

## **Abstract**

**Wireless Sensor Networks (WSN) has become a daily human need because the use of devices that require these technologies is already very much. Therefore, a wireless intermediary is needed in the form of a standard 6LoWPAN protocol (IPv6 Low Power and Lossy Network) which is an adapted layer from the IPv6 protocol. IPv6 itself was created to replace the role of IPv4, which has now been exhausted. So, IPv6 will have a big influence on the future of the Internet of Things (IoT) that relies on Wireless Sensor Networks (WSN). The Routing Protocol for Low Power and Lossy Networks (RPL) was released as the 6LoWPAN routing protocol standard. Therefore, a simulation of performance analysis of throughput parameters, average delay and average power consumption from one cluster containing 1 sink node and 6, 8 and 10 sensor nodes to prove the effectiveness of the Routing for Low Power and Lossy Networks (RPL) protocol using the Contiki operating system version 2.7 and Cooja Network Simulator are then analyzed using Wireshark. With the results of the average analysis of the 3 simulations obtained, the more nodes formed, the greater the average delay and average power consumption value. Also performed is node mobility testing of the RPL protocol and node mobility with the best life-time is when the node moves randomly. Limitation of Transmission Range has an effect on RPL performance. The smaller the range, the better the performance of RPL.**

**Keywords: Wireless Sensor Networks, IPv6, Internet of Things, Routing for Low Power and Lossy Networks**