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Benchmarking Internet of Things devices

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Abstract

The use of commercial o_-the-shelf components for implementing Internet of Things devices has become a common practice amongst researchers and solution providers. IOT solutions, based on the Raspberry Pi, BeagleBone and BeagleBone Black, o_er cost e_ective, versatile and uncomplicated platforms for rapid application development. The devices are treated as black box devices and little work has been done to quantify the performance of these devices when the system architecture, software components or communication channels are varied. This paper introduces micro- and macro-benchmarking methods for these devices; quantifying the performance of each device for the varying hardware architectures. Micro-benchmarking was performed using lmbench - a cross platform benchmarking framework for UNIX devices. The macro-benchmarking was implemented using a custom developed CoAP benchmarking utility created using the libCoAP library. The results showed that the selection of the platform processor is a key design requirement and has the most potential to optimise CoAP server performance. The latency associated with the communication channels was found to be a dominating factor for round-trip times associated with CoAP requests.