Abstract

Wireless Sensor Network (WSN) is a network that is widely used for purposes of monitoring and connectivity, both in military and non-military activities. This network has the sensor nodes are able to communicate with other sensor nodes, but the network has limited its use in computing, storage space, and energy used.

It required the routing protocol mechanism in each sensor node energy efficiently to maximize the performance of each sensor node on a network. One of the protocols that can be used is Hierarichal Protocol. The first protocol was developed using this system is LEACH. In LEACH protocol divides the sensor nodes into clusters which have main sensor node Cluster Head (CH). CH collects data from sensors into the scope and then aggregating the data and sends it to the Base Station. In the selection of the CH LEACH, each node will be assigned a random value between 0 or 1. Nodes that have a value less than the threshold then the node will be elected as the CH.

Then there is the development of a routing protocol LEACH uses a Genetic Algorithm. Developed from routing protocols using Genetic Algorithms is that the CH election. Genetic Algorithms apply biological operations such as crossover and mutation to obtain the best solution (CH) based on the fitness function which defines the energy consumption of the network of multiple chromosomes.

In this study proved that the energy consumption on routing protocol Genetic Algorithm is lower than LEACH using the 20 nodes, the energy released by routing protocol Genetic Algorithm amounted 94.698 Joule whereas LEACH 95.618 Joule during 3600 seconds generated of simulation time. However, the energy consumption to 40 nodes on routing protocol Genetic Algorithm is higher than LEACH. The energy expended for routing protocol Genetic Algorithm is 168.728 Joule whereas LEACH 157.699 Joule during 3600 seconds generated of simulation time. In defending the life of the sensor nodes, Genetic Algorithm is better than the LEACH to 20 and 40 nodes . The resulting time is the time until there is a network of nodes that died from loss of energy (the energy is 50 Joule). Results of routing protocol Genetic Algorithm is 7 hours 41 minutes 49 seconds and 10 hours 45 minutes 21 seconds while LEACH is 4 hours 40 minutes 47 seconds and 5 hours 1 minute 40 seconds for 20 and 40 sensor nodes .

Keywords : Wireless Sensor Network, Energy Efficiency, Genetic Algorithms, LEACH