

Evaluation of RPL under different routing metrics

Internship

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1 Context

Today, the number of devices connected to the Internet exceeds the number of people on Earth. Thanks to recent technological advances, a large number of objects can be equipped with a unique identifier and communication capabilities. They will integrate the Internet of Things.

2 Subject

In this context, designing efficient algorithms and protocols is essential for the interoperability of these smart devices. The communication between these objects is characterised by low data rate, high loss rate and instability. A protocol that takes into account all these characteristics has been recently standardised by the IETF : RPL - Routing Protocol for Low-Power and Lossy Networks[1].

Routing protocols use metrics in order to compute a path for sending packets to the destination. They are critical for determining the performance of the network, since they have a direct impact on the delivery, delay and the quality of the packets. RPL makes no exception : it defines an objective function that uses one or more metrics to compute this path.

The student will evaluate the impact of different metrics (in particular MinHop, ETX, RTT and RSSI) on the performance of RPL. First, he will have to get familiarised with the Contiki [2] operating system and the already existing implementation of RPL. Afterwards, he will have to modify the implementation of RPL in order to incorporate the different routing metrics. The exhaustive evaluation of the different metrics will be made on a platform for experimentation composed of 256 sensors : the FIT Equipex¹.

3 References

- [1] T. Winter, P.Thubert et al. RPL : IPv6 Routing Protocol for Low Power and Lossy Networks.
- [2] Contiki : The Open Source OS for the Internet of Things. <http://www.contiki-os.org/>

1. <http://www.senslab.info/>