

Special Issue on
Improving Network Measurement Using Reconfigurable Devices

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Network measurement is the basis of many applications such as load balancing, routing, traffic scheduling, content caching, and intrusion detection. Collecting information on flow size (i.e., the number of packets in a flow) and flow volume (i.e., the number of bytes in a flow) in network measurement is usually required. Typically, measurement applications track up to ten or even hundred millions of flows, making the counter arrays very large. While these counters are updated upon a per-arrival packet base, operating at line speed poses great challenges. Difficulties come from a dilemma: fast memories like SRAM run at high speed but have small capacity which is unable to hold the whole counter array, while slow memories like DRAM have large size but run at slow speed and can hardly catch up the ever-increasing link speed.

To address this problem, an ideal solution is to leverage reconfigurable devices (e.g., FPGA) to balance the resources for speed and storage used for measurement. For example, smart compression algorithms can be implemented upon FPGAs, which makes on-chip memory (SRAM) the fast data cache while keeping the large off-chip memory (DRAM) as the permanent repository. Compared with the fixed-logical ASIC chips, reconfigurable devices can adaptively adjust the resources allocation on the fly, according to real-time traffic profile.

Taking these into consideration, this special issue focuses on novel academic and industrial works aiming at improving network measurement based on reconfigurable devices, which may include architectures, algorithms, practical tools, and applications.

Potential topics include but are not limited to the following:

- ▶ Reconfigurable architectures or FPGA implementations for network measurement or telemetry
- ▶ Embedded, SoC-based reconfigurable architectures for network measurement or telemetry
- ▶ DevOps techniques based on reconfigurable architectures
- ▶ Advanced data structures or algorithms for reconfigurable-architecture-based network measurement or telemetry
- ▶ Advanced findings in data collection, analysis, and storage
- ▶ Fault localization or troubleshooting tools, applications, or frameworks based on reconfigurable architectures
- ▶ Communication protocols for reconfigurable-architecture-based network measurement or telemetry
- ▶ SDN/NFV platforms built in reconfigurable architectures
- ▶ Network operation management leveraging reconfigurable architectures
- ▶ Virtualization techniques
- ▶ Industrial research and practice

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Papers are published upon acceptance, regardless of the Special Issue publication date.

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Submission Deadline

Friday, 25 January 2019

Publication Date

June 2019