

University of Ss. Cyril and Methodius in Trnava

Faculty of Natural Sciences

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2. Biology and Biotechnology
3. Environmental Sciences
4. Chemistry
5. Young Scientists

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# Experimental verification of the performance of the iEDF scheduling algorithm for IoT tasks in an Edge cloud system

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**Abstract:** The aim of this paper is to verify the performance of the iEDF (improved Earliest Deadline First) algorithm that we designed and implemented. It is the algorithm that schedules IoT tasks in an Edge cloud system. We verify the performance of the algorithm based on 2 key criteria: makespan (the completion time of the last task in the schedule) and deadline fulfilment (the latest required completion time) of each task. We designed experiments, implemented 3 scheduling algorithms in the CloudSimPlus simulator environment: our iEDF, the original EDF and a Greedy-based algorithm and used 33 scaled datasets of IoT tasks. Together we obtained 99 pseudo-optimal schedules for various scaled datasets of tasks using the whole set of microclouds and by applying all 3 scheduling algorithms. This provided us with a detailed picture of the behaviour of the scheduling system when using different input sets. On the base of performed complex experiments and by mutual comparing of algorithms, we found that our algorithm iEDF achieves the shortest (best) makespan and 100% deadline fulfilment for all scheduled tasks. The Greedy-based algorithm had slightly worse makespan results and insufficient deadline fulfilment. The EDF algorithm had slightly worse deadlines (83 to 100%) and the worst makespans among the compared algorithms.

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**Keywords:** IoT, Edge computing, task scheduling, Earliest Deadline First algorithm, improved Earliest Deadline First algorithm

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