SATCHAIN: GEO NETWORK SECURITY MECHANISM BASED ON BLOCKCHAIN AND QKD PROTOCOL

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Abstract - The Fifth generation(5G) networks are expected to provide a fully connected world with terrestrial wireless and satellite communications integration. Due to satellite physical constraints in terms of available power and area, data processing capacity is low, storage and security are limited such that the data may be vulnerable to tampering or contamination by attackers. Since satellite communication has been more and more important in developing global communication networks, there have been concerns about the security in satellite communication. this project, a blockchain technology and QKD protocol based on authentication and privacy protection scheme is proposed for a satellite communication network. to this aim, an architecture consisting of both conventional and restricted devices connected to the blockchain via a wireless heterogeneous network is deployed. The communication is carried out through registration authentication and revocation. In this scheme, the satellite will forward the collected information to the ground base station, which will record all key parameters on the distributed blockchain and all malicious node certificates will be cleared from the blockchain by the ground base station.

1.INTRODUCTION

A satellite is a body that orbits around another body in space. There are two different types of satellites – natural and man-made. Examples of natural satellites are the Earth and Moon. The Earth rotates around the Sun and the Moon rotates around the Earth. A man-made satellite is a machine that is launched into space and orbits around a body in space. Man-made satellites come in many shapes and size and have different pieces of instruments on them to perform different functions while in space .Satellite communication is the method of transporting information from one place to another using a communication satellite in orbit around the Earth. A communication satellite is an artificial satellite that transmits the signal via a transponder by creating a channel between the transmitter and the receiver located at different locations on the Earth.

Telephone, radio, television, internet, and military applications use satellite communications.

2. Body of Paper

Existing System :

Satellite Communication comes with many benefits and various risks. Cryptographic algorithms should develop security solutions that protect GEO Satellite networks and minimize security risks. As security is the prime concern for any communications.

Proposed system :

There are essentially three types of orbits classified by the satellite altitude: geostationary earth orbit (GEO), medium earth orbit (MEO), and low earth orbit (LEO). Among them, GEO satellites are stationary relative to the earth's surface so that the doppler shift is negligible and has a lower transmission outage probability than non-GEO satellites. The GEO satellites work at very high altitudes (≈35,786 km) and can offer the most extensive coverage. Thanks to the low outage probability and wide coverage, GEO satellites are preferred in our proposed protocol. Satellite communications systems enable the sending and receiving of information worldwide, offering internet access, television, telephone, radio, and other civilian and military operations. The advent of HTS (high-throughput satellite) systems has greatly enhanced technical capabilities and offered wideband services at lower costs

3. CONCLUSIONS

The satellite communication channel is different not only from the common mobile channel but also from the ground station channel. The satellite communication channel is the fusion of the satellite channel and the mobile communication channel. Satellite communication channels are extremely vulnerable to hackers and external interference signals. Protecting satellite networks from illegal information access and use can be extremely challenging. In this project, Quantum Key Cryptography and blockchain technology is introduced to analyze the security of satellite communication networks in terms of access control, confidentiality, and security authentication. The proposed scheme is developed to solve the security problem of using a centralized database in satellite communication. The simulation results show that the proposed method was able to significantly improve security and protection for satellite communications.

FUTURE ENHANCEMENT:

In the future, the blockchain-satellite system will depend on cloud constellations for managing data centers in orbit, where companies can upload their data and bypass ground networks; this approach will help governments and companies obtain information from different sources and orbits in space20.

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