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MiniSymposium on Edge Computing

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The IoT and pervasive computing evolution pose sustainability challenges to the current Internet architecture. Presently, most of the processing and storage in the Internet is performed in the cloud, with massive data-centers that are located in remote locations and occupy an area of a few football fields, contain tens of thousands of servers, consume electricity of a small city and utilize expensive cooling mechanisms. Such data-centers will not be sufficient in the IoT era, as the number of smart connected devices and the data generated by them increase.

For one, tethering all the required bandwidth to transfer the data from the devices to a centralized data-center would be very costly. It is difficult to imagine how to transfer this data over the existing public networks without further substantial investments to expand them, which might take years to complete if at all technologically feasible. Response latency also becomes an issue, since many IoT applications, such as smart traffic control and accident avoidance, rely on high responsiveness to events.

It appears that it will become increasingly vital for the support of such applications to deploy small form factor, energy efficient mini data-centres near sources of Big Data to process and filter data locally rather than sending them to centralized cloud data-centres. Several industrial players have realized the challenges towards IoT and have recently introduced the term Edge or Fog computing, which is being promoted as a new technology that could complement cloud computing and bring cloud computing services closer to the rapidly growing number of user devices.

We are very happy to present to you the papers of the ParCo17 MiniSymposium on Edge Computing. This is the first scientific forum on the topic that is organised in Europe. We present a program of four papers that explore hardware, software and application development and deployment challenges in Edge Computing environments. Varghese et al present the concept of Edge-as-a-Service (EaaS) for integrating Edge Computing devices with future Cloud Computing ecosystems. Patras et al introduce a structured dataflow approach for simplifying application development in Edge Computing environments and provides flexibility in deploying applications across a variety of Edge and Cloud infrastructures. Chen et al explore the challenge of power modelling for distributed systems composed of both low-power microservers and well provisioned Cloud servers. Kalogirou et al explore a new avenue for minimizing costs for Cloud providers by leveraging extended hardware operating margins.

We hope that you enjoy this collection of papers and that they will stimulate further research in the exciting and topical them of the MiniSymposium.