

Evaluasi kinerja metode network breathing untuk konstruksi topologi jaringan yang hemat energi pada jaringan grid router zigbee = Performance evaluation of network breathing method for construction of energy efficient topology in zigbee grid router network

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Abstrak

[Penelitian ini bertujuan untuk melakukan evaluasi metode Network Breathing sebagai suatu rancangan metode konstruksi jaringan yang adaptif pada komunikasi ZigBee. ZigBee merupakan salah satu protokol komunikasi untuk Wireless Personal Area Network (WPAN) yang dibangun di atas standar IEEE 802.15.4. Karakteristik low power dari ZigBee menjadi salah satu alasan utama dalam pemilihan protokol ini. Suatu metode konstruksi jaringan yang adaptif dapat dirancang untuk mendukung karakteristik ini. Metode ini dimaksudkan untuk membentuk topologi jaringan ZigBee yang senantiasa meminimalkan jumlah router ZigBee yang harus aktif. Metode ini akan menghemat konsumsi energi pada jaringan ZigBee dengan membuat router dalam kondisi tidak aktif ketika tidak ada perangkat akhir dalam jangkauan yang harus dilayani. Rancangan metode ini memiliki prosedur implementasi seperti membentuk jaringan yang bernafas, dan memanfaatkan algoritma shortest path Dijkstra untuk menentukan jumlah minimal dan posisi router yang harus aktif sesuai dengan posisi keberadaan perangkat akhir yang harus dilayani. Validasi terhadap rancangan metode ini dilakukan dengan tool perangkat lunak simulasi jaringan NS2, yang menunjukkan penghematan konsumsi energi router hingga 87% tanpa mengurangi kinerja throughput dan end-to-end delay pada jaringan.

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