

# Overview of IEEE 5G Initiative and Beyond



## Contacts:



**Ashutosh Dutta**

[ashutosh.dutta@ieee.org](mailto:ashutosh.dutta@ieee.org)



**Gerhard Fettweis**

[Gerhard.Fettweis@tu-dresden.de](mailto:Gerhard.Fettweis@tu-dresden.de)

- 5G : Docomo's vision for Olympics 2020 in Tokyo
- 5G network to make debut in 2018 Winter Olympics in South Korea
- AT&T and Verizon start '5G' field trials in 2016

- IEEE, like many other organizations, believes that 5G ecosystem is rather large and will cover many different areas:
  - Not only an evolution of LTE
  - New services, new technologies, new frequencies (6 GHz), new industries, new business models
  - Multi connectivity across bands & technologies (carrier aggregation with integrated MAC across sub- 6GHz & above 6GHz, 802.X and macro cells (legacy)
  - “Rethinking” of fundamental areas used in previous ‘Gs’ (cell architectures, antennas, core networks, etc. -- Is it appropriate to continue to use the word “generation”?)

- Taking advantage of IEEE's overall strength with the past and current standards activities, IEEE is in an excellent position to address a number of 5G areas
  - Small cell and M2M technologies
  - Dynamic spectrum allocation
  - Fronthaul and backhaul technologies
  - IoT
  - SDN/NFV/NGSON
  - Cloud Computing
  - Disruptive Technologies
  - ...
  - .....

- IEEE already started several 5G related activities:
  - SDN/NFV related activities
  - IoT related activities
  - Activities in 802 to address several 5G areas
  - In April 2015, a “working” meeting was held to identify some initial opportunities for standardization in 5G related areas. Separate groups were formed to begin pre-standardization activities. This effort continues further
    - Channel modelling
    - Next Generation Front Haul Interface
    - Radio Analytics
    - Cloud Based Core network interfaces
- Numerous publications and conferences on 5G including IEEE 5G Summit series

- Unification of IEEE's voice in the marketplace
- Creation of a fully inclusive environment; all IEEE Societies/Councils and OU's
- Coalescing around a common framework for standards
- Delivering on a unique value proposition
- Inclusive of all diversity – Inclusive of 10 Regions
- “Coalition of the Willing”
- Drive and connect Industry, SMEs
- Neutral

- ▶ Emerging applications such as SDN/NFV, IOT, M2M, eHealth are some key drivers for 5G
- ▶ Helps to build a neutral environment involving operators, vendors, academics, regulators, and users to identify problems and propose solutions
- ▶ 5G is disruptor and creates opportunities for startups and entrepreneurs
- ▶ IEEE can drive the existing ongoing industry efforts with an all inclusive approach

- ▶ To build a vibrant 5G community that binds heavily with the IEEE
- ▶ To identify standardization opportunities and standardization gaps related to 5G
- ▶ To develop 5G products: Conferences, Publications, Education, Training, Testbeds
- ▶ To leverage IEEE's value and platform for 5G industry-wide consensus development




- ▶ To help with the creation of a vibrant 5G ecosystem (e.g., policy) toward 2020 and beyond
- ▶ To facilitate the development of 5G technical architectures
- ▶ To develop the future roadmap for the anticipated paradigm shifts (evolutionary and revolutionary)
- ▶ To lead and facilitate the 5G Technical Community

- Millimeter wave (hardware, propagation, regulation)
- End-to-End security
- Edge cloud
- Tactile internet applications (verticals)
- Resilience
- ETE latency
- Mobility
- Network anarchy/hierarchy, inter-cell coordination, etc.) NETWORK ARCHITECTURE
- Gigabit service enablement
- Sensing/Switching/Tracking

Solicit New SIGS  
from Open Call

- Publication
- Education, Conferences
- Standards
- Training
- Testbeds
- Use cases by verticals as an output?
- Interference management
- KPI's
  - Low latency
  - Resilience
  - Energy Efficiency
- Technology Challenge
- Inclusionary – All inclusive
- Roadmaps
- Recommendations for standardization

# 5G Standards/Forum Landscape

Forum	Focus
IETF	Network Virtualization Overlay, Dynamic Service Chaining, Network Service Header
3GPP	Mobility and Security Architecture and Specification
ETSI ISG / NFV	NFV Platform/Deployment Standards – Security, Orchestration, Performance and Reliability
IEEE 	5G Standardization Research Security, Reliability and Performance, SDN/NFV initiative IEEE ≥5G – All inclusive 5G Initiative
ATIS	IOT, SDN/NFV,
NGMN	Next Generation Mobile Network Consortium of 21 operators
4G/5G Americas	Advanced LTE
WWRF	Wireless World Research Forum
5G PPP	European Initiative
Open Source	OPNFV, ONLabs, ONF
ITU	IMT for 2020 and Beyond