WHAT ARE SMART CONTRACTS AND HOW ARE ENTERPRISES USING THEM?

Smar

t Contracts is an application of the blockchain technology to create an independently verifiable, secure, permanent and fault-tolerant agreement designed for satisfying common contractual conditions.

Consider the explanation of blockchain fundamentals. Blockchain can be described as a digitized, decentralized and distributed ledger used to record transactions and track ownership and transfer of assets. By design, blockchain guarantees immutability of the ledger using cryptographic algorithms. Any change in transaction within a specific block of the ledger will have a cascading effect on subsequent blocks, making it impossible for anyone to modify the blockchain without affecting its integrity, if a consensus of network majority doesn't allow the change.

Apply the concepts of blockchain to facilitate contractual agreements and the technology works as good as a digital stone with permanent engraved markings to establish a secure and reliable business contract. As seen on cave walls, a smart contract has the following key properties:

- **Independence and Trust:** The Smart Contract agreement is maintained by the blockchain technology, independent of intermediaries and third-party guarantors. The blockchain works as an instrument of trust that is validated through digital signatures.
- **Final and Permanent:** Once the Smart Contract is completed, the agreement terms are maintained as final and permanent under the existing state of the blockchain. Retroactive alteration of the blockchain subsequently alters the contract agreement.
- **Neutrality:** Users rely on the neutral blockchain technology and cryptographic algorithms to maintain trust and agreement to contractual terms. The agreed conditions of the Smart Contract apply to all concerned members regardless of their authority or position.
- **Transparent and Fault-Proof:** Every member in the blockchain network or transactions as part of the agreement have access to the same information that is validated, verified and maintained without involvement of third-parties. The transactions are tamperproof and cannot change outside of the knowledge of members. No individual entity can alter the transaction unless all participants of the network agree to the validity of the transaction through full consensus.
- **Autonomous:** A successful transaction cannot be altered or stopped by any member of the Smart Contract. The technology autonomously completes a transaction and enforces the Smart Contract agreement.
- **Guaranteed Execution:** Smart Contracts guarantee execution of the agreement in response to a transaction. Unlike traditional agreement mechanism that rely on human intervention or approval to execute the intended function of the contract, the underlying code of a Smart Contract has no choice but to execute the appropriate functions automatically.
- **Auditable on the Blockchain:** The verified and time-stamped transactions are available to all members of the participating blockchain network. This history is auditable without limitations on information access and doesn't require intervention by external authorities to verify the transactions. Complete provenance details are available to review and analyze each transaction.
- **Complete Transactions:** Smart Contract transactions cannot partially execute. Instead, they follow an 'all or nothing' principle that states the transaction will either completely succeed or completely fail. Consequently, the contract agreement will apply in its entirety only when the transaction has succeeded completely.
- **Flexible:** A Smart Contract can evolve to support growing business needs as long as all a complete consensus of the network has reached. This allows participants to change or update

agreement terms in a secure and dependable environment that protects each member concerned with the Smart Contract.

With these properties, enterprise organizations are able to establish a new level of trust among their users purchasing products or services via a Smart Contract agreement. Here are a few interesting and popular use cases of Smart Contract technologies in the enterprise segment:

1. Energy Industry: Smart Contract mechanism are popular for energy trading use cases, allowing solar electricity prosumers to sell excess energy via reliable contractual agreements. Similarly, it also allows complex interactions between energy service providers that can trade the energy based on real-time evaluation of generation plant capacity and availability. Moving forward, Smart Contracts can also be used to maintain emission certificates in real-time, allowing customers to purchase electricity from environmentally friendly power generation sources.

2. Healthcare: Smart Contract applications in the healthcare segment can allow patients to gain maximum control over the generation and distribution of their Electronic Health Records (EHR). The technology can also be used to track and maintain medication adherence by patients. Research institutions can use Smart Contracts to identify, seek approvals and compensate patients for using their EHR data. Fitness technology providers can use Smart Contracts to track user performance, reward specific milestones and maintain an accurate history of the fitness routines.

3. Financial Services: The most evident use case of Smart Contracts is in the financial industry segment. For instance, Smart Contracts can be used to manage approval workflows in insurance claim processing and trading agreements. The technology can check for errors, identify completion of events or transactions and manage policies for accurate payout to the appropriate individuals. For instance, a French insurance company offers Smart Contract based flight-delay insurance. The payments are self-processed and triggered automatically in event of flight delays impacting appropriate users. Customers don't need to perform manual processes in order to file the claim and the insurance provider doesn't hold its customers for prolonged time period to verify and honor the insurance claims.

4. Public Sector and Cross-Industry: Smart Contracts have the potential to revolutionize public administrative processes such as voting and identity verification. The technology can be used to log the vote, validate voter criteria and maintain an accurate count of votes. Progressive cities such as Dubai have already invested in blockchain-enabled Smart Contract initiatives for use cases ranging from diamond trade to tourism engagement. The Swedish government is also following a similar approach to digitization by introducing blockchain-based projects to curb fraud and streamline ownership transactions in the real-estate segment. Sweden is in the process of introducing digital property ownership by storing the asset ownership information on blockchain ledgers as a replacement to error-prone paper documentation.

Gartner predicts that by the year 2022, more than a quarter of global organizations will use Smart Contracts in one way or the other. While the impact of the technology is unquestionable, organizations still need to wait and assess its technical maturity before replacing traditional legal contracts with blockchain-based Smart Contract systems.