ANYI: A decentralized social network system constituted by personal information units

Dehui (dehui_jp@yahoo.co.jp)
Chuanshang (songjlx@gmail.com)

Summary

ANYI network system is a decentralized social network composed by personal data units which is managed by users themselves. The data unit represents the individual of ANYI network, the units and the connections among them constitute the entire network.

General principle: Like physical properties, An individual should have full authority of his/her personal information, including personal data, social relationships, and so on.

Goal: To improve the social network both online and offline by rebuilding the relationships among the individuals, based on personal information units.

Features:

· Individuals manage their personal information by themselves and contact with others directly without using any servers.

· Ensure the security of data storage and transmission by using the asymmetric encryption technology.

· Achieve efficient and reasonable info resource interaction based on personal information units.

· Realize the circulation of reputation, help to spot fake news, amplify the effect of reputation in the real world.

· Realize the circulation of information resource in the social network which to maximize the benefits of social resources.

1. Current troubles in social lives

We are enjoying the excellent benefit and convenience of the rapid development of the Internet and various technologies both online and offline. However there are still many outdated processes and new problems which are followed by the rapid changes.

· Data breaches occur frequently on various network platforms, It has already become a worldwide problem. Most people don't think it is safe to save and manage important information on social softwares, And “Delete XX” movement also got massive support. Current social softwares only stay at the entertainment level and it is difficult for the social softwares to assist people's social lives better without getting enough trust.

· Large amount of fake news and vague information on the Internet are seriously bothering us. The bad information spread so fast that we can not protect innocent people such as children from them.

· People identify information based on their own judgment. The limitation of individuals’ judgment gives the fake news much space. Furthermore, the fake news on the internet influences more widely and endless.

· It is an important way for people to get information from real social environment in daily lives. Currently, the information on the internet is disordered, Most of times, people obtain useful information from social environment occasionly. People cannot utilize the resource information in their social environment with high efficiency.

· Crisis of Trust. The Internet makes people's social scope wider but there is no corresponding credibility support system. People don’t know the credibility of a new friend, so we are bearing the risks of being cheated or losing opportunities.

· It is common to use personal sensitive information (such as name,address, phone number, email…) as keyword to build the the relationships with different institutions. Our sensitive information is spreading widely due to the diversification nowadays.The risk of personal information leakage is high. Correspondingly, the institutions also have to cost on keeping these data safely. Moreover people can not manage the relationships easily.

· Nowadays, Filling out the application forms online or offline is normal to submit personal information. Everyone suffers the process of filling out the forms and waiting in long queues for the clerks to check. It will be worst if some mistakes happen. This incompetent way is wasting so much time again and again.

· In most business models, the customers’ data are stored and managed centralized. that makes individuals exist around various platforms like “fragments”. Personal social information is heavily dependent on the commercial platforms, influenced by the the rules and life cycle of them. Individual autonomy in current information age is rarely noticed.

To solve these above mentioned issues, We strongly believe that the ANYI network system is the best solution.

2. Introduction

Personal information unit is the basic element of ANYI network system. (hereinafter collectively referred to as 'node') The nodes are interconnected by peer-to-peer network technology (P2P) to form ANYI social network.

The node is composed of two parts: data and software (processing of data). In order to secure the data, the software part should be subdivided into two layers: intermediate layer and application layer.

The asymmetric cryptography technology is used to ensure the security of data storage and transmission, and the public key is used as the unique ID for the node in ANYI network.

The peer-to-peer network technology is used to realize direct communication among nodes by unified interaction rules, and center server is not needed anymore.

Individuals manage their own personal information autonomously; ANYI community customizes and maintains the interaction rules. The software that obeys the rules can be freely provided by any software vendor. No one can access or use any data without node owner's permission.

2.1 Data

Personal data are only controlled by the node owner.

Data are independent of the application and users can freely choose applicaions to manage the data.

The data are divided into personal information (personal basic information, resource information, social information, access control, etc.) and ANYI network system setting information. Personal information is stored encrypted, the items is stored in a key-value form and the item-keys are uniformed defined. The owner can store any information on the node, including the information from outside.

ANYI node uses asymmetric cryptography technology to secure data. We also use the public key of the asymmetric cryptography as infividual's ID at ANYI network. The ID will be used when building new relationships, sending/receiving messages with other nodes, and manage the access control. Moreover, multiple IDs can be derived from the original ID, to satisfy the anonymity requirements fo certain scenarios.

2.2 Intermediate layer

The intermediate layer is responsible for data processing, network interface and application software layer interfaces.

In the aspect of data, the intermediate layer realizes encryption/decryption of data and accesses data by using item-keys; In the aspect of interaction with the network, the common interaction interface of ANYI network should be realized; In the user interface aspect, the intermediate layer encapsulates data and keys to provide basic functional interfaces to the application layer.

2.3 Application layer

The application layer uses the interfaces provided by the intermediate layer to perform data processing and network interaction, and provides a user-friendly operation interface.

To ensure security, the application layer does neither directly process data and keys, nor interact with the network directly.

2.4 Basic rules of personal nodes

ANYI network system runs on a peer-to-peer network protocol and adheres to the following rules to ensure network communication:

· When a node logins to the network, it broadcasts IP to the network if necessary and refreshes the IP info of the related nodes.

· The IPs are used to send messages to ohter nodes.

· If there is no IP of the target node, or the IP is invalid, the message will be sent by broadcast, The IP info will be updated when a valid response is received.

· The IP info will be auto-maintained if necessary when current node receives request or response.

Information exchange rules between personal nodes:

· Can send message or request proactively and have fault-tolerant processing when communication fails.

· Receives message.

· Synchronizes the updates in the network automatically.

· Responds query requests: Checks the permission and returns the result automatically.

3. Application scenarios of ANYI network system

3.1 Social network +

ANYI network system implements social functions by obeying the common interaction rules in the real world. User ID (The public key of the asymmetric cryptography) serves as the core part for the functions.

3.1.1 Establishing Relationships and Sending Messages

The two individuals establish the relationship by exchanging IDs, and manage the authorities and groups by using ID.

Messages for a certain node are encrypted. The sender encrypts the message with the recipient's ID, a signature generated by the sender's private key is also attached. The receiver can decrypt the message with his private key and verify the signature to confirm the message is not from a impostor.

3.1.2 Groups

Groups can be created and managed freely.

The group management is also based on IDs. There could be multiple administrators, and rules of the group can be freely customized. There will be no more limit from any platform, such as maximum number limit of members.

The sender uses the hashcode generated by all members' ID to encrypt group messages, using a multi-signature rule (1-N) with a threshold of 1, so any member who contributed to the hashcode can decrypt the group message.

3.1.3 Management of different types of information

Personal daily life information can usually be divided into the following categories:

· private information for oneself, such as schedule, memo.

· Instant information shared in a small scopes like family, friends, such as moments.

· Resource information such as business-related, like job opportunities, product discount, etc.

The life circles and targets of the above information are different. ANYI nodes can manage different kinds of information by classification and authority designation for each category.

For resource information, it is necessary to obey appropriate rules so that others can judge if the resource is still avalible. Generally, time, period, location, target people and conditions should be clear. The appropriate rules for different field will not be the same, ANYI community will keep on improving them.

Within the permission scope, the node can obtain real-time information updates of other nodes, and can search with keywords for certain resource information in the personal social network scope. Every node maintains their own node well, post resource to share with family or other scopes. So everyone can get precious resouce information based on trust.

3.1.4 Social network with Reputation

Reputation is an extremely important part of human social activities. Credit management in business has a long history. Personal credit management in the financial industry involves almost every social individual.

However, we don't have a social product that can help managing and circulating dignified information in the daily lives. Offline people can only use reputation information in their social networks occasionally. People often miss opportunities or suffer losses because they can not get reputation information timely and effectively. This also provides huge space for continued scams and fraudulent business activities.

ANYI network system seeks to achieve the circulation of reputation information:

· Store the reputation info on ANYI node, and share it to social network.

· Relate people's daily activities with their reputations.

The circulation of reputation can make people in social networks more self-disciplined, enable people to be able to identify a new face by referring to the reputation info from the proper network scope. The circulation of reputation can help to identify and mark the fake news and the creator, can amplify the influence of reputation and can also affect the development of the real society.

3.1.5 Management of Authority

As the amounts of information is increasing so fast that people can not catch up with it. People are losing the control of massive information. Currently we are involved in more and more social relationships. It is necessary for us to start managing information around us.

ANYI node supports flexible authority management which is based on the public keys(ID). We can manage the authority by minimum unit(each information item).

1) Pre-set permissions: The application processes the information according to such permissions. This is suitable for social relationships.

· You can classify various kinds of relationships.

· You can classify different types of information.

· You can set authority for any information (or information category).

2) Temporary authorization: It is for the situations such as the submission of personal information forms to non-friendship organizations.

3.2 Individual-centric new application scenarios

3.2.1 One-click information submission

Submitting personal information by means of paper or electronic forms is a very common routine. This is necessary but cumbersome, and it is easy to become a bottleneck in busy places such as airports. It will be worst if hand mistakes happen.

ANYI network system can improve this interaction. Using ANYI System, an individual can finish the submission by clicking one button.

· The organization prepares the request for ANYI interface. The request contains the specific request items and associated information.

· The individual scan the request with the node app and the app extracts the information from the node and generates the response content for the owner to confirm.

· The individual confirms the content and clicks the confirmation button to approve the submission,then the response content will be transferred to the organization at once.

Advantages:

(1) Efficient (fast, accurate):

People can do the submission without filling out their basic information by hand repeatedly. There is nothing to worry about hand mistakes, and we don't need to wait long in a queue for the clerks to check the papers.

(2) The interaction records will also retain on the personal node, so that the individual starts to be able to master personal interaction history.

(3) Organizations also can save costs accordingly.

Standardization:

Users have the right to know why these data are collected and how these data will be used. There should also be regulations to make sure the data are properly collected and used.

3.2.2 Reducing the usage of sensitive information & de-entity membership cards

Once one person has a node It means he has at least one ID that uniquely identifies himself. The ID can be used to establish relationships with organizations in daily life.

Sensitive information such as name, address, phone number, email, etc. are not necessary anymore in such cases. It will become safer because the frequency of sensitive information usage will be significantly reduced. Correspondingly, the organizations side can also save cost on keeping sensitive information.

On the other hand, the ID can take place of the entity membership cards or point cards.

It does'n only eliminate the cumbersome card management for individuals, but also saves the costs around card issuance.

3.2.3 Individual-centered use of basic information

At the moment, our basic information is scattered in various organizations such as banks, insurance companies, government departments etc. When the basic information changes, we have to inform the organizations of the change one by one. And because we can not list up all the concerned organizations easily, it is possible that we forget some less important organizations like online shops. So we will be affected correspondingly, and the organizations also suffer the loss caused by the outdated data.

ANYI network system can solve this problem by this way:

The organizations stop storing customers' data. They request the data from individual nodes if necessary.

· When establishing a relationship, the organization requests the individual's permission of accessing certain items of data(without collecting the data at the moment).

· When some data changes, node owners just update the node.

· The organization requests the latest data through ANYI network system when necessary.

(Personal nodes serve as unique source of personal basic data)

Advantages:

(1) When personal data changes, the only thing for a person to do is just to update his own node.

(2) We start to be able to manage the relationships, which means all are stored in our personal nodes. We can also inform concerning organizations of the change easily through ANYI network if necessary. When a certain business service is no longer needed, just disable the permission, so that the corresponding organization can not obtain the data anymore.

(3) The organizations can reduce the period of holding customers' information or avoid to keep it, low-risk or no risk on leaking customers' information. Confidentiality matters the most.

(4) The organizations can avoid the loss caused by outdated information.

3.2.4 Rationalization of information assets

We are used to more and more information services, such as online music, e-books, online education, insurance and so on. These services are our assets. However, we can not deal with such assets like the tangible assets, such as the exchange of ownerships.

Why can't we sell/give an e-book or music to others?

In ANYI network system, we can use node ID to declare the ownership of the information assets, and the exchage of the ownerships can be realized through a change of the owner ID.

Let us take the online e-book as an example to explain how to realize it:

When the platform delivers a book to a purchaser A, First the platform uses A's public key to declare that the e-book belongs to A, and encrypts the e-book with A's public key. In this way, only A can decrypt the e-book.

When A wants to give/sell the e-book to B, A requests the platform to change the owner to B. After the platform verifies the ownership of A, the platform uses B's pulbic key to re-declare the owner of the e-book and re-encrypts the e-book with B's public key.

As a result, the e-book is available for the new owner, meanwhile the former owner of the e-book can not decrypt the e-book anymore.

Similarly, physical assets can also be managed by this mode. Because there is no easy-to-copy feature, the transfer of physical assets is simpler.

Furthermore, the manuals, quality guarantees, etc. of physical products can aslo exist in form of electronic information in ANYI network system. So we can get rid of the management of mass appendant materials of various products.

3.3 The future of individual information management

In addition to the cases above, there should be much more possibilities in all aspects of our daily lives.

In current information era. the individuals are fragmented:

· In the field of e-commerce, the shopping histories are kept on the e-shops side. It is difficult for one person to view his all shopping history from a personal perspective.

· In medical aspect, medical institutions have personal medical records, but the individuals don't . We have no a easy way to collect our health information from the medical institutions.

· In the social network aspect, people have their preference on different social network platforms. To keep necessary relationships, many people have to "seperate" themselves to use multi-social softwares.

· For education, a person may use different schools, websites, apps to learn a certain skill. we can not add up how much time we spent on it. This might be a strong encouragement if we can review the process of studying.

The personal node model of ANYI network system ensures personal priority. Individuals are able to collect all the information regularly, so that we can manage all the transaction information and points status across the organizations in the e-commerce aspect; We can check and use our own health information; We can manage social relationships naturally without being restricted by any third-party platforms; And also, referring clearly to studying our history data, we can adjust how to study in a better way.

On the internet world,the equality with the organizations ensures that we get back our own rights for information. Based on this, I believe everyone will enjoy a better life.

4. Centralization

4.1 Commercial decentralisation

Individual users are not free to migrate data between different social platforms. They cannot freely sell/give out information resources (such as music and e-books) they purchased. Users are enduring the risks of personal information being abused and leaked. Legitimate decision-making changes of commercial companies may affect ordinary users seriously(such as the termination of Email service).

These restrictions and risks on users are the inevitable outcome of the commercial centralization model. Without revolutionary change, the status quo cannot be changed or even prevented from deterioration.

The GDPR (General Data Protection Regulations) issued by the EU declares the rules for business and organizations and rights for citizens, However, GDPR only restricts enterprises by punishment after bad things happened, there is no effective damage recovery measures.

ANYI network system separates personal data from business platforms, individuals will not be so seriously influenced by the business organizations whatever happen on the business organization side.

The controversies about who is the data owner and who has right to control data also can be settled easily.

4.2 Administrative Centralization

As per mentioned in 3.2.1, we need professional judgement if the items collected are reasonable. We need the corresponding legal protection. The legitimate enforcement agency is needed when the information asset is treated the same as the properties. When keys are lost or stolen, we need a mechanism to help recover the control of our own nodes. ANYI network system also requires a real-name authentication mechanism to meet some certain needs.

In conclusion, we need legal lawmakers and law enforcers to protect and manage the world of information assets. This responsibility should only be taken by the governments.

5 Conclusions

Limited by the development of hardware and technology, the server-serving mode(both the client-sever mode and the browser-server mode) of software applications is the best long term solution. Commercial companies provided the resources that not everyone can afford, such as, storage, computing, security and so on that almost everyone can enjoy the applications easily.

However, In such server-serving structures, almost all the users' data are stored on the servers. There is no independent existence of individuals on the internet. People are fragments around the platforms and anyone could be heavily influenced by the changes of the center platform, even if the changes are legit. Everyone can not collect all the personal data easily. It is impossible to build a real personal priority internet enviroment. As of now it is hard to say that we can continue to improve well in such condition.

Currently, we have got all the necessary conditions of hardware and technology to go without center-platforms. These are the following:

· The popularity of smartphone has enabled people to have independent storage, computing, management and network interaction capabilities.

· P2P network technology makes it possible for individuals to communicate without the third party.

· Asymmetric cryptography technology proves the security of information storage and transmission from theoretical and practical applications.

ANYI network system hopes to establish a new network that is reliable, persistent, efficient and reasonable to people's lives.

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