

Analysis of publications on applications of blockchain technology

INSE 6120 Cryptographic protocols and Network Security

Presented to: Professor Ivan Pustogarov

April 19, 2023

Table of Contents

[Introduction 2](#_Toc130222212)

[Literature Review 3](#_Toc130222213)

[Military 3](#_Toc130222214)

[Blockchain in the Gaming Industry 5](#_Toc130222215)

[Current state of blockchain in gaming 5](#_Toc130222216)

[Potential benefits of blockchain in gaming 5](#_Toc130222217)

[Challenges and Limitations 6](#_Toc130222218)

[Conclusion 6](#_Toc130222219)

# Introduction

In this project report we will analyze a number of publications/projects that use blockchain technology as the underlying technology, the way we have decided to do this is to have each member conduct research on different fields in which blockchain technology was applied. More specifically these fields will be:

# Literature Review

## Military

**Military Blockchain for Supply Chain Management [1]**

In this article the authors describe the importance of supply chain management, especially in military parts transportation. The article begins with a simple explanation of what supply chain management (SCM) is and what blockchain is and how both can be integrated. Supply chain management, as described in the publication is the process of production and distribution, it is a system in which we ensure the transportation of raw materials from a supplier until it is delivered to the end customer as a final product. In the middle of it all the raw materials have been presumably processed into parts and those parts put together to create the final product.

The publication also mentions issues pertaining to SCM, especially in the vein of counterfeiting, incompetence, missed parts, etc... along with this it mentions the unreliability of keeping track of issues like these with normal SCM systems, this can be addressed with the traceability that Blockchain technology provides. It would enable anyone to track an error back to its source due to its meticulous nature which will be explained soon.

Blockchain technology as described in its essence is a decentralized ledger of transactions built into a network, transactions are conducted over the network using whichever protocols the network implements and saves this transaction on a “chain” and it is saved on every machine in the network, normally referred to as “nodes”. As the transactions go through every node the system facilitates the recording of each state of this transaction. You can figure out how this kind of system is virtually impenetrable to counterfeiting as each node would have to be verified for something within the transaction to be edited.

Only few military defense are exploring the need for blockchain technology due to the tech’s secure nature, according to the article there are seven possible cases for blockchain technology to be applied for military defense:

1. Tracing Defense Shipments and Contracts.
2. Secure government and battlefield messaging.
3. Cyber warfare preparedness.
4. Preventing data theft.
5. Protecting weapons systems.
6. Military additive manufacturing.
7. NATO applications.

The publication will focus mainly on the 1st application, in the case for military SCM, it is a complex matter, unlike privatized SCM.

The proposed framework in the paper is for Navy defense shipments, even though it is called the Navy it does not handle only sea operations, therefore Navy shipments need to be put under a good amount of scrutiny and need to be ready when needed. In the case of managing part transportation for ships for example, parts need to be genuine to ensure the assets are functioning properly, and constant contact needs to be made to suppliers to assure punctual deliveries as delays will affect the overall vessel completion, that’s why traceability is an important part of this SCM.

Diagram

Description automatically generated

Figure 1: Blockchain recommendation for the Navy SCM

The above figure is the proposed blockchain adaptation to the Navy SCM, As you can see it includes three parties that need to keep communication constant, the supplier which sends the parts/raw materials, the traceability provider which keeps track of each shipment made as well as how long each shipment remains in each branch, and finally the destination or in this case it is named “Depot in RNM”. This proposed project will be closed off only to the military to prevent outside interference, communication will be encrypted within the blockchain, and a ledger will be produced to keep track of all shipments, and a Navy depot known as “West Fleet Supply Depot” will act as an appraiser to assure the authenticity and functionality of the parts.

This specific blockchain like all others keeps a ledger at each node that gets updated with each transaction, but uniquely it allows the navy depot to give read, write, and delete, it is applicable here due to the sensitive nature of military information. When a new transaction happens the node at which this transaction occurs produces a proof of work document and broadcasts it to all other nodes, the other nodes will verify the information and validate the transaction, once it has been validated it will be written into the blockchain.

The publication concludes by reiterating how this kind of SCM will have genuineness in its dealings and it is secure due to all nodes being involved in the information exchange, the author then emphasizes how this should provide a good motivation for integrating blockchain technology into military SCMs.

# Blockchain in the Gaming Industry

In 21st century, blockchain technology is starting to grow in different industries but now it keeps his hand in the gaming industries also. It has the potential to make the gaming industry more secure and transparent as well as ownership on gaming assets and bring new monetization models. In this report we will talk about the current state of blockchain in gaming sector, its potential benefits and some of the challenges and limitations that needs to be addressed.

## Current state of blockchain in gaming

Though the inclusion of blockchain in gaming industry is a new concept, there are several projects ongoing to improve various fields of gaming. The first and notable example is Cryptokitties; this is a game based on blockchain where player can collect, breed and trade virtual cats where each cat is unique and different that gives the players true ownership.

Another example we can give is Enjin. People can manage and build their gaming assets by using blockchain. Those assets can be sold to the Enjin marketplace that gives the game developers a new way of monetization of their gaming industries.

## Potential benefits of blockchain in gaming

For the gaming business, blockchain technology presents a number of potential advantages. Being able to offer actual ownership of in-game assets is one of the main advantages. The majority of in-game items currently belong to the game's creators, and players have no authority over them. By transferring ownership to the players through blockchain, they can sell or trade their assets as they see fit.

Enhanced security and transparency are other advantages of blockchain in the gaming industry. Since blockchain transactions are unchangeable, it cannot be theft. Because of this, it is considerably more difficult for hackers to steal in-game things or carry out other nefarious deeds. Moreover, blockchain can offer transparency in the form of accessible public ledgers, facilitating player ownership tracking and verification.

Blockchain technology has the ability to revolutionize the gaming industry in many ways. Here are some ways in which blockchain can make a significant impact:

1. Real Ownership of In-Game Assets: Today, players have no authority over the majority of in-game assets, which are controlled by the game's creators. By transferring ownership to the players through blockchain, they can sell or trade their assets as they see fit. This might generate additional cash for users and result in the growth of a brand-new gaming economy.
2. More Security: By utilizing distributed ledger technology and encryption, blockchain can boost the security of in-game transactions. Because of this, it is considerably more difficult for hackers to steal in-game things or carry out other nefarious deeds.
3. Transparency: As blockchain transactions are permanent, they cannot be changed or eliminated. Players will find it simpler to trace and confirm the ownership of in-game assets thanks to the transparency this offers in the form of open and public ledgers.
4. Alternative Monetization Features: Blockchain can make it possible for users and game producers to monetize in new ways. A blockchain-based platform called Enjin, for instance, enables game developers to build and manage in-game assets like armor, guns, and other stuff. The Enjin Marketplace offers a new opportunity for gamers to monetize their gaming experience by allowing trading and selling of these assets.
5. Decentralization: Blockchain can make game development and distribution decentralized. Blockchain technology allows game makers to avoid conventional publishers and sell their products directly to users. This might encourage greater variety and creativity in the gaming sector.

As a result of its actual ownership of in-game assets, enhanced security and transparency, new monetization models, and decentralization, blockchain has the potential to have a huge impact on the gaming industry. As the technology continues to develop and mature, we should expect to see more blockchain-based games and platforms emerge in the future years.

## Challenges and Limitations

Before blockchain can be widely used in the gaming business, there are a number of obstacles and restrictions that need to be overcome in addition to the potential advantages. Scalability is one of the main obstacles. Currently, the majority of blockchain systems have restricted capacity, which means they can only process a specific number of transactions per second. For games with a huge player base or many transactions, this might be a serious restriction.

User adoption presents another difficulty. Blockchain is still a young technology, thus it might not be well known to many players. Also, some players may be turned off by the complexity of using the blockchain to acquire and sell in-game goods compared to more conventional means.

## Conclusion

In conclusion, blockchain technology has the potential to revolutionize the gaming sector by enabling actual in-game asset ownership, greater security and transparency. Before blockchain is extensively used in the gaming business, there are a few obstacles and restrictions that must be overcome. In the upcoming years, we may anticipate the emergence of additional blockchain-based platforms and games thanks to ongoing innovation and development.

[1]: Rahayu, Syarifah Bahiyah, et al. Military Blockchain for Supply Chain Management - JESOC. <https://www.jesoc.com/wp-content/uploads/2019/08/KC13_015.pdf>.