**Study Group Leadership Assembly – Session 2: IMT-2020/5G systems - “Transport, slicing, FMC”**

**General**

Three presentations related to IMT-2020/5G systems were given. Each presentation was followed by active discussions on wide area of technical as well as non-technical issues. This report summarizes presentations and discussions.

**Presentation 1: Transport SDN to support 5G (Scott Mansfield, SG13 Vice Chair)**

After introducing Transport Network Building Blocks (SG13 and SG15), transport SDN and related ecosystem, this presentation showed that a foundation should be built through continued coordination within the 5G ecosystem.

**Questions asked for discussion:**

* What is new about the idea of Network Slicing, and how will it enable efficient build-out of networks to support ubiquitous 5G?
* What is the most important technological advancement needed to realize the promise of frictionless communication?
* What will be the regulatory impact of AI controlling the routing of traffic in global networks?
* What would be the optimal structural/procedural arrangement to continue studies on 5G in ITU-T, or are the current Questions in SGs 13 and 15 sufficient, pending their possible revision?

**Discussion**

Since the standards on transport networks involve several SGs (SG2, SG11, SG12, SG13 and SG15), importance of coordination and clear division of responsibilities among these groups were emphasized. TSAG should be used to solve this issue before WTSA-20. Technical discussion is important, but discussion on ITU-T structure is also important.

Impact of slicing on numbering/identification was asked, but need for identifying a slice should be clarified first.

Current division of SG13 and SG15 seems appropriate. However, appropriateness of SG13/SG15 work division in the era of SDN was asked since most of the network functions will be realized by software. Applicability of slicing, which is realized by software, to transport was also asked. Clarification of slicing related to functions of transport layer is necessary. Issues related to single/multi controllers and issues on single/multi layers should also be clarified.

Need for consideration of security was indicated. The meeting noted.

JCA-IMT2020 is working well connecting many related groups and promoting collaboration among these groups.

**Presentation 2: Emerging Challenges and New Research Directions: A Perspective from Network 2030 (Richard Li, Chairman, FG-NET2030)**

This presentation indicated the importance and lack of enough attention to wireline data communication networks, which should be integrated with “Space Internet”. It also showed emerging applications and new requirements (High precision in services, Holographic media, ManyNets Infrastructure, Moving beyond best effort and Advanced Access Technology). It indicated that now it is exactly the time to start off a new wave of innovations with a new data plane for wireline data communication networks and SG13 should start on data plane followed by SG11 on control plane.

**Questions asked for discussion:**

* Future user planes or data planes including its underlying technologies and solutions
* New, and better to be unified, architectures of ManyNets and Digital Twins, especially for convergence of terrestrial and satellite networks across the earth, sky and ocean
* Future Control Plane for Signaling and Control in Support of Future Data Planes
* Futuristic Media and Application-Aware Networking Technologies and Solutions

**Discussion**

Both wireless physical layer and TCP retransmit packets when packets are lost, which leads to waste of bandwidth. It is not good for IoT. VC (virtual circuit) switching, which was developed in ATM era, was suggested as an alternative, but it does not scale.

Current work division between data plane, control plane and management plane is fine. However, there will be more overlapping in future. In addition, new capabilities over networks should also be considered. Introducing “intelligence” into network is an example. This type of “new thinking” is important, in particular, for new applications.

Not all wireline networks are left behind. While the IP/MPLS network is left behind, optical networks and layer-two TSN are not. ITU-T SG15, IEEE 802.1 and IEEE 802.3 are actively developing standards on wireline, e.g., on OTN (Optical Transport Network) and TSN (Time Sensitive Network).

Considering “nano networks” was suggested. More clarification is necessary on this issue.

Importance of consideration of security was indicated. It is under consideration, but it is still very early stage.

Since future network includes many issues, which cannot be solved at once, importance of step by step approach was emphasized.

**Presentation 3: Arising Issues on Migration to IMT-2020 (Engr Charles Chike Asadu, University of Nigeria, presented by Elliot Kabalo, Q5/13 co-Rapporteur)**

This presentation showed objectives and use cases of IMT-2020 as well as the position of FGML5G on development of IMT 2020. It emphasized the importance of participation of developing countries in evolution of new technologies. It also touched radio frequency issues.

**Questions asked for discussion:**

* How many countries have approved spectrum for the trial of 5G services, particularly in developing countries
* What are the indices to determine implementation policies, projects and programmes aimed at facilitating digital revolution and inclusion in developing countries
* should operators leverage on the already existing operating license and use their current network resources to operate the 5G services, or a new license regime provided afresh for operation of 5G services
* How is the view of GSMA and GSA on the economic implication of 5G corroborated by any other body, SDO or ITU.
* Can the FGML5G hold one of its meetings in Africa.
* What is the status of 5G service radiation content

**Discussion**

It was indicated that ITU-T SG5 is working on 5G service radiation issue (EMF).

It was asked what ITU can do on regulatory issues, which are national matters. One way could be to collaborate with each country through ITU-D.

Regardless of whether in-scope or not, licensing issues are important.

To hold a meeting of FG-ML5G in Africa, which facilitates further integration of Africa into this technical area, should be considered by the FG.