

# A Scalable and Fast Consensus Mechanism for DLT-Based Services

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## DLT 기반 서비스를 위한 확장 가능하고 빠른 합의 메커니즘

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### Abstract

Consensus mechanisms are essential in distributed ledger technology (DLT) for verifying new blocks and facilitating node joining. The selection of an appropriate leader node and the fast generation & processing of consensus messages are important for scalable and fast consensus for DLT-based services. This paper presents a scalable and fast consensus mechanism based on a network-aware leader selection function, a fast consensus message transport function, and a multi-path DLT transmission function, which can expedite message delivery for DLT-based services. The proposed mechanism also integrates other components including a network monitoring function and a consensus function with  $O(N)$  complexity. By combining the functional entities, it is possible to achieve fast and scalable consensus for DLT-based services.

### I. Introduction

In the realm of decentralized DLT-based services, ensuring fast and scalable consensus message delivery is essential. Traditional consensus mechanisms often struggle to cope with the increasing number of DLT nodes and various network situations [1], necessitating the development of scalable and fast solutions. This paper presents a scalable and fast consensus mechanism based on various functions including a network-aware leader selection function, a fast consensus message transport function, a multi-path DLT transmission function, a network monitoring function, and a consensus function with  $O(N)$  complexity.

### II. Method

The proposed mechanism is comprised of several functional entities as depicted in Figure 1. The network monitoring function supports the network-aware leader selection function when choosing an appropriate leader node by providing the current network status information. Specifically, it provides real-time monitored information including network delay, node reliability, and available bandwidth to facilitate fast consensus among nodes for dealing with new nodes and new blocks.

The consensus function with  $O(N)$  complexity ensures consensus with the reduced complexity based on the enhanced Fast Byzantine Fault Tolerance (FBFT) algorithm, and the consensus message transport function is responsible for consensus message creation, processing, and delivery between nodes. Additionally, the multi-path DLT transmission function facilitates the efficient transmission of messages between nodes in terms of delivery time throughout the network. The integration of the functional entities will ensure the fast and scalable message delivery for consensus when providing DLT-based services.

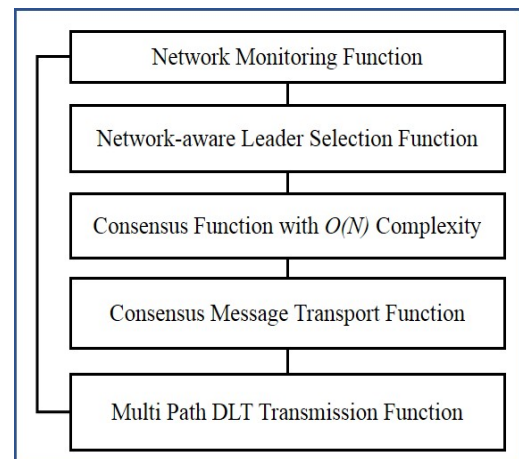


Figure 1: Functions for scalable and fast consensus

### III. Conclusion

This paper presented a scalable and fast consensus mechanism when providing DLT-based services. The proposed mechanism is comprised of a network-aware leader selection function, a fast consensus message transport function, a multi-path DLT transmission function, a network monitoring function, and a consensus function with  $O(N)$  complexity.

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### REFERENCE

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