IEEE SDN Initiative

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IEEE at a Glance

Our Global Reach

426,000+
Members

46
Technical Societies and Councils

160+
Countries

Our Technical Breadth

1,600+
Annual Conferences

3,900,000+
Technical Documents

170+
Top-cited Periodicals

http://www.ieee.org/about

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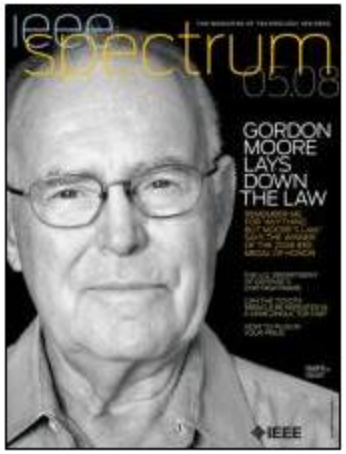
Yesterday's Leaders

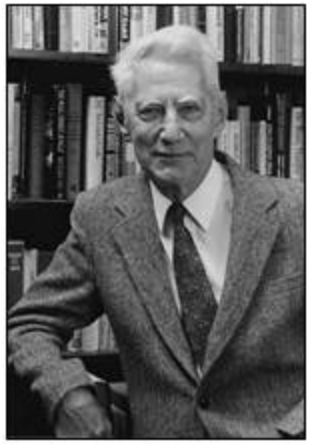
- In a tradition dating back to 1917 and IEEE's predecessor, the IRE, the Medal of Honor has recognized giants within the technology community

2008
Gordon E. Moore
Development of MOS memory, the microprocessor computer and the semiconductor industry



1991
Leo Esaki
Contributions to tunneling, semiconductor superlattices, and quantum wells

1966
Claude E. Shannon
Created Information Theory



1920
Guglielmo Marconi
Pioneering work in radio telegraphy

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IEEE Future Directions Committee

- Multi-Disciplinary, Trans-Disciplinary
- Determine the Direction of Existing, New and Emerging Technologies
- Spearhead their Investigation and Development
- This is NOT Standards Development
- Understand, monitor and drive the SDN ecosystem

SDN, 5G, Internet – Global Connect, Big Data, Brain-Computer Interface, Cloud Computing, Cybersecurity, Digital Senses, Green ICT, IOT, Smart Cities,
Smart Grid, Transportation Electrification

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SDN Initiative Structure

- IEEE SDN is co-chaired by Antonio Manzalini (Telecom Italia) and Eileen Healy (Healy & Co.) and includes players worldwide from industry and academia
- Among the main activities of IEEE SDN there are standardization, education, definition of proof-of-concepts for pre-industrial adoption of SDN and Virtualization (in synergy with other initiatives on Cloud Computing, IoT and Big Data)
- IEEE SDN includes the following Committees: Conference, Education, Publicity, Publication, Standards, Pre-Industrial and Outreach:
  - core team composed of approximately 50 experts actively involved activities;
  - followed by the IEEE Community on SDN (currently involving more than 2500 people worldwide)

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IEEE SDN Flagship Conference: NetSoft

- The 2nd IEEE Conference on Network Softwarization (NetSoft) is the premier IEEE forum for technical exchange on software-defined infrastructures and services.
  - Next date set for June 6-10, 2016 in Seoul, Korea
- Building on the successful first edition held in London, UK in April 2015, this conference will bring together academia and industry to explore the softwarization of networks, clouds, and the Internet of Things.
- For more information and to learn how to get involved, visit: http://sites.ieee.org/netsoft/

Focus Areas and Timeline

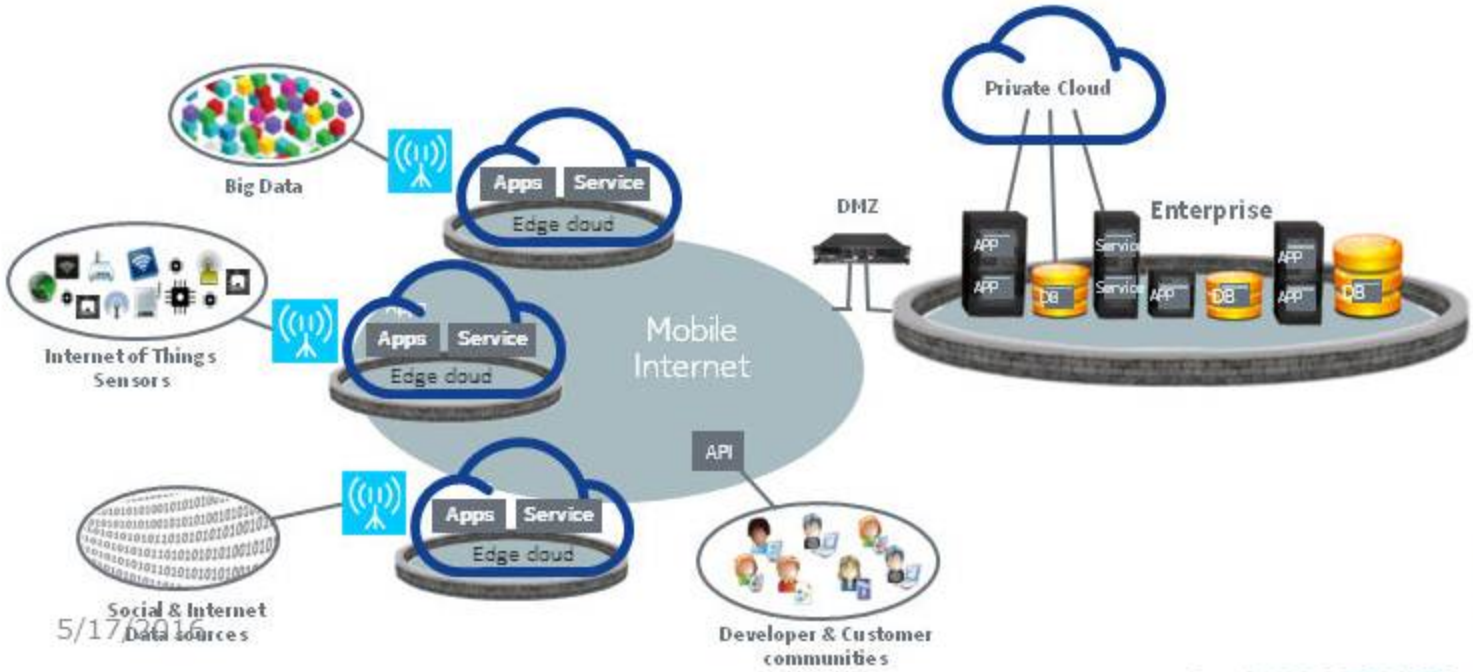
- Open Source SDN supporting "5G Era" networks and service providers
- Open Mobile Edge Cloud – Disaggregate Radio Access and Core Network functions
  - Phase 0 - Proof of Concept (POC) with ON.LAB
  - Phase 1 – Code for more aggressive disaggregation
  - Phase 2 – Integrate code into open source environment
- Federated Testbeds – Interoperability testing of functions and applications implemented with SDN
- Virtual Lab – Enable testing by technical community members
- Later – Interoperability Standards

Mobile Edge

- ETSI/MEC: “Mobile-edge Computing offers application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the mobile network. This environment is characterized by ultra-low latency and high bandwidth as well as real-time access to radio network information that can be leveraged by applications.”
- Fog Computing: “A network architecture that uses one or more end-user clients or near-user edge devices to carry out a substantial amount of storage (rather than stored primarily in cloud data centers), communication (rather than routed over backbone networks), and control, configuration, measurement and management (rather than controlled primarily by network gateways such as those in the LTE core).”

Open Mobile Edge Cloud

- An (open) cloud platform that uses some end-user clients located at the "mobile edge" to carry out a substantial amount of storage (rather than stored primarily in cloud data centers) and computation (including edge analytics, rather than relying on cloud data centers) in real time, communication (rather than routed over backbone networks), and control, policy and management (rather than controlled primarily by network gateways such as those in the LTE core). Based on largely Prof Mung Chiang work



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Pre-Industrial Committee

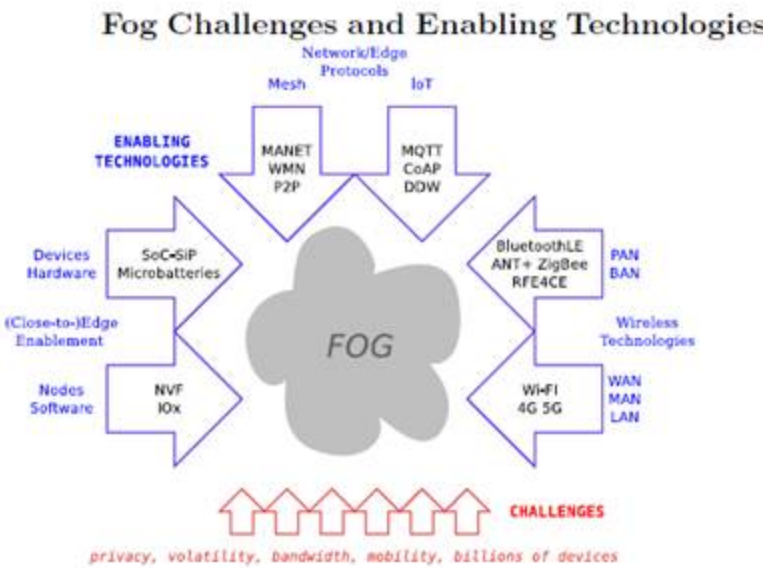
Fog computing/networking

Problem space (is same): Limited compute/storage on smart devices might utilize cloud computing as a extension facility;

Solution idea (is same): What if we can add: mobility support, geo-distribution, location-awareness and low latency. Fog networking/ computing is originally proposed to enable this extension at the "edge" of the network

Components of solution: (so far no architectural proposal)

- Cloudlet (Satyanarayan) is a resource-rich "cloud in a box", for use by nearby mobile devices
- IOx is from Cisco works by hosting applications in a Guest Operating System (GOS) running in a hypervisor directly on the Connected Grid Router (CGR)



Ref: Finding your Way in the Fog: Towards a Comprehensive Definition of Fog Computing, Vaquero and Rodero-Merino

OMEC Workshop – Venice June 15

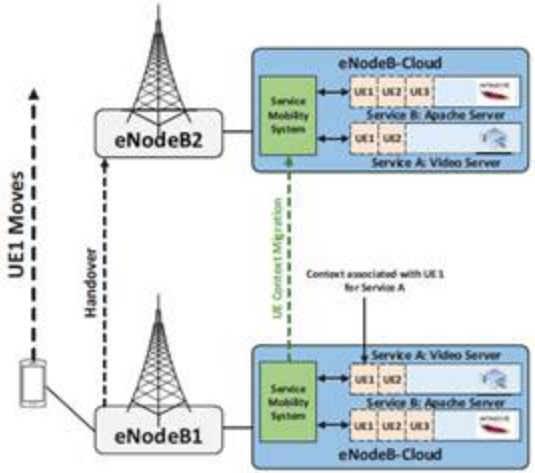
Edge cloud (Service Mobility)

Problem space (is same): traffic between UE and services on the public cloud is "tromboned" towards the anchor point which leads to inefficiencies.

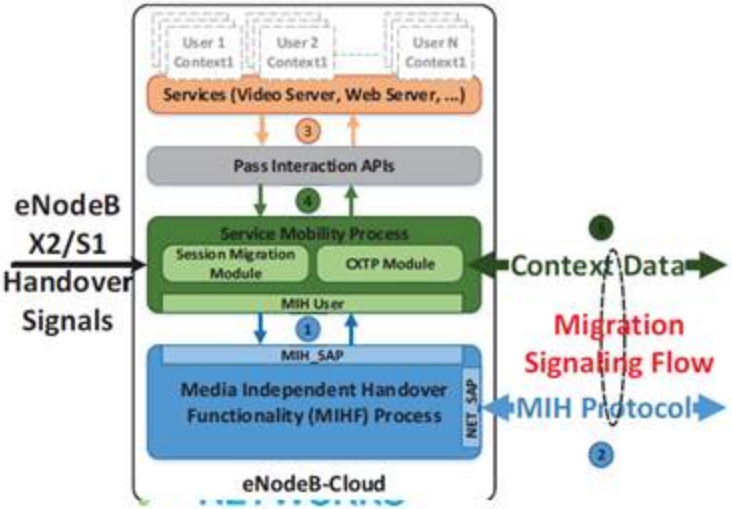
Solution idea is same: Deploying services closer to the UE, near the eNB. The services are deployed on "small scale data centers" connected to, or collocated with the eNB, called eNBC.

To make this work solve issues like, mobility management, context management etc. Excellent prospects on (O)MEC.

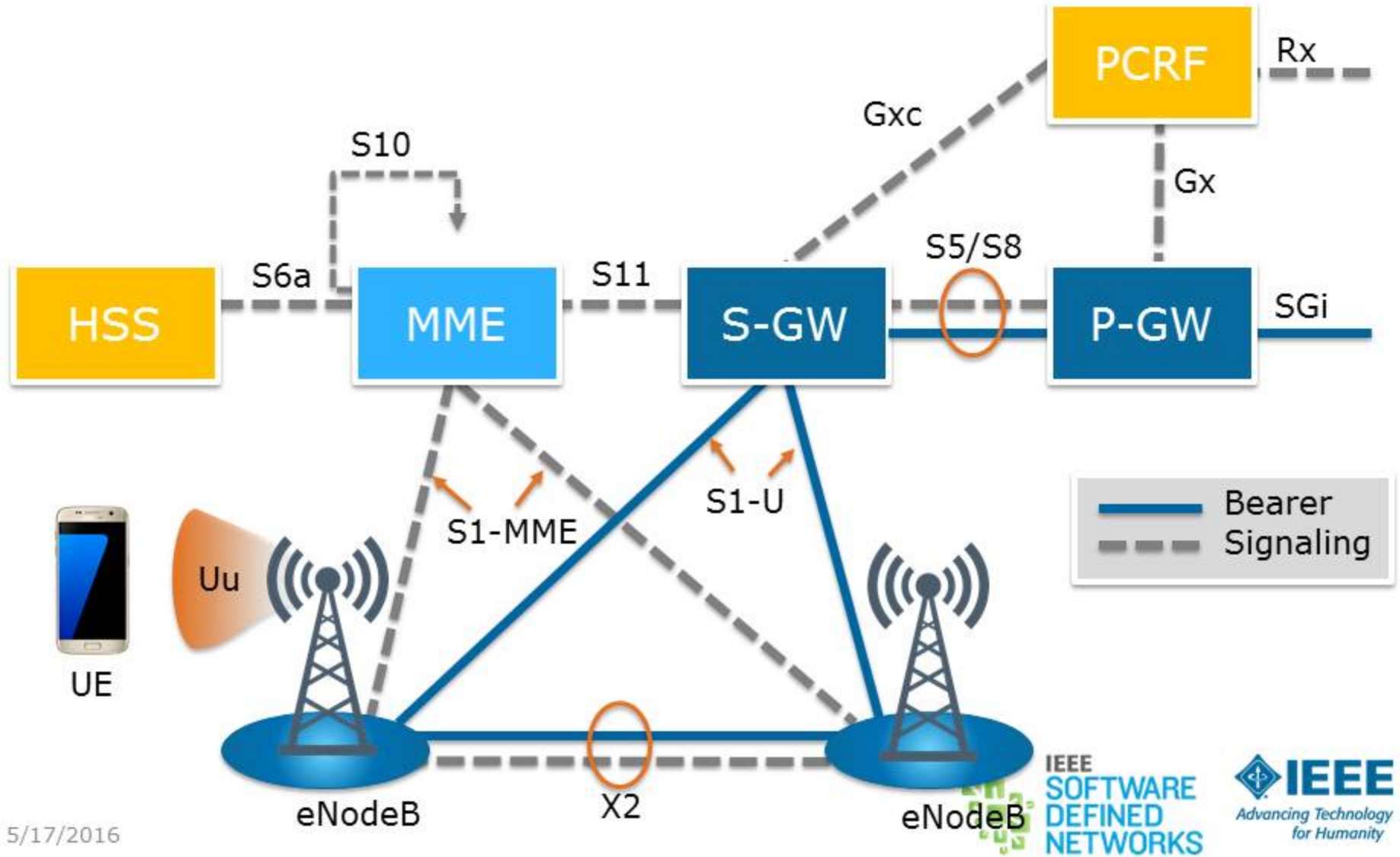
Components of solution:
IEEE 802.21 Media Independent Handover,
Context Transfer Protocol,
Session Migration Mechanism



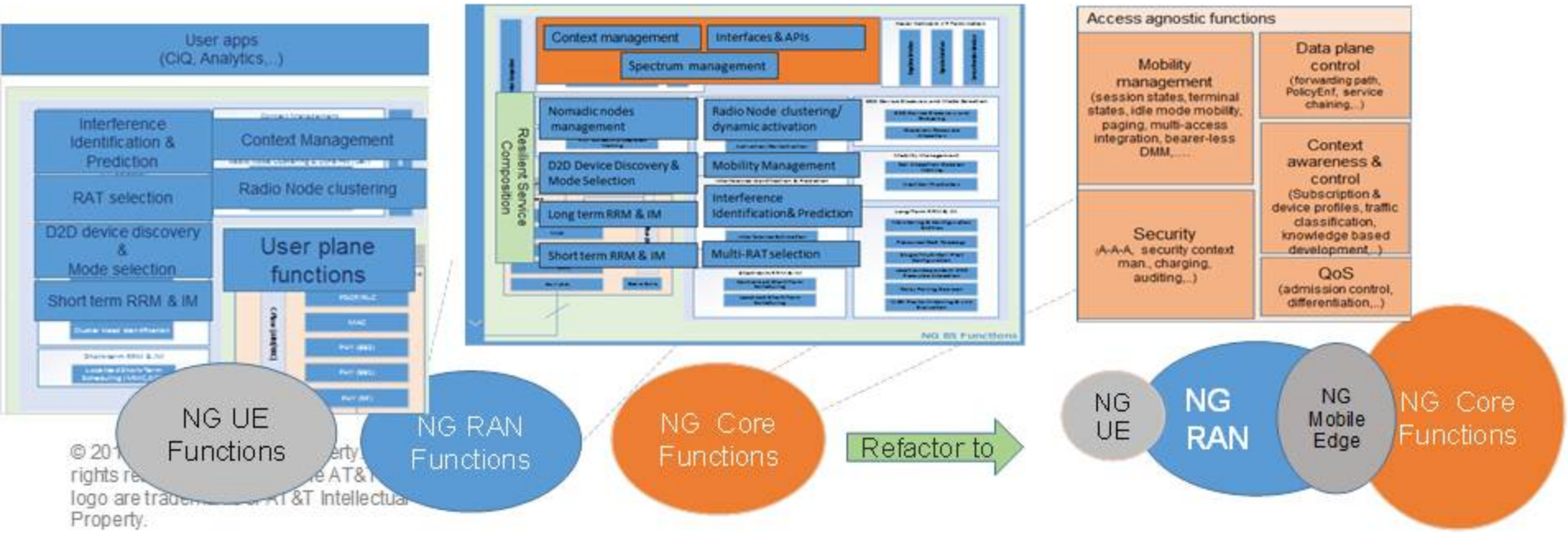
Ref: Service Mobility in Mobile Networks,
Hany Assasa, Srinivasa Vinay Yadhav and Lars Westberg



LTE has Proprietary Boxes Connected by Standardized Interfaces



Transforming Mobility Networks



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About IEEE SDN

- Our goal: a cross-Society IEEE program with the overall goal of addressing SDN and Network Virtualization issues, considering not only technology aspects, but also the socio-economic impacts of the resultant softwarization.
- This is a broad-based collaborative project for SDN and NFV to be introduced by a global professional association, and provides coverage across multiple interdependent tracks.
- These include: the IEEE SDN web portal, conferences, continuing education courses, publications, standards and platforms for pre-industrial adoption of SDN and NFV.

How to Join

- Membership is free to the IEEE SDN Technical Community
- IEEE SDN members are actively shaping the industry around the globe. Connect with industry colleagues, practitioners, researchers, students and all others interested in advancing the field of SDN and NFV.
- IEEE SDN members stay-up-to date on the latest advances including: technology, regulation, policy, social impacts and new business models.
- Visit our web portal for how to join: http://sdn.ieee.org

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Engage with IEEE SDN today!

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