

**ITU-T**

***"Regional Workshop on New Technologies"***  
***Algiers – Algeria, 14-15 February 2018***

**Role of SG 13**  
**in IMT2020 definition**  
**and progress so far**

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**SG13/WP1 Co-Chairman**



# Content

- General context of IMT2020
- Role of WP1/13 in 5G game
- IMT2020/5G activities in ITU-T/SG13:
  - Structure of WP1
  - Commitment of WP1 questions in IMT2020 development and outcome as for today
  - Structuring the deliverables
  - Evolution plan
- Wrap-up

# IMT2020: the challenge and the role of SG13

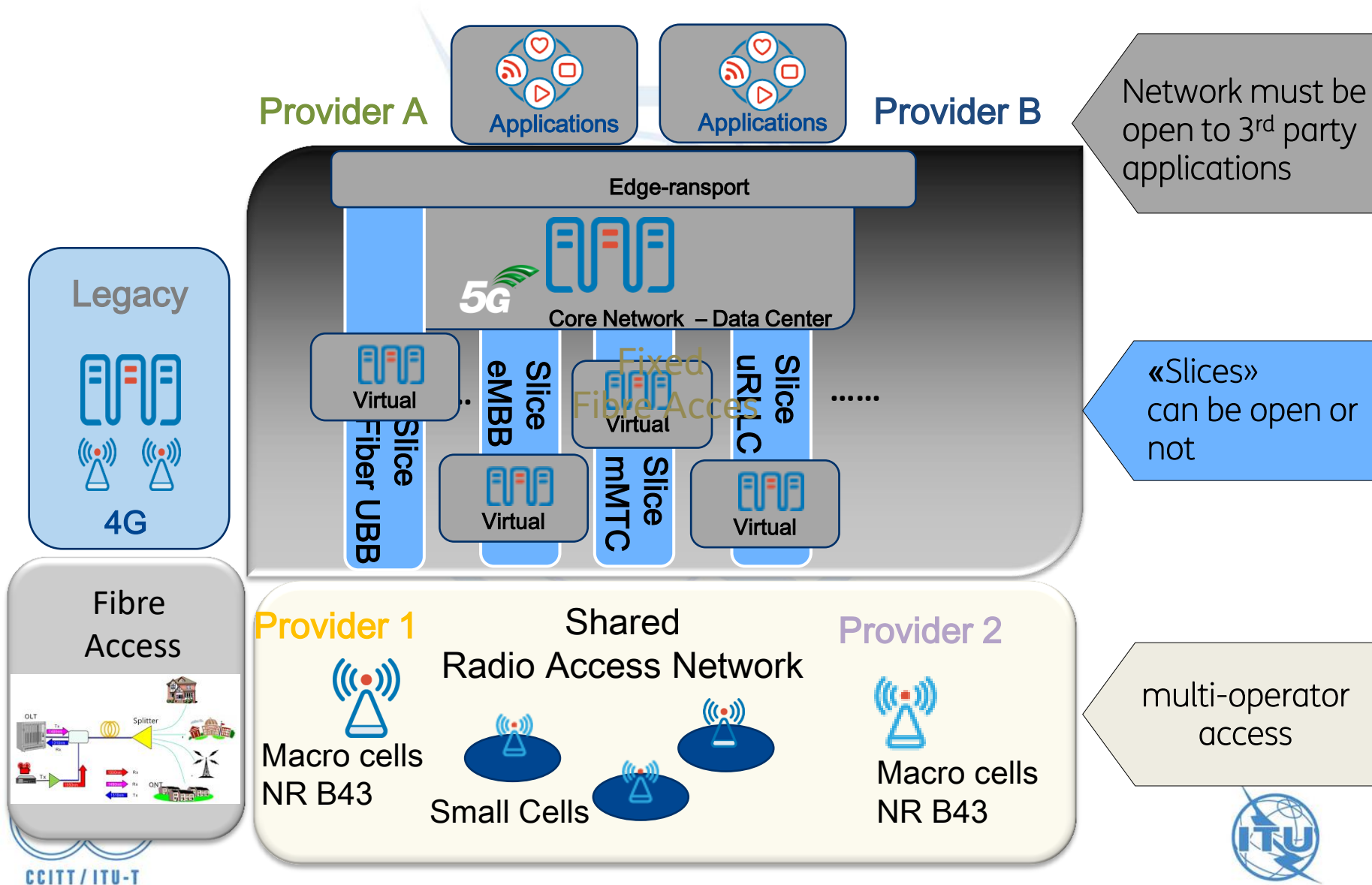
IMT2020 multidirectional transformation involving :

- Network softwarisation to go beyond NFV and extend its effects
- New Core interfacing with fixed access also
- Backhaul and fronthaul based architectures to optimise performance
- Cloud becoming integrated in the network to implement virtualised services as close to the final user as possible
- Optimise the architecture to support IoT, V2X, V2V ...
- Increase QoS for video driven market

WP1/13 created to study IMT2020 in SP 2017-2020 and deliver requirements & architecture and terminology considering work done and further developments in other SGs

- Focus on general architecture and requirements and on selected areas as:
  - Network softwarization and slicing
  - New networking technologies for improved performance
  - FMC, cloud based and in coordination with other relevant groups
  - Service quality in 5G scenario of all-connected world

# Requirements and Architecture for a softwarized and convergent multi-slice network



# WP1/13 Structure and Focus

## Who does what on IMT2020

Question	Title
Q6	Quality of service (QoS) aspects including IMT-2020 networks
	Continuation of Q6/13 from the last study period and QoS for 5G
Q20	IMT-2020: Network requirements and functional architecture
	Transformation from Architecture WG of FG IMT-2020
Q21	Network softwarization including software-defined networking, network slicing and orchestration
	Continuation of Q. 14/13 and 12/13 from the last study period
	Transformation from Softwarization WG and Network Management WG of FG IMT-2020
Q22	Upcoming network technologies for IMT-2020 and Future Networks
	Continuation of Q. 13/13 and 15/13 from the last study period
	Transformation from ICN WG of FG IMT-2020
Q23	Fixed-Mobile Convergence including IMT-2020
	Continuation of Q 4/13, 9/13 and 10/13 from the last study period
	Transformation from FMC WG of FG IMT-2020





# Q20/13 work: The beginning

Consented back in November, Requirements are the beginning of everything.

- Revisions foreseen when new aspects emerge from the other Questions
- A common language is essential and terms & definitions living document is an essential glue for the whole IMT2020 (and 5G) work

## Documents

- Y.3101  
“Requirements of IMT-2020 network”
- Y.3100  
“Terms and definitions for IMT-2020 network”

‘Coming soon’:

- Y.IMT2020-frame, “Framework of IMT-2020 network” (Apr)
- Y.IMT2020-BM, “Business models of IMT-2020” (Apr)
- Y.IMT2020-arch, “Architecture of IMT-2020 network” (Nov)

*The*  
**BEGINNING**  
*OF*  
**SOMETHING**  
*Amazing*

# Q21: softwarisation

A true



in networks

Status of 5G related activities

Q21: Produced RECs and drafts under development



Y.3110,  
"IMT-2020 Network Management  
Requirements"

Y.3111,  
"IMT-2020 Network Management Framework"

Y.3150,  
"High level technical characteristics of network  
softwarization for IMT-2020"

Y.3MO,  
"Requirements and Architectural Framework of  
Multi-layer, Multi-Domain, Multi-Technology  
Orchestration"

Y.IMT2020-MultiSL,  
"Framework for the support of Multiple  
Network Slicing"

Y.3amc,  
"Requirements and Architectural Framework  
for Autonomic Management and Control of  
Future Networks"

Y.NSOM,  
"Network slicing orchestration and  
management"

Y.IMT2020-ADPP,  
"Advanced Data Plane Programmability for IMT-  
2020"

# Q22/13 new networking technologies:

## Another revolution?!!

it's **our**  
revolution  
too

Bring into IMT2020 the work carried on also in IRTF to match networking technology to the characteristics needed for improved content delivery, coping with users mobility

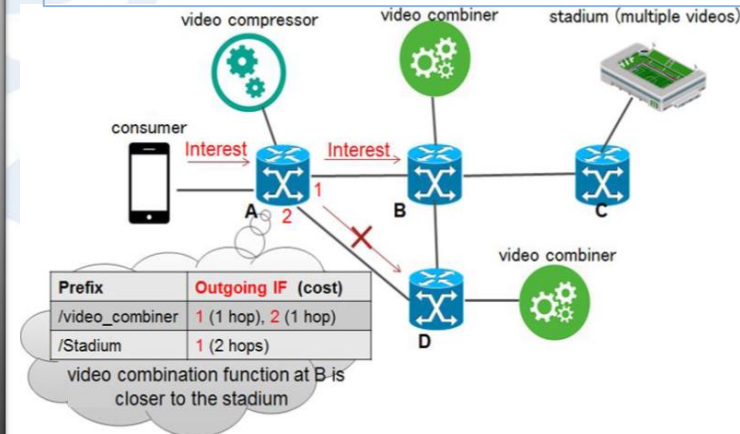
Delivered documents

Y.3071, "Data Aware Networking (Information Centric Networking) - Requirements and Capabilities"

- Y.3070-series supplement Information-Centric Networking - Overview, Standardization Gaps and Proof-of-Concept
- Y.ICN-ReqN Requirements on ICN naming and name resolution (11-2018)
- Y.ICN-DS-framework Framework for directory service for management of a huge number of heterogeneously named objects in IMT-2020 (11-2018)
- Y.SuppICN-PoC-DaaS PoC for IoT Data as a Service using ICN in IMT-2020 (4-2018)
- Y.ICN-FnChain Framework for service function chaining in ICN

Example:

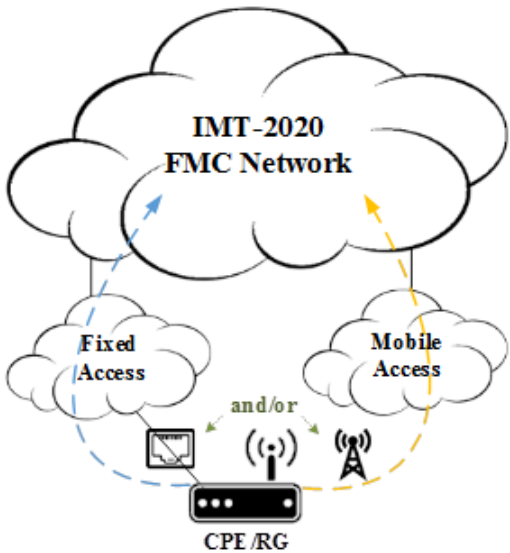
- **Wireless Loss Detection and Recovery (WLDR)**
  - Signalling on eNodeB to manage media flow
  - From Demos last year





# Q23/13 cloud solutions for FMC

Delivered documents  
 Y.3130, "Requirements of  
 IMT-2020 fixed- mobile  
 convergence"



<a href="#">Y.FMC-ARCH</a>	Functional architecture for supporting fixed mobile convergence in IMT-2020 networks	2018-11
<a href="#">Y.FMC-MM</a>	Mobility management for fixed mobile convergence in IMT-2020 networks	2019
<a href="#">Y.FMC-CE</a>	Capability exposure enhancement for supporting FMC in IMT-2020 network	2019
<a href="#">Y.FMC-ReqMO</a>	IMT-2020 FMC functional requirements for management and orchestration	2018-11
<a href="#">Y.MM-RN</a>	Mobility management framework over reconfigurable networks	2018-11
<a href="#">Y.FMC-SS</a>	Service scheduling for supporting FMC in IMT-2020 network	2019

# Q6/13: QoS (also) for 5G

- Not only high bandwidth and better terminals, QoS is tightly bond to network control
- Diferentiated QoS in 5G scenarios requires adaptive behaviour of the network



- Y.IMT-2020.qos-mon IMT-2020 network QoS monitoring architectural framework
- Y.qos-ml Requirements of machine learning based QoS assurance for IMT-2020

# Try to make the deliverables more usable: Technical Packages



# Try to make the deliverables more usable: Technical Packages

TP SOFTWAREZIZATION			
Area	Full title of document	Status (Nov.)	Approved/Planned
Terms & definitions	Y.3100, "Terms and definitions for IMT-2020 network"	Published	13 September 2017
Management framework	Y.3111, "IMT-2020 Network Management Framework"	Published	13 September 2017
Management requirements	Y.3110, "IMT-2020 Network Management Requirements"	Published	13 September 2017
Activity report – NW SWarisation Supplement	Y.3100-series Supplement 44, "Standardization and open source activities related to network softwarezization of IMT-2020"	Published	14 July 2017
Frameworks	Y.IMT2020-frame, "Framework of IMT-2020 network"	Ongoing	Apr-2018
Requirements	Y.3101, "Requirements of IMT-2020 network"	Consented	17 Nov-2017
Architecture	Y.IMT2020-arch, "Architecture of IMT-2020 network"	Ongoing	Nov-2018
Orchestration for slices	Y.NSOM, "Network slicing orchestration and management:"	Ongoing	Apr-2018
Framework for multiple slice support	Y.IMT2020-MultiSL, "Framework for the support of Multiple Network Slicing"	Ongoing	Jul-2018
Requirements of network capability exposure	Y.IMT2020-CE-Req, "Requirements of network capability exposure in IMT-2020 networks"	Ongoing	Nov-2018
Potential directions	Y.3150, "High level technical characteristic of network softwarezization for IMT-2020"	Consented	17 Nov-2017
	Y.AMC, "Requirements and Architectural Framework for Autonomic Management and Control of IMT-2020 Networks"	Ongoing	Jul-2018
	Y.IMT2020-ADDP, "Advanced Data Plane Programmability for IMT-2020"	Ongoing	2019
	Y.IMT2020-CEF, "Network capability exposure function in IMT-2020 networks"	Ongoing	2019
	Y.IMT2020-BM, "Business models of IMT-2020"	Ongoing	Apr-2018

# Try to make the deliverables more usable: Technical Packages

TP SOFTWAREZIZATION			
Area	Full title of document	Status (Nov.)	Approved/Planned
<b>TP FMC</b>			
Area	Full title of document	Status (July 17)	Approved/Planned
Requirements for FMC	Y.3130, "Requirements of IMT-2020 fixed- mobile convergence"	Consented	17 Nov-2017
Arch for FMC	Y.FMC-ARCH Functional architecture for supporting fixed mobile convergence in IMT-2020 networks	Ongoing	Nov-2018
Mobility management	Y.MM-RN - Mobility management framework over reconfigurable networks	Ongoing	Nov-2018
Mobility management	Y.FMC-MM - Mobility management for fixed mobile convergence in IMT-2020 networks	New WI	2019
Requirements on mgm	Y.FMC-MO-req, "IMT-2020 FMC functional requirements for management and orchestration"	New WI	Nov-2018
Service scheduling	Y.FMC-SS, "Service scheduling for supporting FMC in IMT-2020 network"	New WI	2019
Capability exposure	Y.FMC-CE, "Capability exposure enhancement for supporting FMC in IMT-2020 network"	New WI	2019
	IMT-2020 networks		
	Y.IMT2020-ADDP, "Advanced Data Plane Programmability for IMT-2020"	Ongoing	2019
	Y.IMT2020-CEF, "Network capability exposure function in IMT-2020 networks"	Ongoing	2019
	Y.IMT2020-BM, "Business models of IMT-2020"	Ongoing	Apr-2018



# Try to make the deliverables more usable: Technical Packages

TP SOFTWAREZIZATION			
Area	Full title of document	Status	Approved/
<b>TP ICN</b>			
Area	Full title of document	Status (Nov'17)	Approved/Planned
Data Aware Networking	Y.3071, "Data Aware Networking (Information Centric Networking) - Requirements and Capabilities"	Published	29 March 2017
ICN	Y.3070-series supplement "Information-Centric Networking - Overview, Standardization Gaps and Proof-of-Concept"	Ongoing	Apr-2018
	Y.ICN-FnChain "Framework for service function chaining in ICN"	Ongoing	Nov-2018
	Y.ICN-ReqN "Requirements of ICN naming and name resolution in IMT- 2020"	Ongoing	Nov-2018
	Y.ICN-DS-framework "Framework for Directory Service for Management of a Huge Number of Heterogeneously Named Objects in IMT-2020"	Ongoing	Nov-2018
	Y.SuppICN-PoC-DaaS "PoC for IoT Data as a Service using ICN in IMT- 2020"	Ongoing	Apr-2018
Capability exposure	network"		
	IMT-2020 networks		
	Y.IMT2020-ADDP, "Advanced Data Plane Programmability for IMT-2020"	Ongoing	2019
	Y.IMT2020-CEF, "Network capability exposure function in IMT-2020 networks"	Ongoing	2019
	Y.IMT2020-BM, "Business models of IMT-2020"	Ongoing	Apr-2018

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TP SOFTWAREIZATION			
Area	Full title of document	Status	Approved/
<b>TP ICN</b>			
Area	Full title of document	Status (Nov'17)	Approved/Planned
Data Aware Networking	Y.3071, "Data Aware Networking (Information Centric Networking) - Requirements and Capabilities"	Published	29 March 2017
ICN	Y.3070-series supplement "Information-Centric Networking - Overview,	Ongoing	Apr-2018
<b>TP QoS (TBC)</b>			
Area	Full title of document	Status (Nov'17)	Approved/Planned
QoS	IMT-2020 network QoS monitoring architectural framework	Ongoing	Jul-2018
	Y.SuppICN-PoC-DaaS "PoC for IoT Data as a Service using ICN in IMT- 2020"	Ongoing	Apr-2018
Capability exposure	network"		
	IMT-2020 networks		
	Y.IMT2020-ADDP, "Advanced Data Plane Programmability for IMT-2020"	Ongoing	2019
	Y.IMT2020-CEF, "Network capability exposure function in IMT-2020 networks"	Ongoing	2019
	Y.IMT2020-BM, "Business models of IMT-2020"	Ongoing	Apr-2018

# Try to make the deliverables more usable: Technical Packages

## TP SOFTWAREZIZATION

Area

Full title of document

Status

Approved/

### Collaboration & coordinations

The work needed to develop IMT2020 is big and challenging

- Collaboration within WP1 is absolutely a must, and TPs also represent a result of such collaboration
- It is important also to cooperate with other SGs in ITU-T and with ITU-R that are stake holders of 5G
  - External groups need to be followed attentively and coordination with them is very important too
- WP1 has established a relationship with 3GPP SA2 and BBF to understand the chances to coordinate and address coherently the aspects related FMC, with making the respective architectures compatible with proper interfaces

# Future activity plan

- The FMC topic will become more important with the progress of work also in 3GPP and in the BBF
  - More effort on it will be needed soon
- A take off in the definition of ICN technologies is needed and an increase of effort on softwarization aspects can be foreseen (extension of orchestration, slice and multislice management further evolution...)
- Technical Packages will need glue to create a real value added to the single documents
  - When a critical mass of document is reached the glue will be needed
- Network management aspects study will be fostered by the first outcomes of FG ML. Sensitive progress can be expected there

# Wrap-Up

- **IMT 2020 standards have now been in SG13 (and ITU-T in general) focus for more than two years**
- **The first documents on requirements and architecture for IMT2020 have now been published and SG13 Technical Packages are progressing well**
- **From these first document the need for a big effort on protocols emerges quite clearly, with important involment of SG11 and other**
- **Collaboration and sync between different SGs is essential**
- **In 5G standardisation scenario 3GPP is the reference group, need to align to its pace to play a role !**



# Wrap-Up

- IMT 2020 standardisation has been in SG13 (and ITU-T in general) focus for the last 2 years
- The first document on end-to-end architecture for IMT2020 was approved in SG13 and SG13 Technical Group 1
- From the beginning, a big effort on protocols and standards development is important
- Collaborative work between different SGs is essential
- In 5G standardisation, ITU-T is the reference group, need to align to its pace to play a role !



# Thank

# you!

# QUESTIONS?