IMPACT OF MOBILITY ON POWER CONSUMPTION IN RPL

By

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Date Received: 07/08/2018 Date Revised: 29/08/2018 Date Accepted: 17/09/2018

ABSTRACT

The main theme of this paper is to implement the mobility model in Cooja simulator and to investigate the impact of the mobility on the performance of Routing Protocol over Low power Lossy networks (RPL) in the IoT environment. In the real world, mobility occurs frequently. Therefore in this paper, a frequently used mobility model - Random Way Point (RWP) is used for analysis. RWP can be readily applied to many existing applications. By default, the Cooja simulator does not support mobility models. For this, the Bonn Motion is introduced into Cooja as a plugin. As IoT deals with the resource-constrained environment, a comparison is done between the static environment and the mobile environment in terms of power consumption. As expected, the results indicate that mobility affects the RPL in terms of Power Consumption.

Keywords: IoT, RPL, Mobility Models, Power, Resource Constrained Environment, Cooja Simulator, RWP.

INTRODUCTION

Till now the internet is being used for browsing the web, accessing multimedia content, playing games, social networking, and topic search, sending and receiving emails and in many other tasks and now the trend is shifting towards usage of the internet as a global platform for communication between machines (M2M). Within the next few years, the Internet will turn as a seamless platform for traditional networks as well as networked objects thus paving a way to a new era of Interconnected Smart Objects forming Pervasive Computing Environments (Weiser, 1999).

This does not mean that Internet infrastructure will disappear. It will continue its role as a global backbone for WWW but in addition, extends its hand towards interconnecting physical objects with computing and communication capabilities across a wide range of services and technologies (Smart Objects). This can be achieved by embedding electronics into physical objects making them Smart Objects. Smart objects (or things) can be defined as the entities (Miorandi et al., 2012) that have a physical embodiment and a set of associated physical features (e.g., size, shape, etc.), and have a minimal set of communication functionalities, such as ability to be discovered and to accept incoming messages and reply to them, possess a unique identifier, associated to at least one name and one address, possess some basic computing capabilities, may possess some means to sense physical phenomena (e.g., temperature, light, electromagnetic radiation). The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management (Ashton, 2009). The three pillars of IoT are:

- Being identifiable,
- Is being communicable, and
- Being interactive (ability to interact with anything).

The Internet-of-Things can be treated as a highly dynamic distributed networked system with a large number of smart objects that are capable of producing and consuming highly dynamic information. The vision of IoT provides opportunities to manufacturers and companies including users. It will find wide applicability in many sectors, such as agriculture, environmental monitoring, health-care, product management, inventory management, home automation, transportation, and logistics domain, supply chain management, disaster