

INTISARI

KERANGKA KERJA BLOCKCHAIN MANAJEMEN DATA YANG AMAN DI INTERNET OF THINGS

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Penerapan *Internet of Things* (IoT) dalam berbagai sektor menuntut sistem keamanan data yang andal dan efisien. Integrasi teknologi blockchain, khususnya *platform* IOTA dengan struktur *Directed Acyclic Graph* (DAG) menawarkan solusi tanpa biaya transaksi dan skalabilitas tinggi. Namun, IOTA masih menghadapi permasalahan keamanan seperti *splitting attack* serta permasalahan teknis berupa *left behind transactions* akibat kelemahan dalam algoritma seleksi tip. Penelitian ini bertujuan untuk mengusulkan algoritma *Dynamic Alpha* DA-IOTA sebagai alternatif metode seleksi tip yang mampu mengurangi jumlah *left behind transactions* dan meningkatkan ketahanan terhadap *splitting attack*. Hasil evaluasi menunjukkan bahwa algoritma DA-IOTA dengan konsep dynamic alpha secara signifikan lebih efektif dalam mengurangi *left behind transactions* dibandingkan dengan algoritma yang menggunakan alpha statis seperti *Markov Chain Monte Carlo*, E-IOTA, dan AlmostURTS juga dalam aspek keamanan dari serangan. Meskipun demikian, pendekatan ini memerlukan langkah komputasi yang lebih kompleks dan waktu proses yang lebih panjang.

Kata Kunci: Internet of Things, IOTA, Blockchain, DAG, DA-IOTA

ABSTRACT

BLOCKCHAIN-BASED FRAMEWORK FOR SECURE DATA MANAGEMENT ON THE INTERNET OF THINGS

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The integration of the Internet of Things (IoT) with blockchain technology, particularly IOTA, plays a critical role in ensuring secure and scalable data transmission. IOTA's Directed Acyclic Graph (DAG)-based structure offers benefits such as zero transaction fees and high scalability. However, it remains vulnerable to issues like splitting attacks and left behind transactions, largely due to limitations in its tip selection algorithm. This research proposes a Dynamic Alpha DA-IOTA algorithm as an improved tip selection method aimed at reducing the number of left behind transactions and enhancing resistance against attacks such as splitting attacks. The evaluation results demonstrate that the DA-IOTA algorithm with the dynamic alpha concept is significantly more effective in reducing left-behind transactions compared to algorithms using static alpha, such as Markov Chain Monte Carlo, E-IOTA, and AlmostURTS, as well as in terms of security against attacks. However, this approach requires more complex computational steps and longer processing times.

Key words: Internet of things, IOTA, blockchain, DAG, DA-IOTA