Cardiff School of Computer Science and Informatics

CM3202 One Semester Individual Project
40 Credits

Initial Plan

Creating a Data Tracking Application, utilising Blockchain Technology

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1 Project Description

The General Data Protection Act (GDPA) will come into force from the 25th May 2018. A key requirement of the act, states that organisations collecting data from EU citizens, must ensure that personal data will be erased upon request. How are EU citizens expected to know which organisations store information about them? I propose creating an application that tracks data transactions via a blockchain.

The number of electronic devices per person in the UK is at an all-time high. Each of these devices contains and generates a vast amount of information about its owner and their location. The majority of this data will be analysed by large corporations whose apps are being used and websites being visited. Companies such as Amazon, Apple and Google can suggest books, songs, games, clothes, and various other products, which are tailored specifically for each individual customer from the data gathered. When you buy these items, you generate even more data which will be used next time. In addition to analysing data they may also share your data to other companies for a fee. It was reported that Tesco, the supermarket giant, sold data annually for £53,000,000.[1]

Governments have recognised that there needs to be a dramatic shift in control over consumer data, thus are now introducing new legislation i.e. the GDPA. Changes to the current data protection laws include; Breach of Notification - need to subjects users within 72 hours of first becoming aware of a data breach. Right to Access - allow subjects to obtain confirmation that their personal data is being processed furthermore the controller has to provide a copy of the personal data in an electronic format. Data Portability - each user has the right to receive the data stored about them[2]. The penalty for failing to comply may result in a fine of €10,000,000 or 2% of global annual turnover - whichever is higher [3].

The purpose of this project is to develop an application to allow individuals to identify, track and control the data they are producing. The application will generate a unique identifier for each user and link it to a genesis block i.e. an initial block. When an individuals data is provided to a company, the company will create a block on the blockchain corresponding to the users unique blockchain ID, which will contain a record of what information has been collected e.g. name, email address and age. This will create a history which can be audited by the individual, enabling them to identify any malicious activities.

The application will be based on blockchain technology. There are several reasons for using this data structure e.g. it is decentralised and uses proven cryptographic methods to enforce security. A decentralised platform deters attackers because a majority of the network would need to be infiltrated to change the history of data. Cryptographic hashes in addition to consensus algorithms provide the ability to construct an immutable log agreed upon by all nodes within the network. Research will need to be conducted to find software frameworks that enable the construction of blockchains. It would also be useful to find out how blockchain projects have been implemented in the past, the Bitcoin foundation is a prime example that will contain unique insight because it created the first blockchain and is an open sourced organisation with a vast library of scientific papers, despite being a relatively new technology. Finally, the ability to create a smart phone application will be needed, this can be learned via various books in the school library and internet tutorials.

2 Project Aims and Objections

Time constraints will limit the final deliverables of the project. Below are two essential aims that the application will need to function. Each aim has several objectives that need to be completed in order to achieve the overall task.

Aim:Create a decentralised blockchain network

Objectives:

- Research blockchain software solutions
- Set up the decentralized network
- Employ a blockchain on each node of the network

Aim:Develop the capability to communicate with a node within the network

Objectives:

- Research how to implement an application programming interface (API)
- Create an API to interact with elements within the network i.e. the blockchain

3 Ethics

After consulting with Dr George Theodorakopoulos (Module Supervisor) and researching the universities work flow, regarding the procedures and forms relating to data protection, we have concluded no ethical approval is needed. "Dummy" data will be used to test the system i.e. fictional data. Furthermore, there will be no need for interviews, questionnaires, or other mechanisms of collecting any form of "real" data.

4 Work Plan

The work plan details the tasks that need to be achieved each week to maintain the progress of the project. Milestones indicate the deliverables at each stage of the project. In addition to the work plan, weekly sessions will be scheduled with the supervisor, to discuss issues that arise and overall progress. The frequency of these sessions will be subject to change, the deliverance of the milestones will indicate if greater research is needed to solve project issues. The supervisor will not be able to physically meet during the end of term therefore we will communicate electronically via video conferencing technology as previously agreed.

Week 1: Feb 5 - Feb 11

- Research the structure of blockchain technology
- Investigate the different frameworks that are available for constructing blockchains
- Define the scope of the project i.e. the features and functionality that will be delivered as the final product

Week 2: Feb 12 - Feb 18:

- Research how to create simple applications on a smart phone
- Decide what data to include within each block of the blockchain

Week 3: Feb 19 - Feb 25

- Design the contents of each block on the blockchain

- Implement a basic decentralised network

Week 4: Feb 26 - Mar 4

- Develop the network to incorporate the user blockchain
- Research how to implement an API

Milestone: The completion of the decentralised blockchain network

Week 5: Mar 5 - Mar 11

- One entry in the list Build an API to be able to interact with the blockchain Create an application on a smart phone that is able to use the API

Week 6: Mar 12 - Mar 18

- Continue developing the mobile application.

Week 7: Mar 19 - Mar 25

- Develop the ability for several persons on the network i.e. creating a new blockchain for each new user.

Milestone: Implement an interface for reading and writing data to the blockchain

Week 8: Mar 26 - Apr 1

- Create test use cases for; reading and writing data to the blockchain, adding addition nodes to the network and distributing the blockchain to each node.

Week 9: Apr 2 - Apr 8

- Test if the correct data is being displayed
- Continue Testing the application

Week 10: Apr 9 - Apr 15

- Investigate issues that arise during testing

- Fix issues that arise during testing

Week 11: Apr 16 - Apr 22

- Continue fixing issues from testing
- Adjust user interface to make it more aesthetically pleasing and user friendly

Week 12: Apr 23 - Apr 29

- Create a draft of the final report

Week 13: Apr 30 - May 6

- Finish writing the final report

Week 14: May 7 - May 11

- Review and submit Final Report

Report Deadline: May 11 2018

References

[1] Sean Pouler, *"No Loyalty! Tesco sells details of your shopping habits for 53m"*.Daily Mail,17th March 2011, http://www.dailymail.co.uk/news/article-1365512/Tesco-sells-details-shopping-habits-53m.html

[2] *"GDPR Key Changes"*. https://www.eugdpr.org/key-changes.html

[3] *"GDPR enforcement and penalties"*. https://www.itgovernance.co.uk/dpa-and-gdpr-penalties