Title: Energy efficiency through hybrid cloud-PC computing

Keywords: Cloud computing, Green IT, energy efficiency, middleware

Brief Description:
The UK government has specified energy efficiency in the ICT sector as an area of priority in its strategy to reduce CO2 emissions by 34% below the 1990 baseline levels by 2020 [CarbonPlan11]. Offloading part of a user’s computational needs on the cloud obviously reduces the energy consumption at the user’s end but introduces energy costs at the cloud’s end, as well as on the enabling network infrastructure. We propose the concept of a hybrid cloud-PC computing framework which estimates the real-time energy cost of an application if run on the cloud or locally, and accordingly directs it to the one that is the most cost-efficient for it. The aim is to develop the necessary middleware that will support the dynamic allocation of an application on the cloud based on the energy consumption patterns and personal preferences of a user with regards to the performance Vs. energy-efficiency trade-off. The key scientific challenges here are the accurate prediction of energy efficiency and performance before running an application, and the technical implementation of an effective decision algorithm that will operate without user input.

Related References:
This work will benefit from our prior work on decision control mechanisms [SakGel10], performance evaluation [Sak11], energy-efficient networking [MSG13] and cloud research testbeds [SL13]


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