Blockchain Ecosystem: More Stable, Safer and Brings Better Value of Personal Data

We live in a data driven world, where Amazon generates endless stream of items you may like when you are shopping online, and YouTube features suggested videos when you are watching clips on it.

Data is generated all the time and everywhere. For example, while we use our smartphones every day, our personal data, ranging from locations to spending patterns and from health conditions to social media activities, is tracked and collected.

Data is more than simply numbers, but valuable as well. business companies can get insights into sales, target advertising, product development, and more, and make smarter decisions through data analysis.

The size of data has been skyrocketing. In the last two years alone, it's estimated that 90% of the digital universe has been generated. Back in 2012, IBM calculated that man and machine were collectively generating 2.5 exabytes (1 exabyte=10^9 gigabyte) of material per day. It's believed that this figure had increased 20-fold by 2018. Looking into the future, the digital universe will reach 40 zettabytes (1zettabyte=10^{12} gigabyte) in 2020, IDC projected in its Digital Universe Study.

Data Empowers Businesses

Zhu Feida, associate professor of Information Systems at Singapore Management University delivered a speech at PingWest's tech conference SYNC 2019 Southeast Asia in Singapore on December 6, 2019. At the event, Prof. Zhu shared his opinions on the security and privacy concerns of personal data, and proposed an ecosystem based on blockchain to solve the issue.

Prof. Zhu said that personal data is an emerging new asset class and data intelligence empowers business. However, both business companies and individual users face problems. From a business standpoint, they obtain low-quality data from questionable sources with no choice so far, which then makes them draw inaccurate user insights. Additionally, data walls between businesses prevent accessibility to advanced data science models.

More serious problems are exposed to individual users. Since they have little knowledge of and control over their personal data, they have no idea how data was used by business companies. As a result, they cannot protect their privacy and security. Furthermore, companies make profit from free trade of personal data did not share profits with users who have right for digital dividend.

**SYMPHONY Platform: A Solution Based on Blockchain**

Prof. Zhu pointed that blockchain has key features of immutability, traceability, smart contract, distributed storage, and anonymity that help achieve a transparent full history of data via audit, trustworthy mechanism for data control, and well-designed measures for data and identity protection.

He proposed the SYMPHONY project, aiming at bringing out value of personal data and protecting privacy at the same time. The SYMPHONY (SYM) ecosystem consists of three main parties: First, data contributors, including users who generate data from using apps on smart devices, making payments, among others. Second, businesses or data consumers who seek insights from data, such as retailers and automobile dealers. Third, developers in between who create models and algorithms to analyze the data. They play a role of a connector between users and businesses.
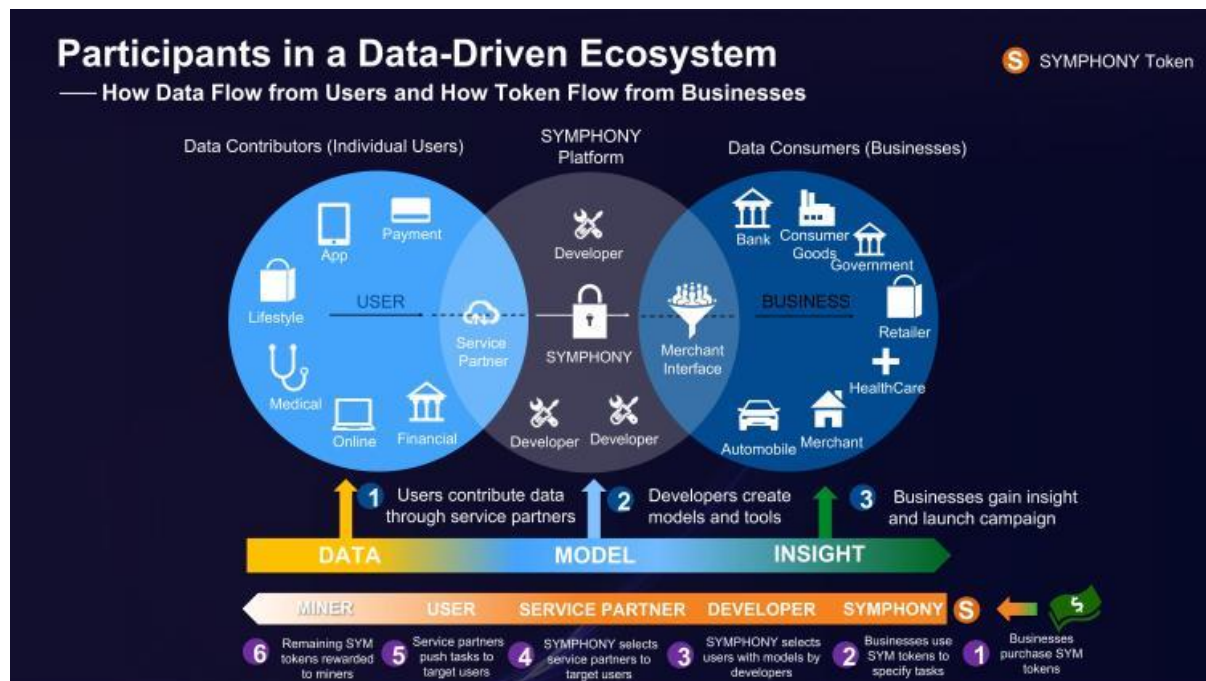
Other participants include service partners and merchant interface. The former ones are generally apps or channels who upload user data, and the latter is a platform that allows merchants to check their orders, view customers' payments, manage users, check settlement status, and more.

Cryptocurrency is used in this ecosystem as an incentive scheme. Businesses purchase SYM tokens with US dollars when they start a new task to gain insights into whatever they seek. The tokens will then be divided by developers, service partners and data miners. Developers select users with models in the task. The SYM platform select service partners who will push tasks to target users. Data miners scrap data and help maintain the whole ecosystems. As a result, contributors all get payments and a healthy token ecosystem is established.

Architecture is a fundamental description of the SYM ecosystem. Being different from general blockchain projects, SYM picked a multi-level design. There are three chains shown on the image below: Execution Chain at bottom, Data Chain in the middle, and Value Chain on top.

Execution Chain: Personal data is transited onto the chain from apps, internet platforms and smart devices. The main role of this chain is data collection.

Data Chain: Where Federated learning technique trains algorithms and distributed data mining scrap content and turn them into useful information.

Value Chain: It tells the value of data collected and analyzed and generate insights for business decisions.

The whole multi-level design balanced data utility, security and privacy. Therefore, it provides democratized and personalized intelligence.

For privacy design, Prof. Zhu and his team initiated a solution to combine commonly-used privacy algorithm with hardware support — an Intel chip — that no one knows what execution is inside.

In some occasions, businesses only want to analyze data from one certain field, such as social media, e-commerce, and education. For this reason, the data ecosystem becomes a sub-domain one. Functional token is launched in each of these sub-domain data ecosystems due to their unique characters. An analogy of it is membership schemes in a variety of stores in a mall.

Computational token is SYM token commonly used across different sub-domain ecosystem. An analogy of it is Chinese RMB, US dollar, Singapore dollars, or other national currency (depends on where you are) that is accepted at every store in your country.

Why We Need Blockchain Technology on Data Privacy Problems

Current data storage method is database. For example, when we are on Facebook, our personal data generated each time is stored on Facebook's database or even third-party database if you log in via Facebook on external websites. "We believe that world top tech companies such as Grab and Facebook are absolutely affordable for databases with highest performance, but data privacy scandals occurred several times in recent years and the number keeps growing," said Prof. Zhu. For example, Cambridge Analytica harvested the personal data of millions of Facebook users and used it for political advertising. Such scandals make people lose confidence in the database.

"The core functions of database are storage, data retrieval and data search. In contrast, blockchain help with data governance," said Prof. Zhu, adding that blockchain is a decentralized ledger technology that can record transactions in a permanent way and data recorded and access history cannot be altered retroactively. Therefore, blockchain solves the problem of trust.

Outlook for Business Analysis

Prof. Zhu shared his opinion on the value of business analysis. He said that "Data has closer relations with business in the current society because the number of personal data is growing extraordinarily. Data tells about ourselves, and the essence of business has something to do with people. Therefore, personal data help business companies know about their customers. No matter what industry business companies are in, whether hospitality, retailer, or even news media like PingWest, we need to use data to help with our business.

Singapore Management University where Prof. Zhu works offers the Master of IT in Business (MITB) program that ranks first in Asia and 11th among 75 business analysis-related master programs across 17 countries. The program's courses are full of real business data and case studies that are more helpful to students. Additionally, many professors in this program have partnerships with business industry that can offer real case studies. Moreover, this SMU features small class sizes with which student engagement and participation are higher.