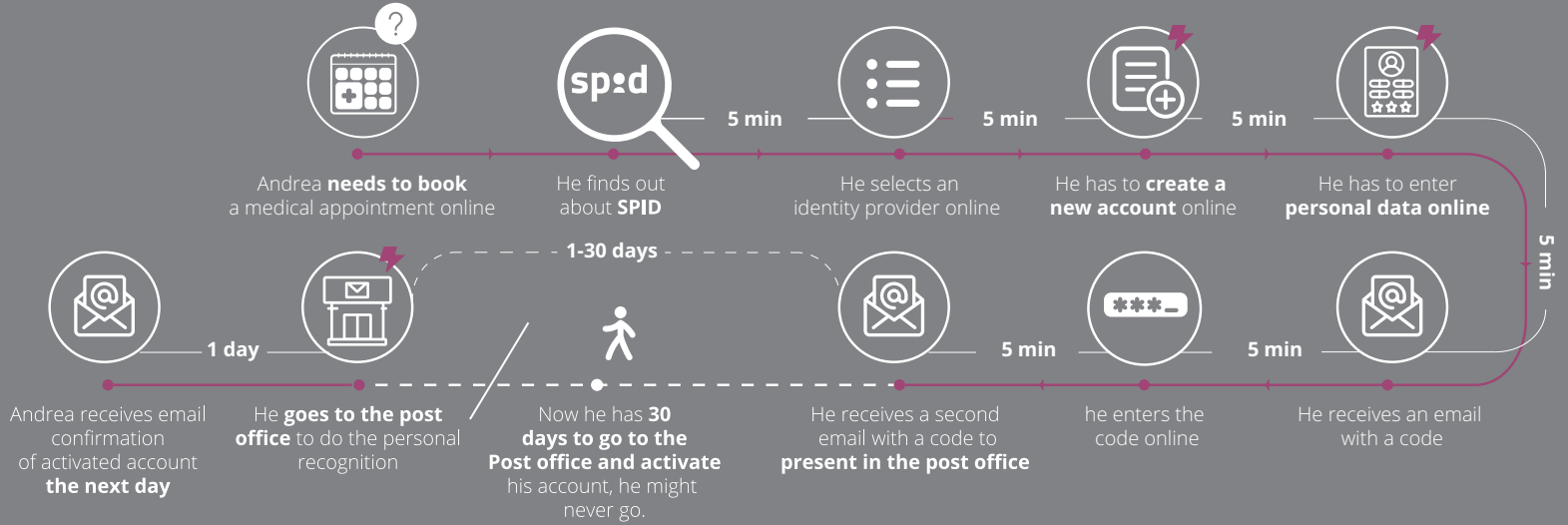
14. He receives a notification request for approval of sharing information with the P.A

- **The system ask to the user if he agree on share his personal information (in this case health insurance number) with the P.A, following the requirement of give back to the user the ownership of his own identity.**

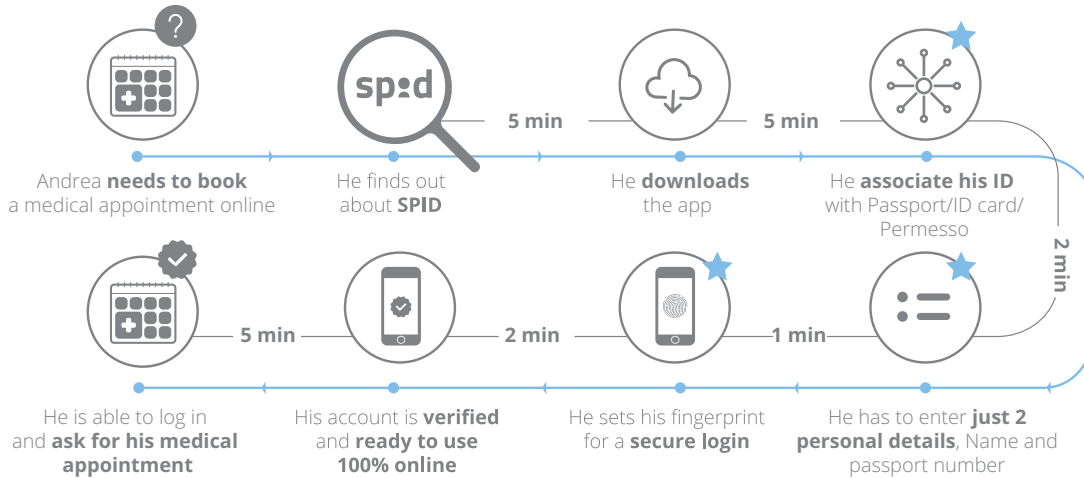
15. His login was successful! now andrea is able to select the date and book his medical appointment online.

0.4.4 Results

AS IS



NEW PROPOSAL



Results

Easy to get

As the whole process is 100% online, users can activate access to the service in a more efficient and effortless way, without the need of going to any place.

Blockchain allows to verify the user Identity with the minimum necessary personal data required, just with name and number of document, the technology will pair the information with the one in the P.A database.

More secure

The system will never share any information without the user consent, the design of the QR code and notification system increase the user confidence about the information shared.

Effortless

As the user is re using his already existing ID (Passport, digital ID card, Permesso di Soggiorno) there is no need to create a new username or password, the login through the app and QR codes allows to access any P.A website with just one code scan.

0.4.5 Touchpoints

Mobile app

The app is the main service touchpoint, the user needs to download it to activate and to log in in different platforms.

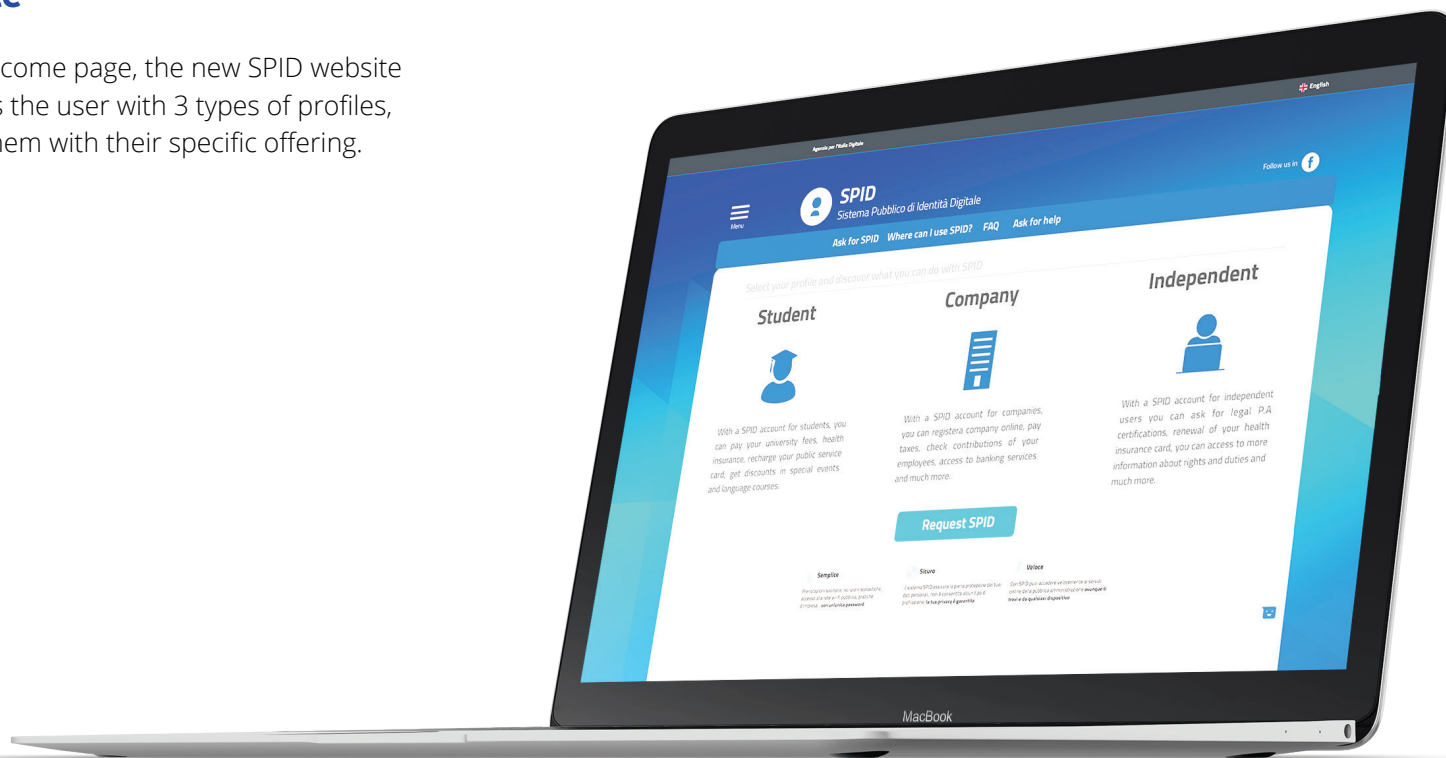
The information given by the user through the app will connect with the Blockchain P.A network in order to verify the user identity.

The design guidelines is given by Team per la trasformazione digitale.



Website

In the welcome page, the new SPID website welcomes the user with 3 types of profiles, each of them with their specific offering.



0.5 Conclusions

“Service Design have all the potential to act as a bridge between Digital transformation and user adaptation in the incoming Digital identification services.”

Aura Cristina Torres
Service Designer soon to be

Final considerations

During the development of my thesis project I confirmed the **relevant work that Service Designers have inside of any topic**, what started as a personal curiosity, ended up opening to me a new big world of changing perceptions of what we know right now.

One of the greatest characteristics of a Service Designer is to take ownership of a topic, translate it in a common language and find a way to solve the initial problem, in my case It was not always easy to find this bridge between law regulations, uncertain technology development and actual implemented Service to finally arrive to a solution proposal but **I consider this characteristic as a big achievement in my starting professional career.**

I realized that this project was just a little introduction of what we can do inside of an ongoing new technology and how can we apply it to solve actual user pain points, **I strongly believe that this introduction project can be a starting point for many others.**

Regarding Blockchain technology

Blockchain have the capacity of address some of the largest obstacles in global developments, including **Legal identity, financial inclusion, security of information and corruption**, is just a matter of learning how to use it properly and how far can we go in our proposals.

The system was designed to give back to people the control of their data, selecting what and with who they share the information, covering one of the main data protection laws for Digital Identification.

About Digital ID and legal framework

Common legal framework

A strong, secure and privacy enhancing Digital ID and authentication framework will enable citizens from all around the world to interact online, opening and creating new opportunities in a digital world.

Collaboration

"No government, country or organization can solve this problem alone" this is one of the ID2020 Blockchain based Digital ID network solution, the key to a universally accepted identity system is collaboration, the partnership between meaningful stakeholders not only led by an industry body trusted by all, also makes the system successfully work.

General rules & Requirements

At the core of any Digital Identity system, the package of rules and regulations is the one that make sure it actually works as it is expected, that's why the solution that I'm proposing is something that only can happen if the legal status reach certain level of maturity.

High quality and user centric digital and public services for citizens and cross border public services for business are required in the E-Government declaration, here is where Service designers can intervene adopting technological solutions and mold them to reach worldwide Identification goals.

Governments should invest on a Digital ID solution right now because all the European Union member states signed a new political commitment that has as a goal to work on technologies for digital identity that must be implemented in 2030, following the sustainable development goals by United nations.

The World bank identification for development (ID4D) perceive the digital inclusion implementation through authentication systems and trust services as a global economic opportunity, this is enough reason for any government to invest and implement work forces for the proper design of a Digital Identification system.

About my solution

From the Service Design point of view and in this particular solution proposal case, Technology is **solving actual service problems and adapting them to the legal requirements for the Digital ID implementation.**

Security

A primary concern about designing any identity system is to protect data from being obtained by third parties for different purposes than operating the identity system itself, **here is where Blockchain technology solves the actual problem in my proposal** and storage only the minimum necessary personal data to complete the identity verification, every time the system needs additional information, the user will get a authorization notification, that at the same time, is giving back the ownership of the identity to the user, that is a main part of the data protection laws for the implementation of Digital ID systems around the world.

Effortless experience

As a principal pain point in the evaluation of SPID, the need to realize a physical visit in the post office to activate the service is a deal breaker for almost every user, **in my proposal, the experience is 100% online and it doesn't require to go anywhere**, saving time for the users, offering and effortless experience.

In the actual user journey, the user might not even reach the physical visit, in this way the service is losing a lot of potential users, that's why **the offering of a 100% digital experience using Blockchain technology solve an actual user experience pain point.**

Collaboration

Another reason why my solution **will be possible just in the near future is because different parties should agree and adopt Blockchain technology** in their organizations, in this case Italian Digital passport, Italian digital ID card and Permesso di soggiorno should share some user data inside of the chain in order to make the system proposal work.

Communication

The efficient explanation of what the user can do with the service is essential for the user adoption, here is the communication part of my proposal, in this case I'm showing the exclusive offering that SPID has for each type of user, creating engagement and direct communication of the service offering.w

0.6 Glossary

BLOCKCHAIN

Node: Computer connected to the blockchain network using a client that performs the task of validating and relaying transactions, it gets a copy of the blockchain, which gets downloaded automatically upon joining the blockchain network.

Mining: is the process by which transactions are verified and added to the public ledger.

Block: Transaction data is permanently recorded in files called blocks.

DTL: Distributed ledger technology
Ledger: Principal book or computer file for recording and totaling economic transactions measured in terms of a monetary unit of account by account type, with debits and credits in separate columns and a beginning monetary balance and ending monetary balance for each account.

Public ledger: is used as a record

keeping system that maintains participants identities in secure and anonymous form, their respective cryptocurrency balances, and a record book of all the genuine transaction executed between network participants.

VC&B: Virtual currency and Blockchain.

Hash: Validated transactions are shared into a block and are seal with a lock.

Distributed ledger: is a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, or institutions.

Immutable: unchanging over time or unable to be changed.

multifactor authentication: (MFA) is a security system that requires more than one method of authentication from independent categories of credentials to verify the user's identity for a login or other transaction.

Ethereum address: Open software platform based on Blockchain technology that enables developers to build and deploy decentralized applications.

Public key cryptography system: is any cryptographic system that uses pairs of keys: public keys which may be disseminated widely, and private keys which are known only to the owner.

PKI: Public key infrastructure

Secure Key: System that improve security and privacy controls while maintaining the integrity and confidentiality of data across multiple environments.

API: Application program interface.

DIGITAL IDENTIFICATION

EFTA: European free trade association

Crossborder recognition: the principle that something legally accepted in one country is also legally accepted in another country.

RGPD: General rules of data protection.

SDK: Software development kit.

GDP: Gross domestic product

NIST: National Institute of standards and technology.

UNHCR: United Nations High Commissioner for Refugees.

SPID: Public system of digital identity

ICT: Information communication technologies.

PA: Public Administration.

PMO: Project management office .

CERT PA: Group of experts that handles computer security incidents, Gubernamental entity in Italy.

CSP: Cloud service provider

SaaS: Software as a service

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