ITU Standardization on 5G

In ITU, 5G technologies are discussed under the IMT-2020 banner.

BACKGROUND:

The ITU-T Focus Group on IMT-2020 (2015-2016) delivered in October 2015 a Gap Analysis document *"Report on Standards Gap Analysis"* with 85 technical areas for application of a 5G standardization efforts in the future and nine deliverables in the following areas:

- terms and definitions for IMT-2020;
- high-level network architecture for 5G; network softwarization;
- Information Centric Networking (ICN);
- Fixed and Mobile Convergence.

See a related flipbook **here**.

CURRENT 5G STANDARDIZATION ACTIVITIES IN ITU

ITU-T SG13 is leading the current studies on 5G building largely on the FG IMT-2020 results:

- **ICN:** approved Recommendation ITU-T Y.3071 *Data Aware Networking (Information Centric Networking) - Requirements and Capabilities;*
- **Network Sofwarization/MANO**: approved Y.3100-series Supplement 44 *Standardization and open source activities related to network softwarization of IMT-2020*; Recommendations ITU-T Y.3110 *IMT-2020 Network Management and Orchestration Requirements* and Y.3111 *IMT-2020 Network Management and Orchestration Framework;* developing Recommendations Y.3MO on *Requirements and Architectural Framework of Multi-layer, Multi-Domain, Multi-Technology Orchestration*, Y.amc *on Requirements and Architectural Framework for Autonomic Management and Control of Future Networks,* Y.IMT2020-NetSoft *on High level technical characteristic of network softwarization for IMT-2020;*
- **Definitions:** approved Recommendation ITU-T Y.3100 *Terms and definitions for IMT-2020 network;*
- **Slicing:** developing Recommendations Y.IMT2020-MultiSL on *Framework for the support of Multiple Network Slicing* and Y.NSOM *on Network slicing orchestration and management*
- **QoS:** developing Recommendation Y.IMT-2020.qos-mon *IMT-2020 network QoS monitoring architectural framework*
- **5G network ecosystem and architecture:** developing Recommendations Y.IMT2020-reqts, Y.IMT2020-frame, Y.IMT2020-arch *on requirements, framework and architecture for IMT-2020 network,* Y.IMT2020-BM *on business models of IMT-2020;*
- **Network capability exposure:** progressing Recommendations Y.IMT2020-CE-Req, Y.IMT2020-CEF *on requirements and network capability exposure function in IMT-2020 networks;*
- **FMC:** developing Recommendations Y.FMC-REQ on *Requirements of IMT-2020 fixed-mobile convergence,* Y.FMC-ARCH *on Functional architecture for supporting fixed mobile convergence in IMT-2020 networks*, Y.FMC-MM *on Mobility management for*

fixed mobile convergence in IMT-2020 networks, Y.MM-RN on *Mobility management framework over reconfigurable networks* and Y.FMC-MO-req *on IMT-2020 FMC functional requirements for management and orchestration*

In addition, some earlier achievements include Recommendation ITU-T Y.3033 *Framework of data aware networking for future networks* and Supplement 35 to Y.3300-series on *Data-aware networking — scenarios and use-cases.*

SG13 has also developed an **action plan on 5G standardization**, which can be downloaded from the SG13 homepage: http://itu.int/en/ITU-T/studygroups/2017-2020/13

See the updated **SG13 work programme** at:
https://www.itu.int/itu-t/workprog/wp_search.aspx?sg=13

ITU-R WP 5D is the group responsible for the overall radio system aspects of the terrestrial component of International Mobile Telecommunications (IMT) systems, comprising the current IMT-2000, IMT-Advanced and IMT-2020. The detailed technical specifications for ITU's IMT-2020 standards (5G) are developed in close collaboration with the leading national, regional and international radio standards development organizations. The ITU-R WP5D complements the ITU-T SG13 studies with the approved ITU-R Recommendations:

- ITU-R M.2083 *(IMT Vision) on Framework and overall objectives of the future development of IMT for 2020 and beyond;*
- ITU-R M.2101-0 *on modelling and simulation of IMT networks for use in sharing and compatibility studies;*

And the approved ITU-R Reports:

- ITU-R M.2370 *on IMT traffic estimates beyond year 2020*;
- ITU-R M.2373 *on interactive unicast and multicast audio-visual capabilities and applications provided over terrestrial IMT systems*;
- ITU-R M.2376-0 *on Technical feasibility of IMT in bands above 6 GHz;*
- ITU-R M.2375 *on architecture and topology of IMT networks;*
- ITU-R M.2291-1 *on the use of IMT for broadband public protection and disaster relief applications.*

Studies and works are in progress to develop Recommendation ITU-R M.[IMT-2020.SPECS] *on the detailed specification of each of IMT-2020 technology* and Reports ITU-R M.[IMT-2020. TECH PERF REQ] *on the technical performance requirements expected of a technology to satisfy IMT-2020*, ITU-R M.[IMT-2020. EVAL] *on the evaluation criteria and evaluation methods for IMT-2020 technology,* ITU-R M.[IMT-2020. SUBMISSION] *on the specific requirements of the candidate technology related to submission, the evaluation criteria and submission templates* and ITU-R M.[IMT-2020.OUTCOME] *on the outcome of the evaluation and assessment and the statement on those candidate technologies suitable to move to the specification phase in ITU-R.*

See ITU-R WP5D home page at: http://itu.int/en/ITU-R/study-groups/rsg5/rwp5d
ITU-R approved Recommendations: http://www.itu.int/rec/R-REC-M/en
ITU-R approved Reports http://www.itu.int/pub/R-REP-M/en

Also, **ITU-T SG15** develops standards on transport networks, which can be used for fronthaul, middlehaul, backhaul and other parts of IMT-2020/5G networks. In particular, the following documents were recently approved or are under development:

– ITU-T G Suppl.55 *Radio-over-fibre (RoF) technologies and their applications* (approved in July 2015)
– ITU-T G Suppl.56 *OTN transport of CPRI signals* (approved in February 2016)
– Recommendation ITU-T G.RoF *Radio over Fiber systems* (under development)
– Technical report on *Transport network support of IMT-2020/5G* (under development)

See the updated **SG15 work programme** at:
https://www.itu.int/itu-t/workprog/wp_search.aspx?sg=15

In addition **ITU-T SG5** developed a *Technical Report on "Study on methods and metrics to evaluate energy efficiency for future 5G systems* and is currently developing a series of technical reports and international standards that will study the following environmental aspects of 5G:

– Electromagnetic compatibility (EMC);
– Electromagnetic fields (EMF);
– Energy feeding and efficiency; and
– Resistibility.

See the updated **SG5 work programme** at:
https://www.itu.int/itu-t/workprog/wp_search.aspx?sg=5

Finally **ITU-T SG11** is currently developing standards related to protocols to be used in 5G-based networks. SG11 approved the following Recommendations about 5G technologies:

– ITU-T Q.3051 *Signalling architecture for the control plane of distributed service networking*;
– ITU-T Suppl.67 *Framework of signalling for software-defined networking*;
– ITU-T Q.3315 *Signalling requirements for flexible network service combination on broadband network gateway*;
– ITU-T Q.3711 *Signalling requirements for software-defined broadband access network*;
– ITU-T Q.3712 *Scenarios and signalling requirements of unified intelligent programmable interface for IPv6*;
– ITU-T Q.3713 *Signalling requirements for broadband network gateway pool*;

ITU-T SG11 is actively working on several draft new Recommendations on 5G protocols, including:

– Q.NS-LCMP *Protocol for network slice lifecycle management*;
– Q.PVMapping *Signalling Requirements for Mapping between Physical and Virtual Networks*;
– Q.SCO *Scenarios and signalling requirements for SDN based Central Office*;
– Q.SMO *Signalling requirements of Software-defined Metro Orchestration*;
– Q.BNG-IAP *Signalling requirements of IP address pool based on broadband network gateway by SDN technologies*;
– Q.BNG-DBoD *Signalling requirements for dynamic bandwidth adjustment on demand on broadband network gateway implemented by SDN technologies*;
– Q.NEA-REQ *Signalling Requirements of NFV Entity Management for Network Attachment*;

– Q.SAN-MIM *Signalling requirements of SDN-based access networks with media independent management capabilities*.

See the updated **SG11 work programme** at:
https://www.itu.int/itu-t/workprog/wp_search.aspx?sg=11