

Modern Tools of Science

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Abstract

During the last years we have met and get used to many completely new technologies. Drones are not only toys for kids, but also allow Polish National Railways monitor security of cars waiting at the connection stations. Small affordable Internet-connected home weather stations get data from almost all places on Earth and create a map available for everyone. Smartphones equipped with GPS and utilizing mobile data transmission can be used to call the closest available taxi, foresee its time of arrival and monitor its position in a real time.

All these fascinating examples making the world, thus our life better, couldn't exist without solid back up from modern information technologies. Information on flying drones has to be reliable exchanged to provide a security for an air transportation. Video streams from their cameras need high-bandwidth networks. In heterogeneous local and wide area networks both aspects could be easily managed with Software-Defined Network concept, appeared just a few years ago. Sooner or later the amount of images taken by flying drones will require machines to analyze it. This couldn't be done without massive employment of computing accelerators as GPUs or FPGAs. Weather data provided by mentioned sensors from one side, and forecast information available through the Internet, on the other one, utilize HPC systems performing acquisition, computing and presentation layers in Cloud computing model. In today competitive environment optimization of service level of taxis for passengers has to base on such areas as the customers' demand, situation on the roads, especially in crowded cities, and of course the weather current state and future predictions. So many factors cannot be quickly and effectively processed without Big Data solutions.

The intention of such introduction is to find new topics modern science can dive into not only by basic research, but also applied conclusions, as well as possibility of implementations. 3 such examples will be presented and discussed during the rest of the lecture.