

INTISARI

Analisis Pengaruh Kerusakan Router Terhadap Kualitas Layanan dan Struktur Jaringan Sensor Nirkabel Berbasis Zigbee

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Penerapan jaringan sensor nirkabel (JSN) di lingkungan alam terbuka mempunyai resiko berupa hilangnya atau rusaknya simpul-simpul jaringan. Simpul-simpul jaringan tersebut bisa rusak/hilang karena terendam air, tertimbun tanah dan bebatuan, atau bergeser keluar area jaringan. Kerusakan router pada JSN akan mempengaruhi kinerja dan kualitas layanan jaringan secara keseluruhan. Pada JSN berbasis ZigBee, protokol network layer-nya mempunyai fungsi self-healing. Dengan fungsi self-healing, sebuah simpul dapat mengalihkan rute transmisinya dari router yang mengalami kerusakan ke router lain.

Penelitian ini berusaha mengkaji pengaruh kerusakan router pada JSN berbasis ZigBee. Dimodelkan sebuah jaringan dengan 6 router yang tata letaknya membentuk heksagon dan dikelilingi 12 end-device. Setiap end-device mengirim paket data menuju coordinator yang berperan sebagai sink secara intermittant. Skenario kerusakan router dibuat bertahap dalam dua pola: pola berurutan dan berselang-seling.

Melalui serangkaian pengujian dan pengukuran parameter kualitas layanan diketahui: 1) fungsi self-healing dapat menghubungkan kembali 2 router dan 2 end-device selama pengujian jaringan berlangsung, 2) simpul-simpul yang dapat terhubung kembali ke jaringan memberikan kontribusi 26,5% dari data yang diterima simpul coordinator.

ABSTRACT

Analysis on The Impact of Routers Failure upon The Quality of Service and The Structure of ZigBee Based Wireless Sensor Networks

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The implementation of wireless sensor networks (WSN) in the wild environment has the risk of losing or damaging network nodes. The network nodes can be damaged / lost by submerged water, buried in soil and rocks, or shifted out of the network area. The router failure on WSN will affect the performance and quality of network services as a whole. In ZigBee-based WSN, its network layer protocol has a self-healing function. With a self-healing capabilities, a node can divert its original transmitting route from a damaged router to another router.

This study attempts to study the effect of routers failure on ZigBee based WSN. A network consists of 6 routers whose layout form a hexagon and is surrounded by 12 end-devices to be modeled. Each end-device sends data packets to coordinator that acts as a sink. Router failure scenarios are made incrementally in two patterns: sequential and interlaced patterns.

Through a series of testing and quality of service parameters measurement these can be revealed: 1) self-healing function can reconnect 2 routers and 2 end-devices during network testing, 2) nodes that can be connected back to the network contributes 26,5% of the total data received by the coordinator.