Integration of Blockchain in Computer Networking: Overview, Applications, and Future Perspectives for Software-defined Networking (SDN), Network Security and Protocols

GR-342

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Problem Statement

- Increasing complexity and challenges in computer networking
- Centralized control and single points of failure in traditional networks
- Need for robust, secure, and scalable solutions for network management and protection
- Limited research on blockchain integration in computer networking

Research Methodology

- Comprehensive literature review on blockchain technology and its applications in computer networking
- Identification and analysis of potential use cases, benefits, and limitations
- Evaluation of current solutions and future perspectives in SDN, network security, and networking protocols
- Recommendations for further research in the field

Discussion

- Optimizing consensus mechanisms Enhancing scalability and privacy preservation techniques
- Scalability challenges due to growing ledger size and network traffic
  - Sharding and off-chain solutions
  - Alternative consensus mechanisms
- Enhancing privacy preservation techniques
  - Zero-knowledge proofs
  - Homomorphic encryption
- Ensuring interoperability and standardization of networking protocols and practices
  - Cross-chain communication
  - Development of standardized frameworks

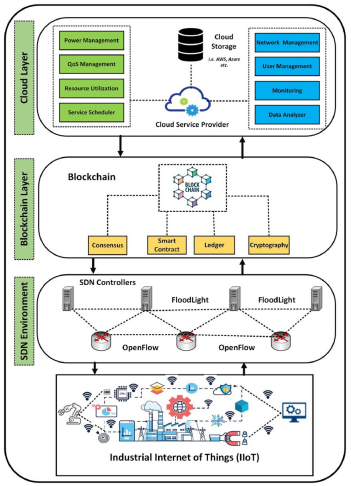

Figure: High level architecture Diagram of Blockchain Integration in SDN

Result/Findings

Blockchain in Software-defined Networking (SDN:

- Decentralized and automated network control. Improved resource allocation and orchestration through smart contracts. Increased trust and transparency among network participants

Blockchain in Network Security:

- Tamper-proof nature and mitigation of risks associated with centralized control. Secure, verifiable, and auditable transactions and communication
- Addressing network challenges: mitigating DDoS attacks, enhancing intrusion detection and prevention, and securing routing protocols

Blockchain in Networking Protocols:

- Potential to improve existing networking protocols. Development of new, secure, and transparent protocols. Facilitates standardization and interoperability

Conclusion

- Blockchain technology has the potential to address various networking challenges
- Promising applications in SDN, network security, and networking protocols
- Further research needed to develop blockchain-based applications, frameworks, and tools to facilitate computer networking

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