

6G Network and Data Management with Blockchain

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Abstract:

We live in a world where technology is immersed in our life. 6G network and artificial intelligence (AI) development are two essential technologies. 6G will be able to cover worldwide network access space to underground. Reliability, efficiency, and security are necessary for the public to use with confidence. This paper, it will introduce high-level security to achieve a reliable, efficient, and secure network by introducing a blockchain-enabled crowdsourced system. The blockchain-enabled crowdsourced systems will include fog servers, a blockchain platforms, trusted authorities, and participant users. With the advancement of technology, it is now common to own a smart device that stores and processes personal information. We use smart devices to search for things and directions with GPS signals with just our fingertips. In comparison, we live in a different world from the previous turn of the century; now out the threat of national

6G Network

Introduction:

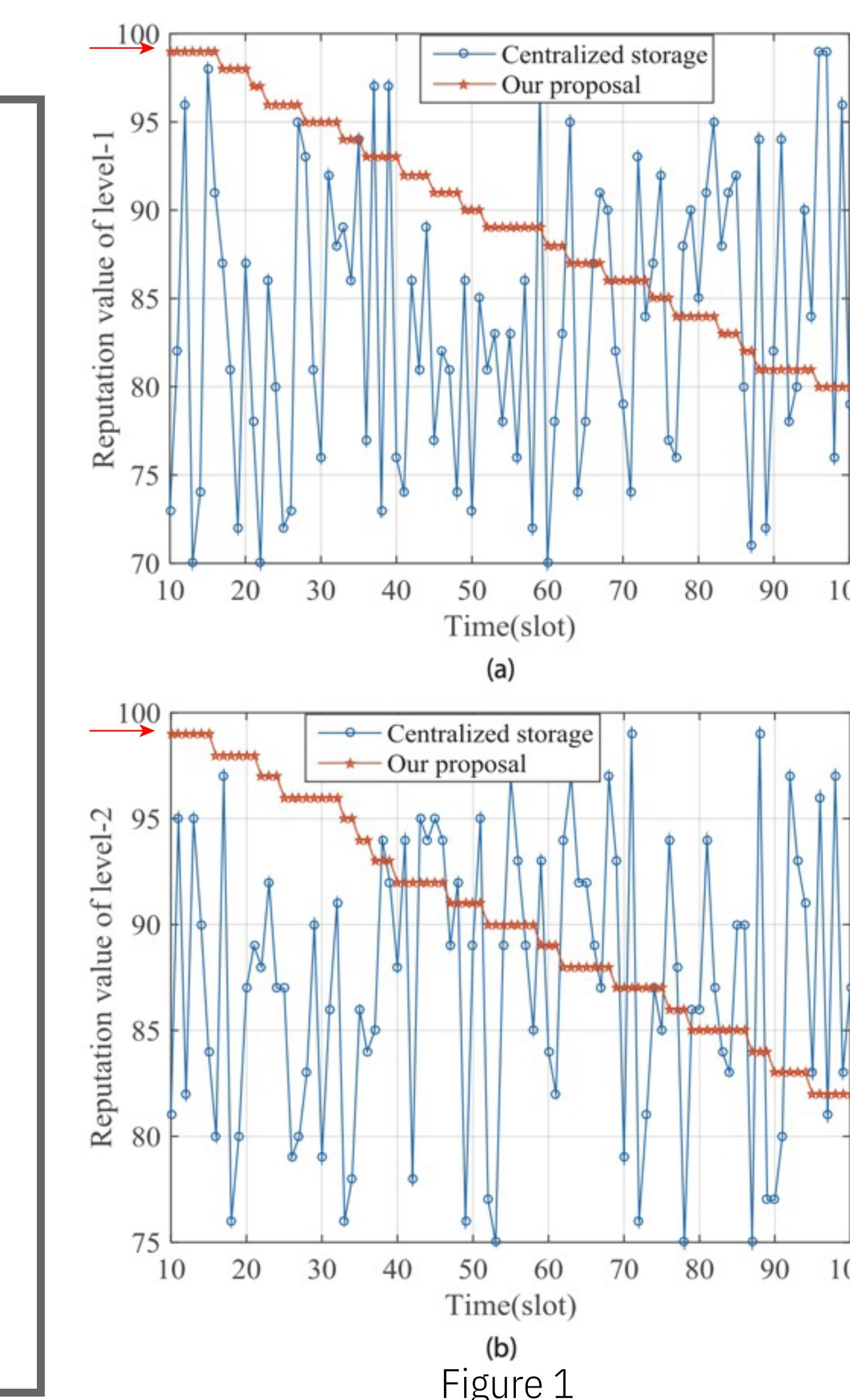
By integrating satellite communications and unmanned surface vehicle (USV) to 6G mobile communication, global and underground network communication will be consistent in the 6G era. The biggest innovation of 6G compared to 5G is its bandwidth and space-division multiplexing including MIMO wireless communications, fiber-optic communications, and other communication technologies. Furthermore, AI plays a major role in designing and optimizing the 6G networks. A significant characteristic of AI is its accuracy in analyzing data to reach specific goals.

- **Reliability** is necessary for users needing the request completed; therefore, never crashing during a process and consistently delivering the results to the requester.
- **Efficiency** is crucial for businesses utilizing this technology to attract customers' attention. Participant measurement is calculated by the effect of interruption and notification.
- **Security** is most important for both ends, to keep personal information private and keeping away from mistreatment.

Results:

Changing the reputation value in a single block necessitates recalculating not just the block's proof of work, but all the following blocks, which is impossible for attackers to accomplish.

The data is a comparison shown in figure 1, shows a blockchain-enabled decentralized system and a centralized system, comparing the changes of a reputation for both level-1 and level-2 attackers. Since our blockchain-enabled system selects trustworthy workers to solve requests, reputation values for both attackers' levels decreased as more time slots has given. While centralized data's reputation value spontaneously increased.



Conclusion:

With blockchain technology, data can now be decentralized and accessed by any node. However, when blockchain technology is restrained with networks, the risk of publicity of information of smart contracts will face attacks from every network. The smart contract has an extreme complete behavior due to Turing complete program, there is a risk when the data is distributed with blockchain. It is hard to gain keep the privacy of private blockchain and the efficiency of a public blockchain. And more concerns such as rules and regulations setting limitations to the use of data. To maximize the use of data, data needs to be stored and analyzed efficiently, although there will be serious privacy ethical concerns. Therefore, utilizing and making good use of big data is a major challenge to utilize in the 6G network.

Method:

Centralized data could be mistrustful and lead to a major data leak or damage, which could lead to powerlessness. With 6G and blockchain-enabled crowdsourced system can deliver a consistently efficient and reliable data transmission. A blockchain platform is a set of blocks of data that are chained with other blocks of data that is impossible to change the content of one block of data without interfering. The core point of blockchain is the approach of handling data decentralized and distributed prevents retroactive altering of data (figure 2).

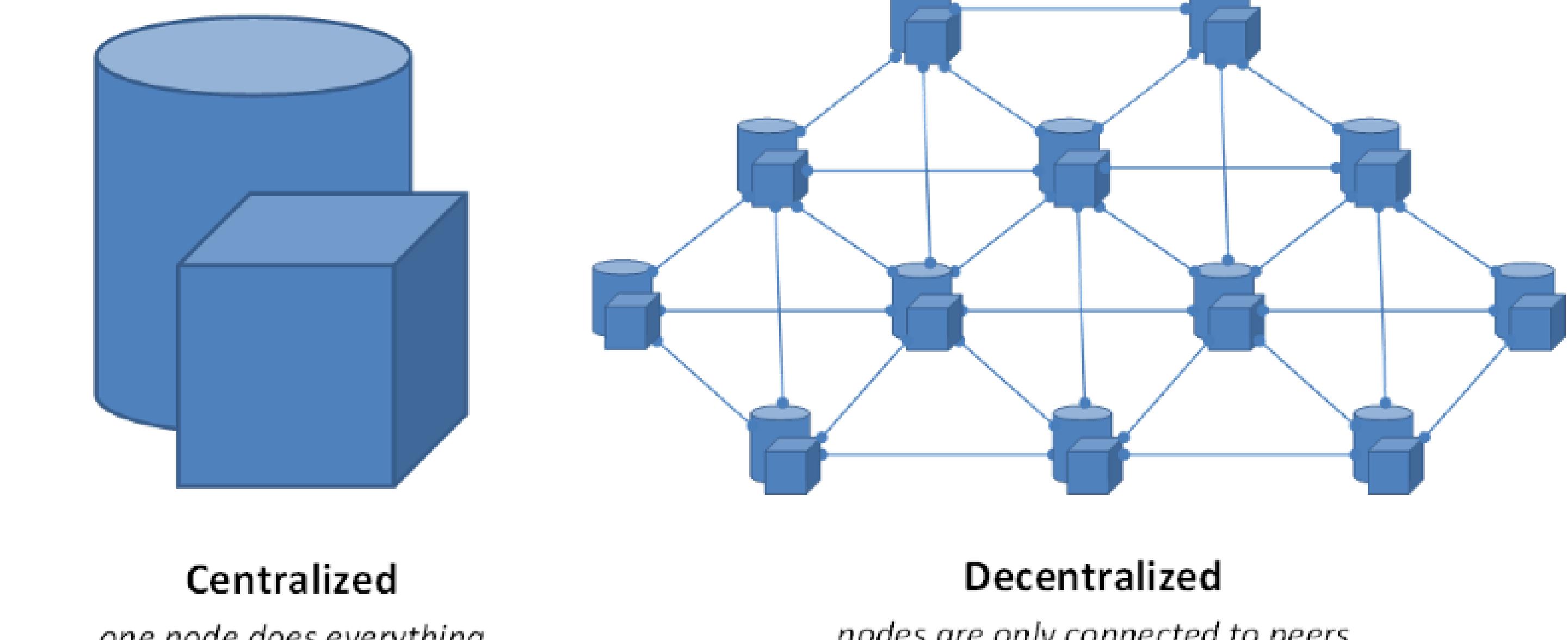


Figure 2

A blockchain-enabled crowdsourced system consists of four structures: fog server, a blockchain platform, trusted authority, and participant users (figure 3).

- **A fog server** is the core of a blockchain-enabled crowdsourced system. It conducts user management, task management, and outlier detection; meaning it will receive requests and send results to the participant requesters and select the trusted authorities to secure privacy. And sends crucial data to **blockchain platforms** to store data. Receiving and sending data is straightforward, a participant requester requests a problem, fog server will receive the data, gain solved data, and send the results to the requester.
- Since **security** is a key point, a request data will be gathered to trusted authority for key secret management, to explore authorized valid identity for participant users (requester and worker) without exposing privacy.

In this experiment, we will provide two levels of attackers.

- **A level-1 attacker:** provides false information.
- **A level-2 attacker:** provides the correct information with an otiose route.

* We assume attackers and normal workers do not change their identities.

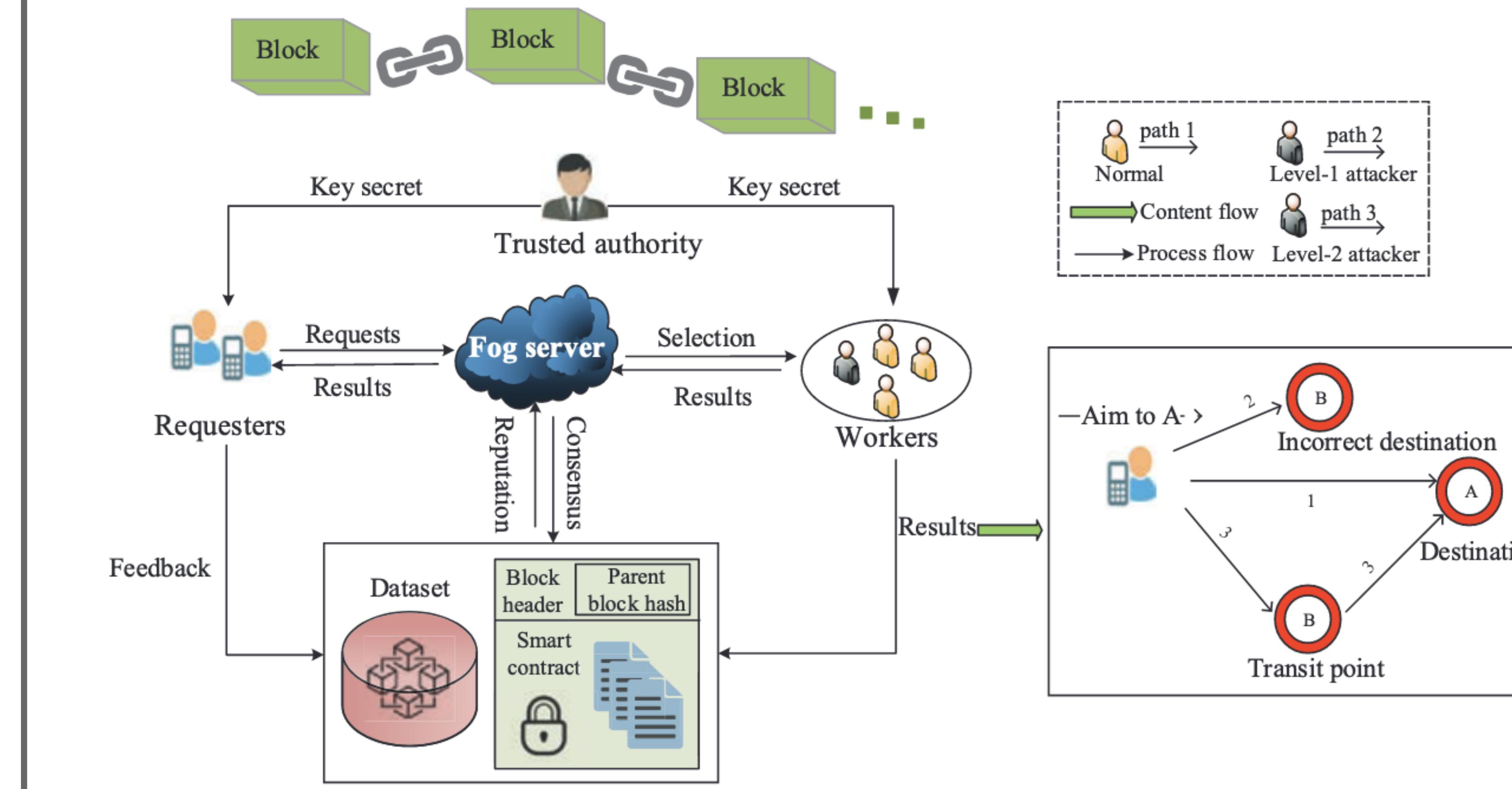


Figure 3

Discussion:

With rapidly improving technology, personalized information and services are crucial. The architecture and characteristics of the 6G network will open many opportunities for entities to create infinite innovations. Introducing the importance of data management and security, we can now all agree that all data needs to be utilized correctly and securely stored. In addition, we have discussed new potential research directions.

Acknowledgement:

I am sincerely thankful to Dr. Li for publishing the article and the data, and I am incapable to complete this paper without it.