Telecom Operations in Blockchain Technology

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ABSTRACT:This research paper is about Block chain Technology and its uses in Telecom operations in IT Sector.Several Service Providers will use Block chain technology rather than Cloud computing for Telecom Operations to subscribers since it is more cost effective and gives good Quality assurance in terms of operations to Subscribers.

KEYWORDS: Telecom Operations,BlockChain,Telco Operations

I.   INTRODUCTION

In most simple words, Blockchain is a Peer-to-Peer(P2P), decentralized, public ledger that records online transactions and works without involving any third-party.It records all the transactions that have taken place in a secure and immutable way, thus ensuring security and privacy. Blockchain technology has become popular because of its ability to offer decentralization, reliability, and security. Apart from this, Blockchain does not take a lengthy process for verification, agreement, and approval.

Technology has captured the popular imagination due to its ability to provide complete transparency, immutability, privacy, and security. When it comes to the telecom industry, there are various challenges. Despite the fact that the telecommunication sector has changed a lot over the last 20 years, still, both providers and subscribers struggle with roaming, high fees, risk of fraud, privacy issues, and somuch more. When it comes to inter-carrier transactions, they rely on a mix of automated and manualsystems that make the method of doing business together complicated, delayed, and expensive.

II.   BLOCKCHAIN USE-CASES IN TELECOMMUNICATIONS

Blockchain is arising as a revolutionary technology to manage all the existing issues in the telecom industry, thus opening a new era in terms of efficiency, transparency, and security. Due to its potential to enable full automation in financial settlement and fraud prevention to KYC procedures for onboarding customers, this technology is transforming telecom for good. Let's explore some of its use-cases in the telecom industry.

Roaming and Settlements

As we already mentioned, roaming is one of the major issues because intermediaries are involved in controlling roaming partner settlements, which takes around two months to get resolved. This process further leads to manual errors, frauds, lack of transparency, and other issues.

This complex process can be automated by using smart contracts functionality. Smart Contracts on the Blockchain network can ensure the settlement between the participating members by eliminating third-party intermediaries and automating the SLA agreements through tamper-proof verifiable transactions and real-time updates to the end-users.

Identity Management and Fraud Prevention

Identity Management and fraud prevention in the telecom industry is another crucial aspect because multiple third-party agents handle the submission of identity documents; thus, the chances of misuse and leakages are more. Blockchain can address such issues by offering decentralizedstorage with control remaining entirely in the hands of document owners. Its immutable nature will not only help reduce forgery but also control the submission of fraudulent documents.

In the telecom industry, the large instances of databases and storage can be replaced with distributed ledgers, thus eliminating various issues.

Mobile Number Portability (MNP)

If you have ever gone through the MNP process, you must have realized that it's a long, time-consuming process. The reason for high

processing time is essentially due to data mismatch between operators and periodic updation required from the central database.

Blockchain can streamline this entire complex process by providing a single source of truth where all service providers can review and action requests for Mobile Number Portability. The distributed ledger will help eradicate single-point failure, as all service providers have access to the shared data. Thus instead of days, MNP can be achieved almost instantaneously.

Due to Blockchain's potential, various telecom industries, including Airtel, AT&T, Vodafone, among others, are utilizing this technology to enhance their services. For instance, Telefonica has collaborated with IBM and uses the IBM platform to log information collected by various networks when routing international calls in order to improve the reliability and transparency of collected information. Similarly, Vodafone, a global telecom giant, leverages Blockchain to bring clarity and efficiency to transformed processes. Moreover, other well-knowntelecom industries are using Blockchain to enable micropayments formusic, mobile games, and other value-added services.

Thus from the above discussion, we can conclude that this distributed ledger technology is taking the entire world into the future, and despite this, there is so much room for exploring and discovering new opportunities.

III.   TELCOS IN BLOCKCHAIN TECHNOLOGY

Identity management services:

New revenue streams could be generated by offering blockchain identity management services to subscribers and business partners. Telcos could provide their subscribers with an "eSim" or app that creates unique virtual identities for each subscriber which are encrypted and stored in a blockchain, and which subscribers would use to automatically authenticate their identities when visiting partner websites.[2] For example, a virtual identity stored in a blockchain using the teleco's app could be used by a subscriber to sign into Facebook or Gmail on a mobile device. The benefit of such services is that the subscriber would not need to continuously provide his or her personal details to different service providers in order to create new accounts and complex passwords. The virtual identity stored through the teleco's app could be provided to numerous partner websites and apps as a unique identifier

Internal processes:

Telcos could streamline their operational and business processes by adopting hybrid blockchain networks, which have both public and private features. Telcos could use a public blockchain platform, such as Ethereum, to establish a private network to create a more efficient billing system,[11] accurately track subscribers' use of their networks and instantaneously charge their subscribers.

Data management services:

similar to identity management services, a telco could also use blockchain technology to provide data storage and verification services to subscribers. For example, a telco could assist a university to digitize and store student certificates on a blockchain. If a prospective employer needed to verify a student's credentials, the student could simply produce the digital certificate available on the blockchain and the employer would be assured of its authenticity

Fraud prevention services:

currently, it is estimated that fraud costs the telecommunications industry over USD 38 billion each year.[4] Blockchain-based products could be specifically designed to minimise this risk. In particular, "roaming fraud" and "identity fraud" could be mitigated through the use of blockchain technology.
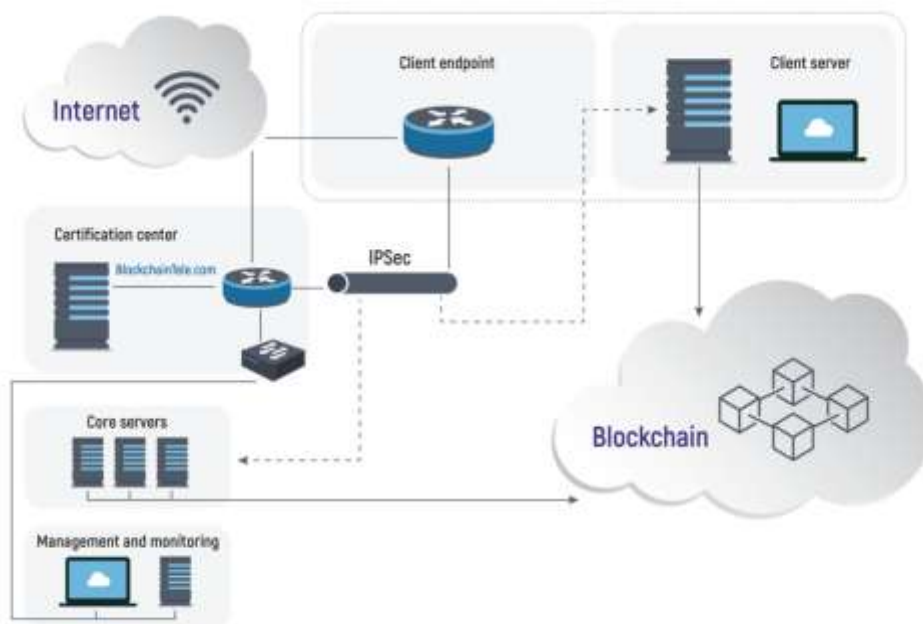
DIAGRAM FOR TELECOM OPERATIONS IN BLOCK CHAIN

 Roaming fraud: roaming fraud can occur when an individual seeks to actively avoid payment for use of roaming services. It is made possible because of the delay in time between an individual accessing a mobile network while roaming (referred to as Visited Public Mobile Network or "VPMN") and that network being able to pass along the data necessary for the subscribers' home telco provider (referred to as the Host Mobile Public Network or "HPMN") to bill the subscriber the relevant roaming charge (which is then paid to the VPMN under a roaming agreement). The fraud perpetrator can incur the often significant costs of roaming and then avoid payment as a result of the billing time delay.[6] The HPMN typically cannot detect the fraud until after it has been perpetrated, leaving it with no redress mechanisms. This type of fraud can be mitigated by establishing a permissioned blockchain by the relevant HPMNs and VPMN partied to a smart contract-enabled roaming agreement. Every time an individual accesses a VPMN, a smart contract could be executed to automatically send the relevant data to the HPMN, allowing it to calculate and immediately charge (and ideally deduct) the relevant amount, which can then be transferred back to the VPMN

Identity fraud: identity fraud can occur when an individual uses false identification to obtain services (e.g. a physical sim card).[7] Blockchain's inherent public key cryptography capability can be used to link a mobile device to the owner's identity.

 By implementing blockchain technology, a phone-generated public key could be broadcasted instead of an International Mobile Subscriber Identity, which would be used to identify and authorise the device and individual. This would keep personal information more secure as all private information would be encrypted in a private key known only to Deviceowner.

Internetofthings(IoT): Telcos could overcome the security and viability issues associated with IoT by adopting blockchain technology, which allows for highly secure peer-to-peer self-managed mesh networks using a sufficiently large number of nodes. These nodes could be represented by single embedded IoT sensors with the ability to verify every block within the blockchain.[9] Initially, telcos could create private IoT networks based in mid-range cell-towers with relatively low investment requirements and costs. Once these have proved viable, a public network could be established (or built on the Bitcoin or Ethereum networks), enabling seamless connectivity and security

5G: telcos could use blockchain technology to provide subscribers with a swift and reliable 5G service. The 3GPP and non-3GPP access networks could be connected via a blockchain network where each access point (e.g.WiFi router, SP cell tower) can serve as a node in the network,monitoring the devices.[10] A device could then use the access node that can best provide it service. Telcos could code

the rules and agreements between the various access-providing networks as flexible smart contracts which could instantaneouslychange any time a policy needs to be amended.

Roaming: blockchain technology can enable telcos to automatically enter into "micro contracts" for roaming services. There is a trend for many virtual providers to provide SIM cards that can connect to multiple telco networks, which may encourage more roaming and autonomous brokering of prices machine-to-machine. Telcos could use smart contracts to automatically execute roaming agreements between subscribers who are temporarily using their networks, and accurately track each transaction and charge the subscriber for their limited use of the network

Connectivity provisioning: Telcos could use blockchain technology to make public Wi-Fi more readily accessible to subscribers. Subscribers and telcos could enter into instantaneous and simple "micro contracts" for the supply of public Wi-Fi services, making the authentication and payments more cost-effective through autonomous blockchain-based transactions between devices and access points

Digital asset transactions: telcos could use blockchain technology to implement micropayment-based business models for digital assets (e.g. for the purchase of music, mobile games, gift cards or loyalty points). Telcos may incur lower transaction costs and increase the speed of processing, compared to transactions that involve cash, debit or credit cards or cheques

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