

Case study of LoRaWAN-based smart elements in urban environment

Abstract

Communication is one of the enablers for smart elements in a smart city. The ability of these smart elements to communicate with each other enables them to react intelligently to dynamically changing conditions. Most communication radios like Zigbee, BLE, and WiFi, among others, are short-ranged and while others such as 3G and 4G LTE, are power-hungry and subscription-based. While these protocols and communication modes work for certain applications, it carries two main limitations; difficulties in deploying IoT solutions in areas without cellular (GPRS, EDGE, 3G, LTE/4G) coverage and reduction in battery life. Thus, the future implementation of IoT and the connection of all kinds of "things" located in all kinds of places, needs a communication medium tailor-made for IoT which is low power, significantly long range, cheap, secure, and easy to deploy. This work presents the results of LoRaWAN coverage tests in Selangor Cyber Valley which is a greenfield development area where smart systems are designed into the blueprint. The data collected are during the early development phase with minimal buildings and foliage. The data demonstrates that the LoRaWAN covers a maximum radius of 2.49 km reliably with less than 10% packet loss. This strongly suggests that LoRaWAN is a reliable connection protocol for outdoor end-devices in urban environments. Future data collection after further developments may demonstrate the impact of buildings and foliage in urban environments on LoRaWAN.