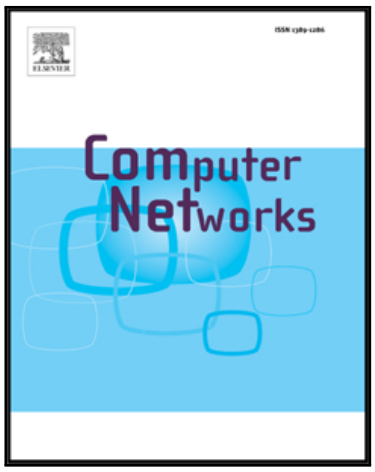

Low-power and Lossy Networks under mobility: a survey

Afonso Oliveira, Teresa Vazão

PII: S1389-1286(16)30089-5
DOI: 10.1016/j.comnet.2016.03.018
Reference: COMPNW 5858

To appear in: *Computer Networks*

Received date: 30 July 2015
Revised date: 22 March 2016
Accepted date: 28 March 2016

Please cite this article as: Afonso Oliveira, Teresa Vazão, Low-power and Lossy Networks under mobility: a survey, *Computer Networks* (2016), doi: 10.1016/j.comnet.2016.03.018

Low-power and Lossy Networks under mobility: a survey

Afonso Oliveira[a,*], Teresa Vazão[a]

[a]*INESC-ID / Instituto Superior Técnico / Universidade de Lisboa*

Abstract

With the creation of the Routing Over Low power and Lossy networks (ROLL) group, work centered on the Internet of Things (IoT) has been emerging. A routing protocol for Low-power and Lossy Networks (LLNs) named the IPv6 Routing Protocol for Low-Power and Lossy Networks (RPL) has been created recently, though it still has some issues, including its lack of responsiveness to mobility. This article surveys proposed mobility extensions to the RPL and analyzes how the mechanisms introduced affect the requirements for LLNs.

Keywords: LLN, RPL, IoT, 6LowPAN, routing, mobility

1. Introduction

In the Internet of Things (IoT), objects that surround us in our daily life will be connected to a network. With the emergence of these connected smart objects, there is a need to build a routing protocol that can run in resource-restrained devices and aims to reduce energy consumption because a considerable amount of nodes in an IoT scenario is battery powered. To this purpose, the Routing Over Low power and Lossy networks (ROLL) working group from Internet Engineering Task Force (IETF) was created, and they introduced the term Low-power and Lossy Networks (LLNs) to characterize these network scenarios.

To cope with the resource limitation of LLN networks, the Institute of Electrical and Electronics Engineers (IEEE) created a new Medium Access Control (MAC) protocol, IEEE 802.15.4. The limited capabilities introduced in this standard, such as the low MTU size (127 bytes) and low data rate (250 kbps) [3], put a great barrier in the implementation of IPv6-based routing protocols, as IPv6 has a minimum Maximum Transmission Unit (MTU) size of 1,280 bytes [9]. For this purpose, IPv6 over Low-power Wireless Personal Area Network (6LoWPAN) [24] creates an adaptation layer between the network and a data link to support IPv6 in LLNs.

In the ROLL working group, IETF studied the different application scenarios in which LLNs might be used. The simplest scenario is home automation, which aims to support our in-house daily life activities. Simple applications exist to monitor and control lightening and shutters, appliances or healthcare devices; more complex ones

*Corresponding author

Email address: afonso.oliveira@tecnico.ulisboa.pt (Afonso Oliveira)