An effort to make the 5th Generation Fixed Network become real: ISG F5G

Presented by: **Luca Pesando (Chair of ISG F5G)**

December 6, 2020

Fibre technology Fifth Generation
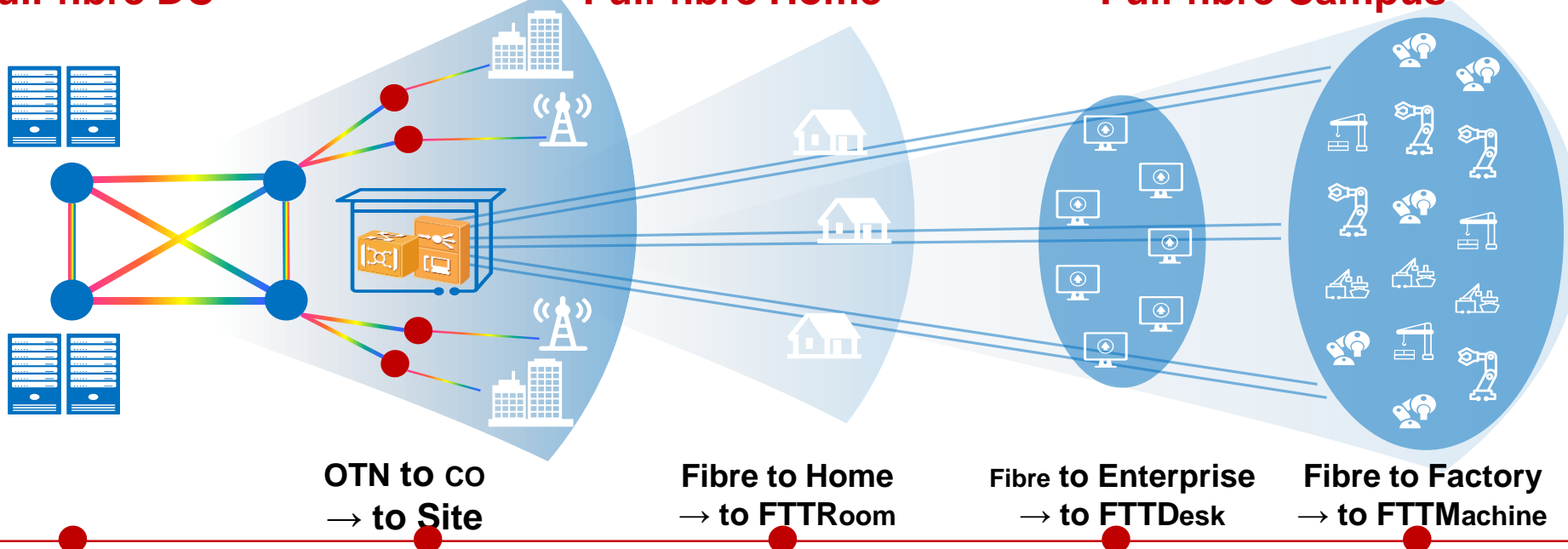
Needed for fibre to make 5G deployment possible… …and not only

Full-fibre DC   **Full-fibre Home**   **Full-fibre Campus**

F5G

OTN to CO
→ **to Site**

Fibre to Home
→ **to FTTRoom**

Fibre **to Enterprise**
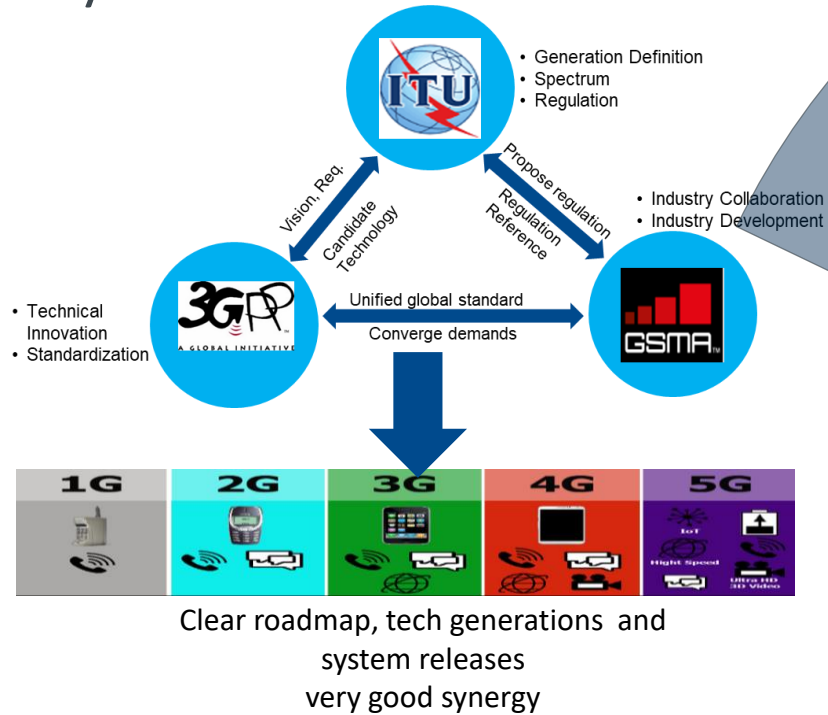→ **to FTTDesk**

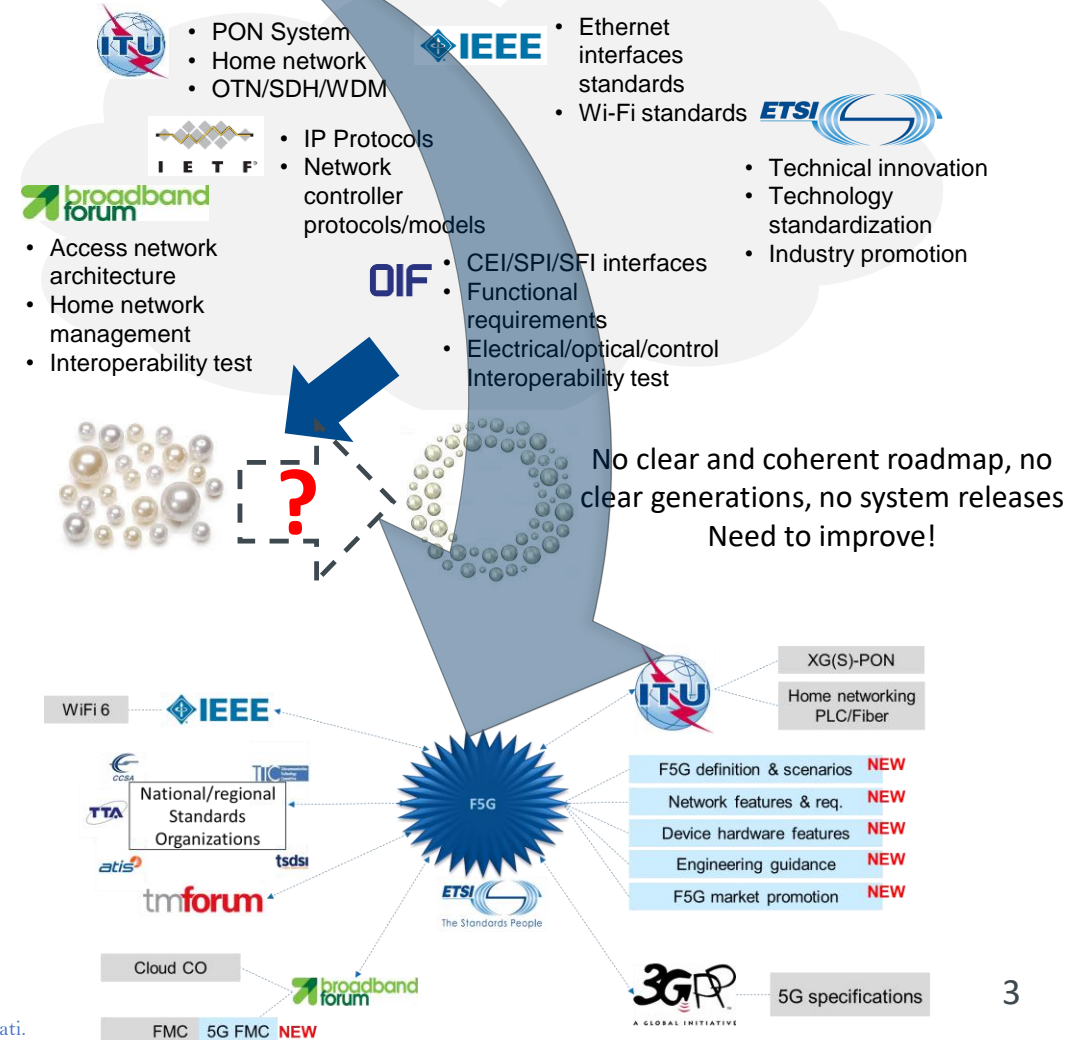**Fibre to Factory**
→ **to FTTMachine**

Fibre to provide services to the end users matching the requirements of new applications

Learning from Mobile: improving the standard process in Fixed Networks

Mobile World: Sync'ed Work of few entities

- Generation Definition
- Spectrum
- Regulation

- Technical Innovation
- Standardization

Unified global standard
Converge demands

- Industry Collaboration
- Industry Development

Vision, Req. Candidate Technology
Propose regulation
Regulation Reference

1G 2G 3G 4G 5G

Clear roadmap, tech generations and system releases
very good synergy

Fixed World: Scattered Efforts and loose Coordination

ITU
- PON System
- Home network
- OTN/SDH/WDM

IEEE
- Ethernet interfaces standards
- Wi-Fi standards

IETF
- IP Protocols
- Network controller protocols/models

broadband forum
- Access network architecture
- Home network management
- Interoperability test

OIF
- CEI/SPI/SFI interfaces
- Functional requirements
- Electrical/optical/control Interoperability test

ETSI
- Technical innovation
- Technology standardization
- Industry promotion

?

No clear and coherent roadmap, no clear generations, no system releases
Need to improve!

WiFi 6 IEEE

CCSA TIC
TTA
National/regional Standards Organizations
atis tsdsi

tmforum

ETSI
The Standards People

ITU
XG(S)-PON
Home networking PLC/Fiber

F5G

F5G definition & scenarios NEW
Network features & req. NEW
Device hardware features NEW
Engineering guidance NEW
F5G market promotion NEW

Cloud CO

broadband forum
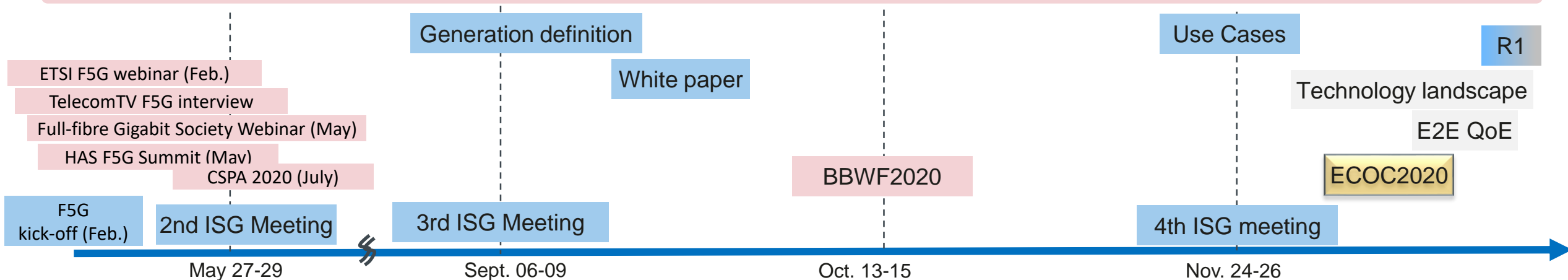FMC 5G FMC NEW

3GPP
5G specifications
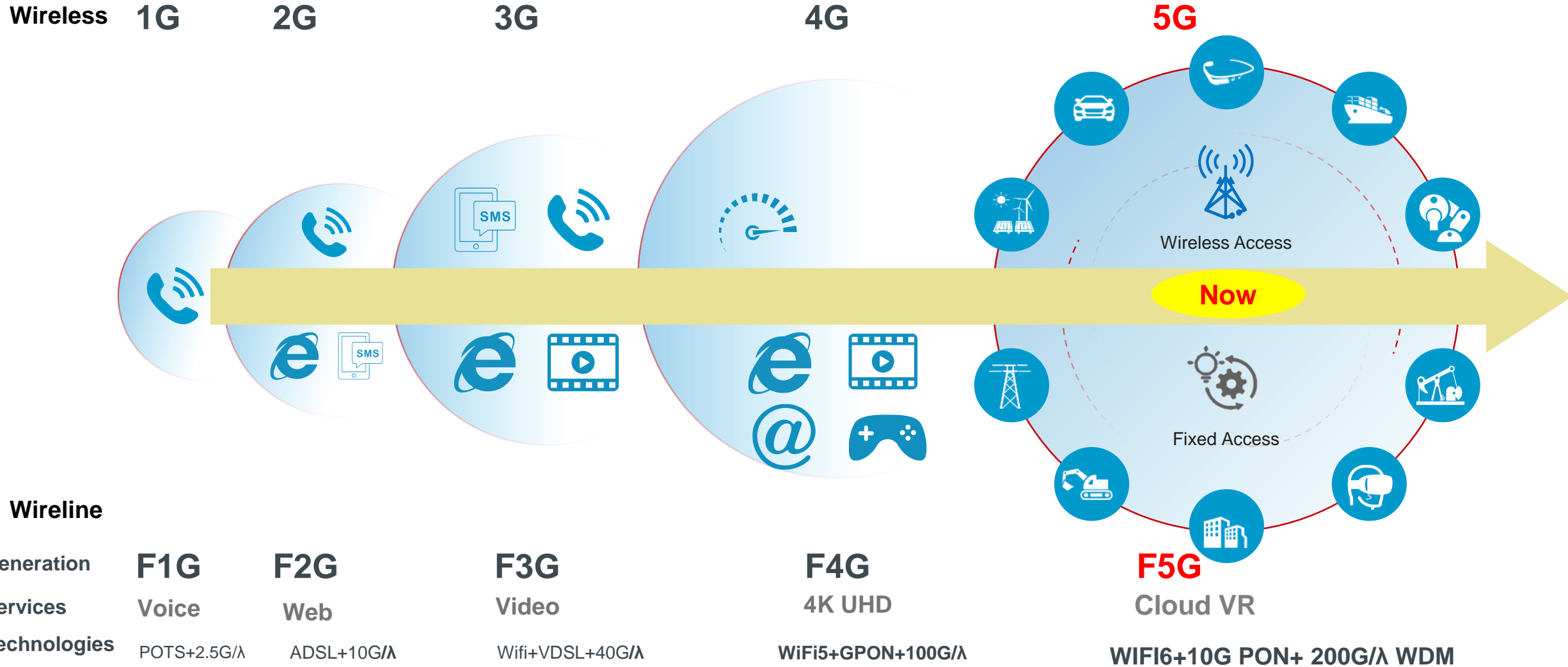
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ISG F5G snapshot

ETSI

Membership: increasing from 10 founding members in Feb to 58 in Dec 2020

Work Plan: 3 documents finalized (WP and 2 deliverables) 2 more in progress for R1 (target 2020)

Timeline labels:
- Generation definition
- Use Cases
- R1
- ETSI F5G webinar (Feb.)
- White paper
- Technology landscape
- TelecomTV F5G interview
- Full-fibre Gigabit Society Webinar (May)
- E2E QoE
- HAS F5G Summit (Mav)
- CSPA 2020 (July)
- BBWF2020
- ECOC2020
- F5G kick-off (Feb.)
- 2nd ISG Meeting
- 3rd ISG Meeting
- 4th ISG meeting
- May 27-29
- Sept. 06-09
- Oct. 13-15
- Nov. 24-26

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Identifying Generations for Fixed Network

Wireless

1G 2G 3G 4G **5G**

Wireless Access

Now

Fixed Access

Wireline

Generation	**F1G**	**F2G**	**F3G**	**F4G**	**F5G**
Services	Voice	Web	Video	4K UHD	Cloud VR
Technologies	POTS+2.5G/λ	ADSL+10G/λ	Wifi+VDSL+40G/λ	WiFi5+GPON+100G/λ	WIFI6+10G PON+ 200G/λ WDM

F5G together with 5G as cornerstones for new digital world

F5G: what does the new generation deliver

Represent the most important features in a 3 dimensional space:

- eFBB (enhanced Fixed BB): BB Line technology performance

- GRE (Guaranteed Reliable Experience): Service supported by minimum guaranteed latency

- FFC (Full Fibre Connectin density)

More parameters can be considered (Energy Efficiency, Availability, Reliability, Spectrum Efficiency, Ceverage…) in a poligonal representation

Genereations are spheres of increasing radius
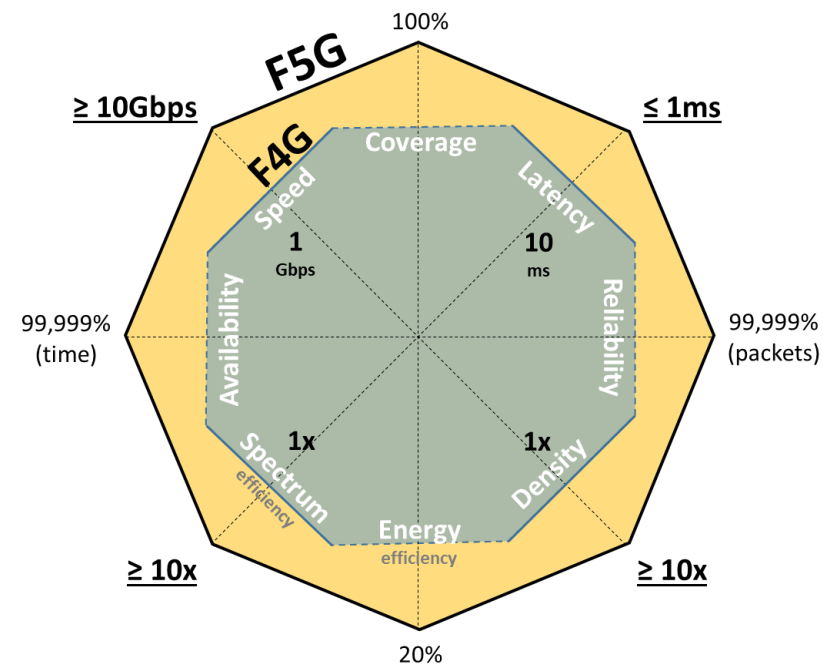
F5G White Paper published by ETSI

Contents

https://www.etsi.org/technologies/fifth-generation-fixed-network-f5g

https://www.etsi.org/media-library/white-papers

Use Cases

14 Accepted Use Cases for R1

Enhanced Fixed Broadband (eFBB)
Speed

Scenario based broadband

Extend PON to legacy Ethernet Uplink

Multiple Access Aggregation over PON incl. 5G X-Haul

Low cost private line for SMEs

Passive optical LAN

Cloud Virtual Reality

Digitalized ODN

Enhanced traffic monitoring and network control in Intelligent Access Network

PON for City Public Service

On Demand High Quality Transport for Real time application

PON for Industrial Internet

High Quality Private Line

PON on-premises

Remote Attestation

Full-fiber connection (FCC)
Density
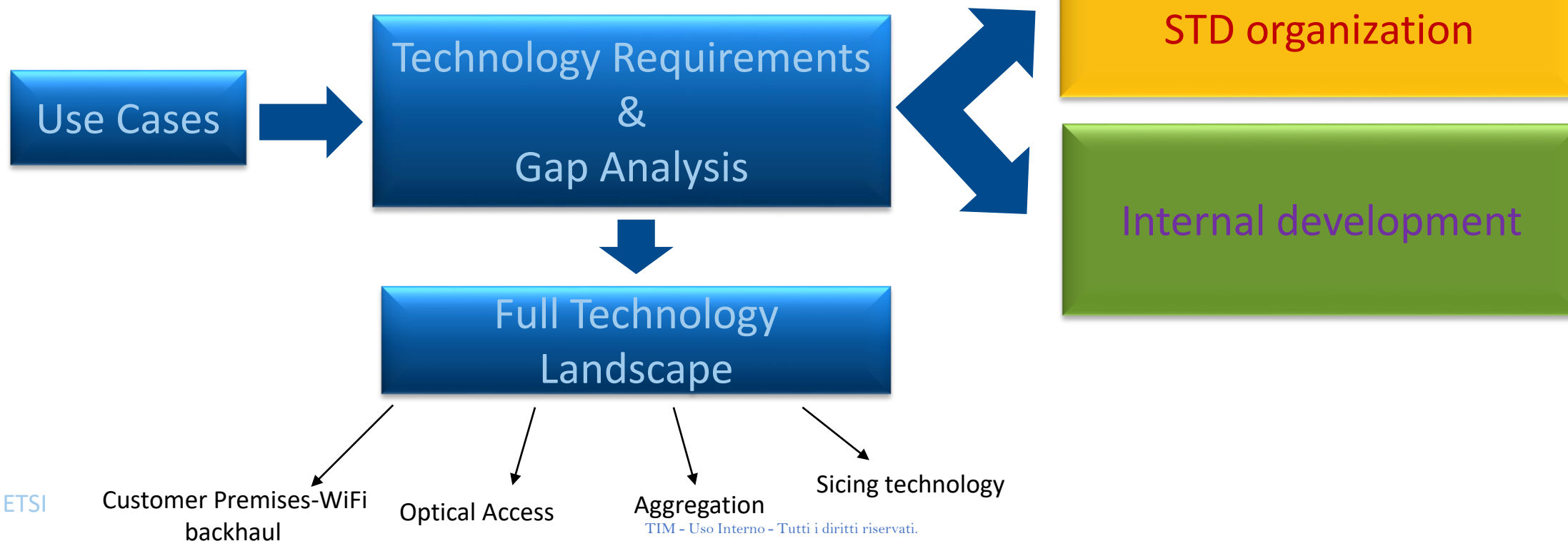
Guaranteed Reliable Experience (GRE)
Latency

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The Technology Landscape deliverable

PON on premises
Extending the reach of PON to the customer premises network: FTTRoom-POL

- Reduced split ratio→Reduced power budget
- Shorter distance (max 1km)→cheaper Tx/Rx

- IEEE
- ITU-T
- ………

Use Cases → **Technology Requirements & Gap Analysis**

Technology Requirements & Gap Analysis ↗ **Contribution to relevant STD organization**

Technology Requirements & Gap Analysis ↘ **Internal development**

Technology Requirements & Gap Analysis ↓ **Full Technology Landscape**

Full Technology Landscape →
- Customer Premises-WiFi backhaul
- Optical Access
- Aggregation
- Sicing technology

Moving forward

Ongoing and short-medium term

- Group Specification on **Technology Landscape (Gap Analysis and Requirements)** and GS on **Quality of Experience** for R1

- Group Specifications on **F5G Architecture** and on **E2E Management** (R2)

- Group Report on **Use Cases and Technology Landscape** for **vertical industrial scenarios** (Industrial PON)

- **PoC** based on the use cases (and requirements) to be defined and started in Q1 2021, then becoming a permanent and continuously evolving activity

Long Term

- More verticals in detail

- Evolution to next generations

Thank you!

Together, we make it happen.