A Blockchain based Autonomous Decentralized Online Social Network

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***Abstract*—Online social networks (OSN) are becoming more important in people's daily life, however, all popular OSNs are centralized, and this raises a series of security, privacy and management issues. A decentralized architecture based on blockchain technology provides the ability to solve above issues. In this paper, an OSN service is developed based on blockchain technology in order to make it operate decentralized. Large volume of data normally required low-security requirements can be stored in Interplanetary Filesystem (IPFS) to make data decentralized. A decentralized autonomous organization is developed for user autonomy, users can self-manage the OSN in a democratic way.**

Keywords - Blockchain, Online Social Network (OSN), Decentralized Autonomous Organization (DAO)

I. INTRODUCTION

Online Social Network (OSN) is a platform for people to build connections with each other via the Internet. It is a major platform that the public can obtain and disseminate information, exchange views and share their lives on it. Research from Chaffey [1] reveals the liveness of top used OSN in the world (Figure 1), therefore, it can be found that interacting with OSN is a very popular online activity for Internet users.

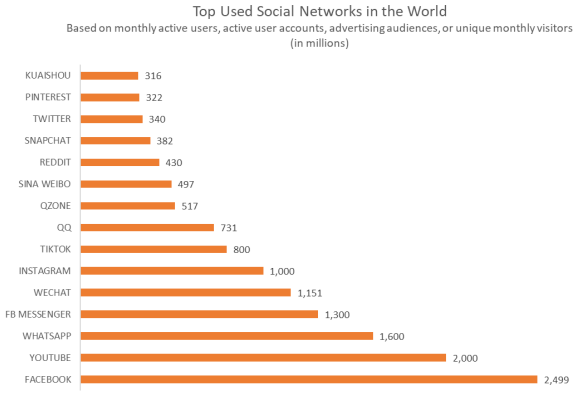

Figure 1. Top used social networks in the world

Nowadays, most of OSNs are centralized, which means the OSN companies often have full ownership of all user data and service. In general, users can only use the service after they agree to the agreements of OSN which are enacted by OSN companies. However, many agreements give the OSN companies right to use user data for personalized services such as advertisement. If users do not allow the companies to use their data and protect their privacy, they usually have to make a series of expatiatory applications or even give up using such OSN. Data and service centralization also caused all data of users is uploaded and stored in centralized servers which are controlled by OSN companies. Therefore, it is hard for users to protect their contents on the OSN when the servers crash down. To make matters worse, if the servers are hacked, security information includes password, security problems, address of users is possible to be leaked. For many users using the same password in kinds of sites, hackers can easily hack their accounts by using a method named credential stuffing attack [2]. This makes personal information of users at risk of leakage and abuse. Such problems of centralized OSNs boost researchers to consider develop an OSN based on the decentralization framework.

Decentralized OSNs have the potential to provide a safer and more controllable social network environment for users where privacy and information are more controllable for their owners. Because the data is stored in a distributed way and service is no longer relied on centralized servers. In general, a decentralized OSN is usually operated by a peer-to-peer mechanism in which each node stores some parts of data and support the service. However, it is not binding on malicious acts, and lack of self-management and sustainable developing abilities.

In this paper, we proposed an autonomous decentralized online social network architecture based on blockchain technology. Blockchain is able to provide a safe and trusted peer-to-peer mechanism where participants have unique identities and private keys. The private key has the highest control right of the corresponding account and is stored in user's own device. Moreover, all transactions in blockchain need to be signed by the private key, so cheating can be avoided. In order to give the system abilities of self-management and sustainable development, a decentralized autonomous mechanism powered by blockchain is embedded in the architecture. The rest of this paper is organized as follows. Firstly, we introduce the background of related technologies used in this architecture. Secondly, a detail description of the architecture is discussed. Thirdly, functions of this project are showed. Finally, a conclusion is made.