Title (EN): **Universal framework for remote firmware updates of low-power devices**

Title (SK): **Univerzálny framework pre vzdialené aktualizácie firmvéru nízkopríkonových zariadení**

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Annotation: The motivation of research is to improve the efficiency of remote firmware updates for low-power devices. These devices are nowadays used in wireless sensor networks, smart systems and cyber-physical systems. Their numbers can exceed hundreds and they can communicate using custom networks or internet-of-things. Firmware updates are achieved by network transfer. In case of many devices on a network, it is important to reduce the amount of data shared on the network. Frequent updates can wear out memories of the devices faster, so it is necessary to reduce the amount of memory operations executed on these devices.
[1] presents a framework for remote firmware updates. It includes processes to improve firmware similarity, generate delta files and track historical changes in a firmware. Each of these processes includes innovative configurations that make it possible to generate delta files for various update scenarios. Important contribution is the multiplatform design of the framework successfully tested on 3 different hardware platforms. The designed solution includes an update module for target devices that executes an update with minimal number of written pages in the device program memories. The framework reduces the amount of update data by 80% and improves over existing solutions by 5-50%, depending on the update scenario.

Main scientometric outputs:

1. KACHMAN, Ondrej - BALÁŽ, Marcel - MALÍK, Peter. Universal framework for remote firmware updates of low-power devices. In Computer Communications, 2019, vol. 139, p. 91-102. (2.766 - IF2018). ISSN 0140-3664. Type: ADCA