SI: Recent Advances in Cloud Data Centers Toward the Fog Data Centers

In recent years, we have witnessed tremendous advances in Cloud Data Centers (CDCs) from all communications layers point of view. Recent report from Cisco Systems Inc. demonstrates that the CDCs, are distributed across geographical locations, will dominate the global data center traffic flow for the foreseeable future and its importance is highlighted by one of the top-line projections from this forecast that, by 2019, more than four-fifths of the total data center traffic will be Cloud traffic. The geographical diversity of computing resources in CDCs brings several benefits, such as high availability, effective disaster recovery, uniform access to users in different regions, and access to different energy sources. Although this technology is predominant, it is essential to leverage the new agile software technologies, agile processes and agile applications near to the edge and the users—hence Fog concept appeared.

Fog computing (FC) emerges, as an alternative for traditional cloud computing to support geographically distributed, latency sensitive, and QoS-aware IoT applications while reducing the burden of data centers in traditional cloud computing. In particular, FC with the features (e.g., low latency, location awareness, and capacity of processing a large number of nodes with wireless access) to support heterogeneity and real-time applications is an attractive solution to delay- and resource-constraint large-scale applications. The distinguishing feature of the FC paradigm is that set of Fog Nodes (FNs) spreads communication and computing resources over the wireless access network, so as to provide resource augmentation to resource and energy-limited wireless (possibly mobile) devices. The joint manager of Fog and Internet of Technology (IoT) paradigms will reduce energy consumptions and operating costs of state-of-the-art Fog-based data centers (FDCs). An FDC is dedicated to supervising the transmission, distribution and communication FC. The FDC, as a vital component of the internet of everything (IoE) environment, is capable of filtering and processing a considerable amount of incoming data on edge devices, by making the data processing architecture distributed and thereby scalable. Therefore, FDC provides a platform for filtering and analyzing the data generated by sensors utilizing resources of FNs.

In this context, an increasing interest is growing around FDCs/CDCs that allows the delivery of various kinds of agile services and applications over telecommunication networks and the Internet including resource provisioning, data streaming/transcoding, analyzing of the high definition videos across the edge of the network, IoE application analyzing, etc. Motivated by the above issues, this special section solicits original research and practical contributions that advance the use of CDC/FDC in new technologies such as smart city and industries. Results obtained by simulations must be validated in bounds by experiments or analytical results. We invite authors to contribute with both original research articles and review articles to this Special Collection. The submitted papers must have at least 50% different material beyond any other previously published work.

- ✓ CDC/FDC networking principles, designs, analyses, and performance
- ✓ Content and service distribution models for FDC/CDC
- ✓ Orchestration across computation, storage and communication resources for for FDC/CDC
- ✓ Theoretical and experimental evaluation of information-centric networks for FDC/CDC
- ✓ Security and privacy challenges for FDC/CDC
- ✓ Testing and evaluation tools for FDC/CDC
- ✓ The future for FDC/CDC: challenges and open issues

Timetable:
Deadline for manuscript submissions: May 2018 as Special Issue CD-FDC2018 at Manuscript central
Acceptance Notification: August 2018
Expected publication date (tentative): December 2018

Lead Guest Editor
Dr Mohammad Shojafar, University of Rome, Italy
Email: mohammad.shojafar@uniroma1.it
Guest Editors
- ✓ Prof. Dr. Rajkumar Buyya, University of Melbourne
  Email: rbuyya@unimelb.edu.au, Site: http://www.buyya.com/
- ✓ Dr Mohammad Shojafar, University of Rome, Italy
  Email: mohammad.shojafar@uniroma1.it Site: http://www.mshojafar.com
- ✓ Dr Zahra Pooranian, University of Padua, Italy
  Email: Zahra.pooranian@math.unipd.it Site: http://www.math.unipd.it/~zahra/
- ✓ Dr Mehdi Sookhak, Arizona State University, United State
  Email: msookhak@asu.edu, Site: https://isearch.asu.edu/profile/3165910