



Innovations in Clouds,  
Internet and Networks

19<sup>th</sup>  
ICIN  
CONFERENCE

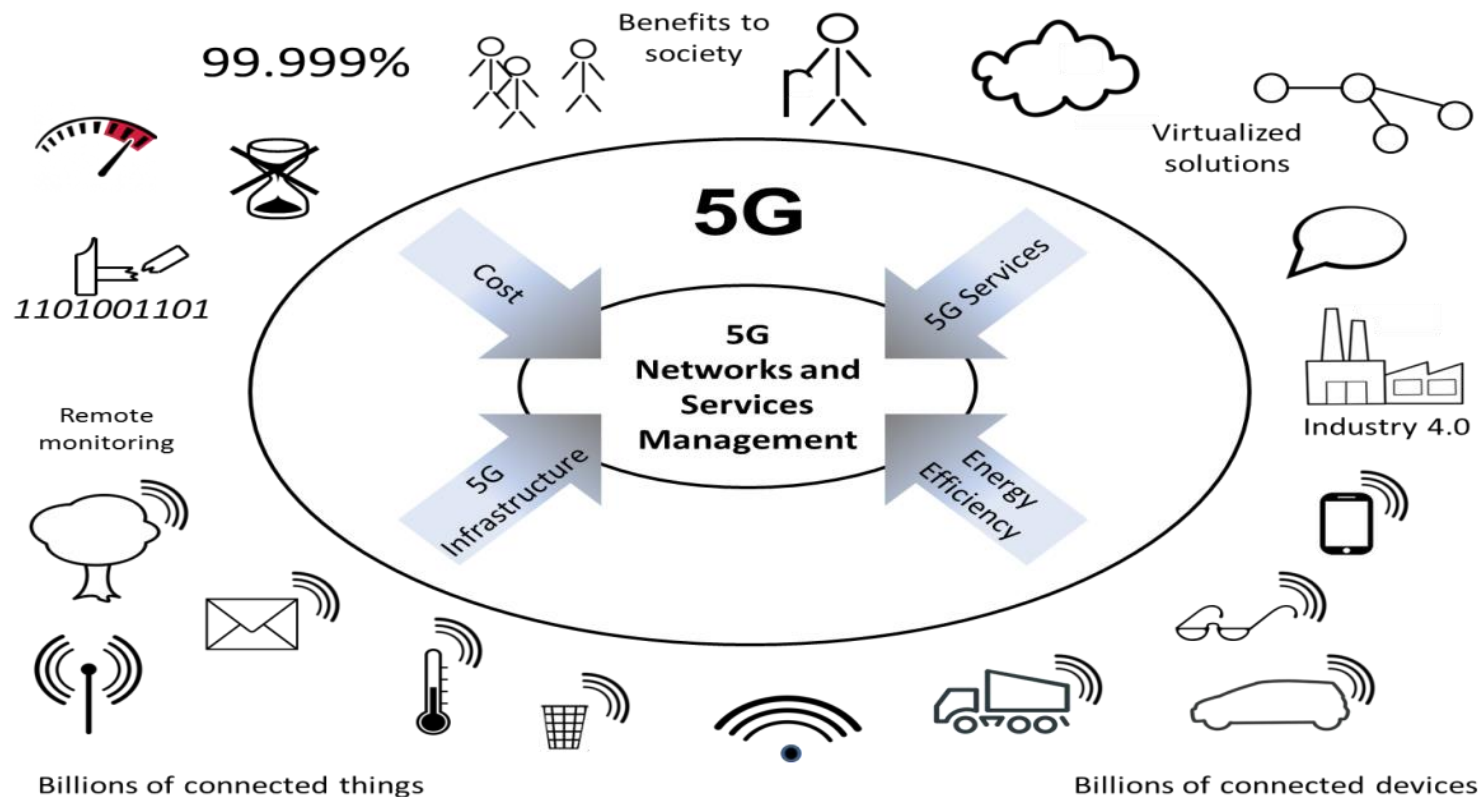
PARIS  
MARCH 1 - 3, 2016

# Network IT-ization and 5G

## *Introduction*

Prosper Chemouil





Unprecedented challenges facing network operators:

- Exponential increase in data/video traffic
- Massive connectivity (mobile devices, things, everything)
- Proliferation of vertical services

## Virtualization and Softwarization as enablers of Future Networks and Services

To meet challenges and create new revenue streams with innovative services (e.g., content caching, in-network video streaming, etc.):

- ❖ Cost-effectiveness - leveraging economies of scale by constructing infrastructure from a few commodity hardware
- ❖ Elasticity and Agility - ability to rapidly deploy and elastically scale services
- ❖ Efficiency and programmability

See Raouf's keynote

- Where?
  - New Generation PoPs need to be re-architected
- How?
  - Software-Defined Infrastructure leveraging:
    - ❖ Cloud (virtualized platforms, service-oriented architecture, elastic scaling, and scalability)
    - ❖ SDN (simpler forwarding devices, programmable control plane)
    - ❖ NFV (reduced CAPEX and OPEX, optimized service chaining)
  - Revisit some
    - ❖ Transport Protocol Stack including Forwarding
    - ❖ New Content Networking Paradigms

See Raouf's keynote



## Cognitive Management

### Benefits

- ✓ Alleviates complexity
- ✓ Enables real-time adaptation to context
- ✓ Relies on network analytics
- ✓ Reduces OPEX

### Benefits

- ✓ Creates network abstraction to enable faster innovation
- ✓ Allows for programmability and flexibility



## SDN



## NFV

### Benefits

- ✓ Agility of service deployment and provisioning
- ✓ Reduces CAPEX, OPEX
- ✓ Optimizes space & power consumption

- **Intelligent edges, how to benefit from SDN/NFV** – Friedrich-Joachim Westphal (*Deutsche Telekom Labs, Germany*)
- **5G: It's the Network, Stupid** – Dirk Kutscher (*NEC laboratories Europe, Germany*)
- **A Vision for Explicit Path-Cooperative Transport** – Mirja Kuehlewind (*ETH Zurich, Switzerland*)

- **Cloud RAN Challenges and Solutions** – Rajeev Agrawal and *Anand Bedekar (Nokia, USA), Troels Kolding (Nokia, Denmark), Vishnu Ram (Nokia, India)*
- **Congestion Control Using OpenFlow in Software Defined Data Center Networks** – *Masoumeh Gholami* and Behzad Akbari (*Tarbiat Modares University, Iran*)
- **Experimentation as an ISP-Service** – Zaineb Tahri, *Ramzi Ouafi* and *Mohamed Karim Sbai (ESPRIT School of Engineering, Tunisia)*

- **Using Linux Containers in Telecom Applications** – *Csaba Rotter, Gergely Csatári, Lorant Farkas, Gabor Nyiri, Laszlo Janosi and Robert Springer (Nokia Networks, Hungary)*
- **Biochemically-inspired Method for Constructing Service Space in Virtualized Network System** – *Go Hasegawa, Shun Sakurai and Masayuki Murata (Osaka University, Japan)*
- **An Adaptive Observation Window for Verifying Configuration Changes in Self-Organizing Networks** – *Tsvetko Tsvetkov (Technische Universität München, Germany), Janne Ali-Tolppa (Nokia Networks, Germany)*
- **An Efficient Security Framework to Detect Intrusions At Virtual Network Layer of Cloud Computing** – *Kamatchi A. and Chirag Modi (National Institute of Technology Goa, India)*
- **Research Challenges in 5G Networks: a HetNets Perspective** – *Muhammad Umer Farooq, Cormac J. Sreenan and Kenneth N Brown (University College Cork, Ireland)*





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**Thank you!**

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