

1st workshop on Information-Centric Fog Computing

Dirk Kutscher

Yiannis Psaras

12 June 2017



<http://networking.ifip.org/2017/index.php/workshops/workshop-on-information-centric-fog-computing-icfc/icfc-technical-program>

Edge and Fog Computing

- Drivers for local communication and computation
 - Internet of Things, not-always-connected networks
 - Moving from data consumption to data production at the edge
 - Trust- and latency sensitivity
 - Energy and communication/storage resource conservation
- Edge Computing
 - Local processing at the edge
 - E.g, Edge Gateways in IoT, vehicular gateways
 - Often but not necessarily with cloud backends
- Fog Computing
 - Generalizing to multi-tier edge computing
 - Distributed applications in the network -- from edge to cloud
 - Adapting distribution of application components according to application requirements and network characteristics

Challenges for Edge/Fog Computing

- Networking abstraction
 - TCP/IP for dynamic communication between distributed application components?
 - Chaining HTTP intermediaries?
 - Layering: network layer vs application layer
- Execution environments
 - Virtual machines, microservices, PaaS?
- Security
 - IoT security is hard -- fog computing security may be harder
 - Trusting platforms, fog computing functions, generated data
- Management and orchestration
 - Large-scale deployments needs sufficient automation and reliability
 - Enterprise and telco networks have existing management platforms
 - Fog computing may exhibit requirements beyond current NFV requirements

Why ICN for Fog Computing?

- Data-centricity
 - Fog computing: distributed data processing
 - Location-independence -- asking for named data in the network...
 - ICN has data-oriented security on network layer...
- ICN as a data logistics service
 - ICN in general: make data available where it is needed
 - Network can adapt: caching and forwarding strategies
- ICN in network-processing
 - Level 1: dynamic data generation
 - Level 2: in-network caching and synchronization/distribution
 - Level 3: named-function networking?

Programme

- 5 papers in total, addressing:
 - ICN and IoT
 - Named-Function Networking
 - Caching at the edge
- 1 keynote speech
 - “Information-Centric Networking in Wireless Networks and Beyond”
- 4 panelists - themes to be covered:
 - Motivation and Feasibility of ICN Fog
 - Research Challenges
 - Deployment Challenges

Schedule Overview

Keynote: *“Information-Centric Networking in Wireless Edge Networks and Beyond”* -- Eve Schooler

Session 1: Information Centric Networking and IoT

- *“Edge-ICN and its application to the Internet of Things”*, Nikos Fotiou, Vasilios A. Siris, George Xylomenos, George C. Polyzos, George Petropoulos, Konstantinos V. Katsaros
- *“Observing Resources over ICN”*, H. Islam, Dmitrij Lagutin, Nikos Fotiou

Session 2: Computing and Caching at the Edge

- *“Execution State Management in Named Function Networking”*, Christopher Scherb, Balázs Faludi, Christian F Tschudin
- *“In-Network Live Stream Processing with Named Functions”*, Christopher Scherb, Claudio Marxer, Urs Schnurrenberger, Christian F Tschudin
- *“A Content-based Centrality Metric for Collaborative Caching in Information-Centric Fogs”*, Junaid A Khan, Cedric Westphal, Yacine Ghamri-Doudane

Industry Panel: Adoption Challenges and Prospects of Information-Centric Fog Computing

Session 3: Computing Networks

- **Invited Talk:** *“Tools, reliability and pricing for cloud-based compute instances”*; Ioannis Andreopoulos
- *“Benchmarking and Simulating the Fundamental Scaling Behaviors of a MapReduce Engine”*, Brenton Walker
- *“Session Support for SCN”*, Mikael Gasparyan; Guillaume Corsini; Torsten Braun; Eryk Jerzy Schiller; Jonnahtan Eduardo Saltarin de Arco

Panel Discussion: Adoption Challenges and Prospect of ICN Fog Computing

Panelists:

- **Eve Schooler** (Principal Engineer and Director, Intel IoT)
- **Dirk Trossen** (Senior Principal Engineer, InterDigital Europe)
- **Chris Wood** (Researcher, University of California Irvine)
- **Cedric Westphal** (Principal Research Architect, Huawei)



Panel Discussion: Adoption Challenges and Prospect of ICN Fog Computing

Topics

1. Motivation and feasibility of ICN edge/fog computing

- Why is this a good idea? Why not?
- What are expected benefits?

2. Challenges for ICN edge/fog computing

- What are the most important challenges in your opinion?
 - Research challenges
 - Deployment challenges

3. Outlook: Deployment

- Most promising use cases (if any)?
- Most promising approach (architecture, specific technology etc.)?

1st workshop on
Information-Centric Fog Computing

<http://networking.ifip.org/2017/index.php/workshops/workshop-on-information-centric-fog-computing-icfc/icfc-technical-program>