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Cloudlet-based Efficient Data Collection in Wireless Body Area Networks

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Abstract: Wireless Body Area Networks (WBANs) have developed as an effective solution for a wide range of healthcare, military and sports applications. Most of the proposed works studied efficient data collection from individual and traditional WBANs. Cloud computing is a new computing model that is continuously evolving and spreading. This paper presents a novel cloudlet-based efficient data collection system in WBANs. The goal is to have a large scale of monitored data of WBANs to be available at the end user or to the service provider in reliable manner. A prototype of WBANs, including Virtual Machine (VM) and Virtualized Cloudlet (VC) has been proposed for simulation characterizing efficient data collection in WBANs. Using the prototype system, we provide a scalable storage and processing infrastructure for large scale WBANs system. This infrastructure will be efficiently able to handle the large size of data generated by the WBANs system, by storing these data and performing analysis operations on it. The proposed model is fully supporting for WBANs system mobility using cost effective communication technologies of WiFi and cellular which are supported by WBANs and VC systems. This is in contrast of many of available mHealth solutions that is limited for high cost communication technology, such as 3G and LTE. Performance of the proposed prototype is evaluated via an extended version of CloudSim simulator. It is shown that the average power consumption and delay of the collected data is tremendously decreased by increasing the number of VMs and VCs.