

5G Applications

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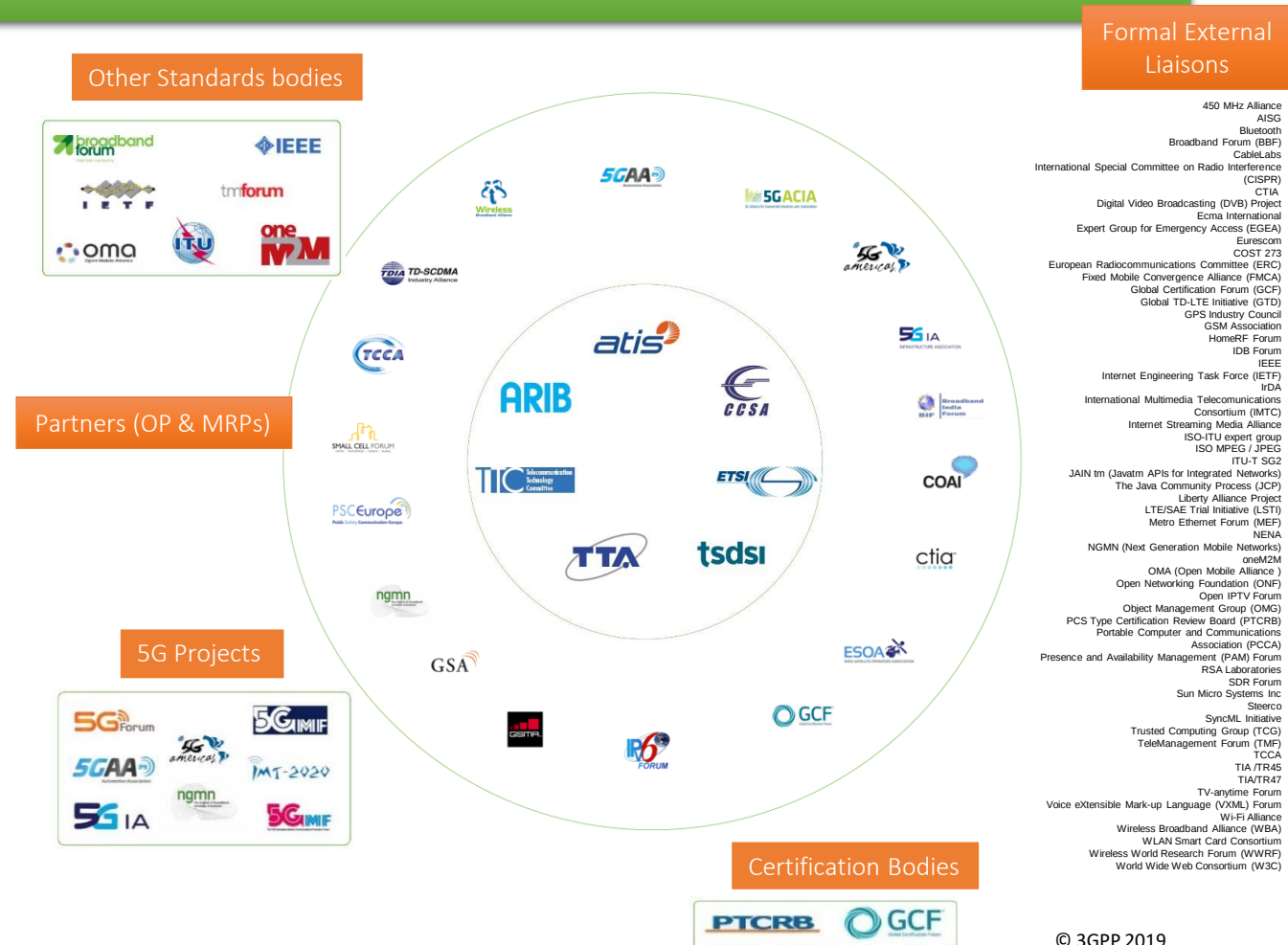
3GPP standards eco-system



Participation in 3GPP is made possible by companies and organizations becoming members of one of the 3GPP **Organizational Partners**, the seven Standards Developing Organizations (SDOs) - from China, Europe, India, Japan, Korea and the United States.

Specific inputs, in the form of market requirements may also come in to the Project via any of the 18 **Market Representation Partners** in 3GPP. These organizations have all signed up to the 3GPP Project scope and objectives.

There is also a lot of external cooperation with other standards bodies and a broad variety of other groups, by way of formal Liaisons.



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3GPP
A GLOBAL INITIATIVE

[illegible]

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Multiple breakthrough technologies



Perfect storm of :

- Low latency radio with fully flexible network
- Artificial Intelligence and Automation
- Device revolution for AR/VR
- Vertical industries going cellular



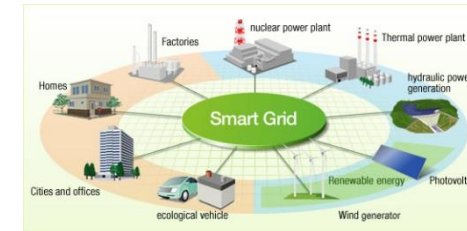
Is it just the same old faces?

3GPP Members now include, for example:

- **Agricultural** machinery manufacturers (e.g., John Deere, Husqvana, etc)
- **Automotive** manufactures (e.g, Volkswagen, Volvo, Toyota)
- **Rail** (e.g., Internationale Union of Railways)
- **Factory Automation** companies (e.g., Siemens)
- **Energy** Sector (e.g., Legrand)
- **Environment** (e.g., Veolia)
- **Broadcasting** Community (e.g., EBU, BBC, TDF)
- **Satellite** Community (e.g., ESO, Inmarsat)
- **Aerospace** (e.g., Lockheed Martin, BAE)
- **Retail** Sector (e.g., Alibaba)
- **Social Media** (e.g., Facebook)
- **Advertising** (e.g., Google)

Full listing available here:

<http://www.3gpp.org/about-3gpp/membership>



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Where are we now on 5G?

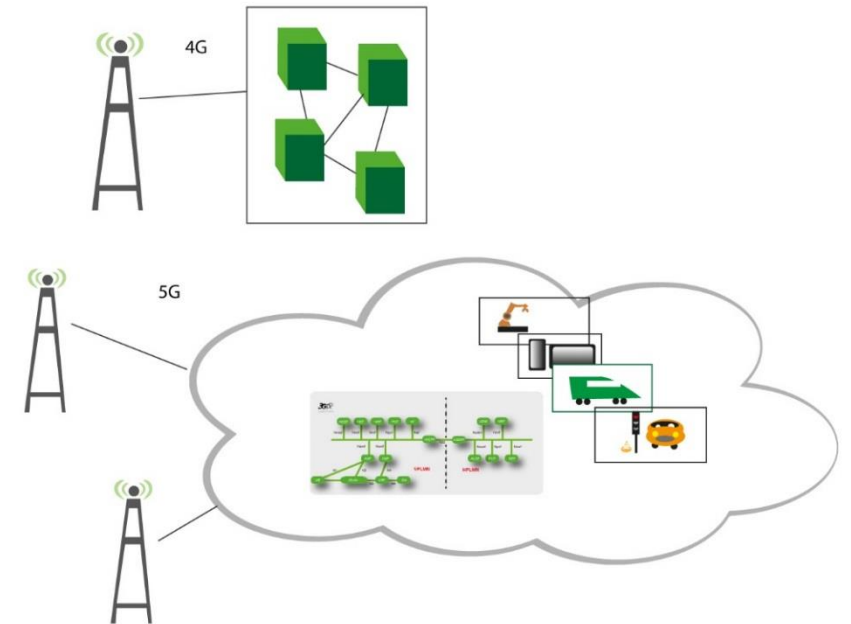


- 3GPP continues to expand the LTE platform to improve its efficiency to meet the mobile broadband demand
- 3GPP is on schedule with the standardization of 5G, addressing the expanded connectivity needs of the future
- Phases for the normative 5G work
 - Phase 1 (Rel-15): Addresses the more urgent subset for commercial deployments
 - Phase 2 (Rel-16): Completes the IMT 2020 submission, addresses all identified use cases & requirements

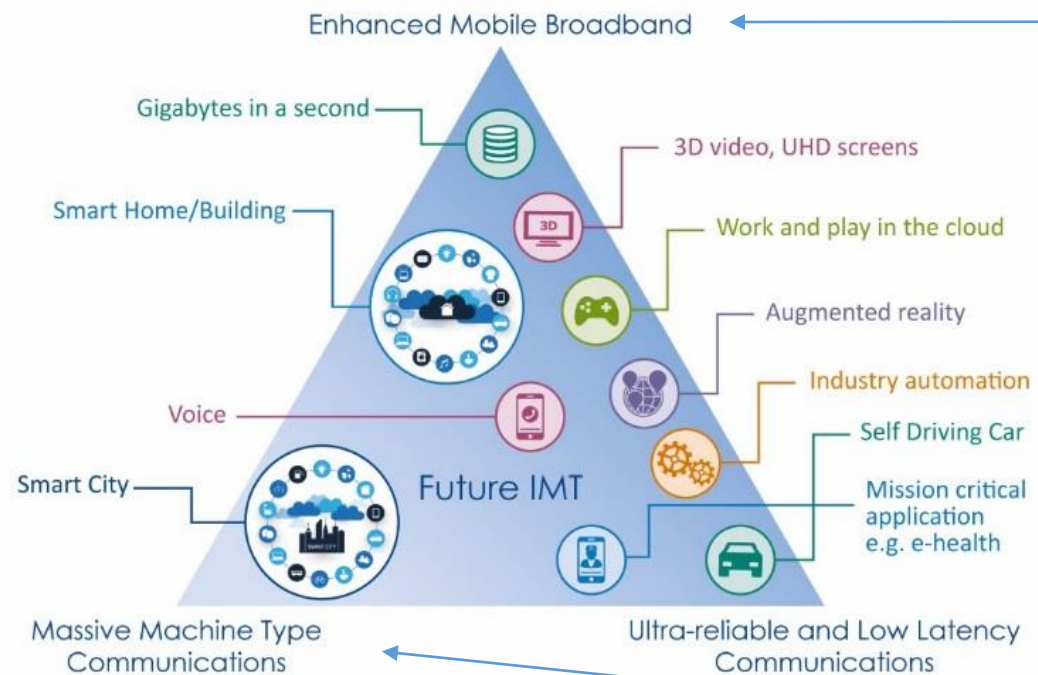


Network Transformation

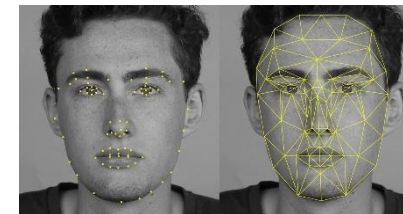
- 📶 One Network fits all → Open & Flexible Enabler
- 📶 Telecom Operators → Multiple Stakeholders
- 📶 Phones → Things
- 📶 Procedures → Services
- 📶 Static Topology → On-demand Resources
- 📶 Dedicated Hardware → Orchestrated Resources
 - Network Function → Virtualization
 - Single Network → Slice



The IMT vision



Initial driver for early adopters of 3GPP 5G



Future capabilities will tip the balance of network load towards IoT

Future outlook



5G Vertical support

- Vehicle Communication, Mission Critical Communications, Industrial IoT, Audio Visual Production...



Enhancements for the system coming:

- 5G LAN, High Precision Positioning, Cellular IoT for 5G, URLLC capabilities, Fixed and Satellite as 3GPP accesses, ONAP interworking, QoS Monitoring, Network Automation, protocol and core network improvements...



5G will span several releases, look out for the Rel-17 work plan soon



Release 17

Functional Freeze: June 2021*

● TSG SA content & prioritization discussion at SA#85 (September 2019):

- 5G System Enhancement for Advanced Interactive Services
- Cellular IoT enhancement for the 5G System
- System enhancement for Proximity based Services in 5G
- Enhancement of support for 5G LAN-type service
- Integration of Satellite in 5G Systems
- Architectural enhancements for 5G multicast-broadcast services
- Support for 5G Wireless Wireline Convergence
- Application Awareness Interworking between LTE and NR
- Extended Access Traffic Steering, Switch and Splitting support in the 5G architecture
- Enhanced IMS to 5GC Integration
- Enhancement to the 5GC LoCation Services Phase 2
- Enablers for Network Automation for 5G Phase 2
- Enhancement of support for Edge Computing in 5GC
- Enhanced support of Non-Public Networks
- Enhancement of Network Slicing Phase 2
- Enhancement of 5G UE Policy
- Architecture enhancements for 3GPP support of advanced V2X services - Phase 2
- Supporting Flexible Local Area Data Network
- Supporting Unmanned Aerial Systems Connectivity, Identification, and Tracking
- Enhanced support of Industrial IoT - TSC/URLLC enhancements
- Multimedia Priority Service (MPS) Phase 2
- Support for Multi-USIM Devices
- System architecture for next generation real time communication services
- Service-based support for SMS in 5GC
- Smarter User Plane
- UPF enhancement for control and SBA
- Usage of User Identifiers in the 5G System
- Enhancements for cyber-physical control applications in vertical domains
- Support for Minimization of service Interruption
- Complete Gap Analysis for Railways Mobile Communication System

● TSG RAN Work Areas under discussion

For final decision on the Rel-17 content at RAN#86 (December 2019):

- **NR Light**
- **Small data transfer optimization**
- **Sidelink enhancements**
- **NR above 52.6 GHz (incl 60GHz unlicensed)**
- **Multi SIM operation**
- **NR multicast broadcast**
- **Coverage enhancements**
- **NB-IoT and eMTC enhancements**
- **Industrial IoT & URLLC enhancements**
- **MIMO enhancements**
- **NR for Non Terrestrial Networks**
- **Integrated Access and Backhaul enhancements**
- **Generic enhancements to NR-U**
- **Power saving enhancements**
- **RAN data collection enhancements**
- **Positioning enhancements**

Projected *

019

Conclusions



- 3GPP is an industry driven standardization activity with truly global reach
- Standardization of interfaces enables an interoperable, multi-vendor approach to deployment and generates mass market economies of scale
- NR remains high focus for RAN groups
- IMT-2020 '5G' process progressing – 3GPP leading the way
- Release 16 focus continues to expand towards new use cases and new sectors
- The 3GPP processes are necessarily complex, but we need to adapt to bring new sectors in to the work
- 5G will be a multi-Release technology (beyond Release 16), Rel-17 in the planning stage

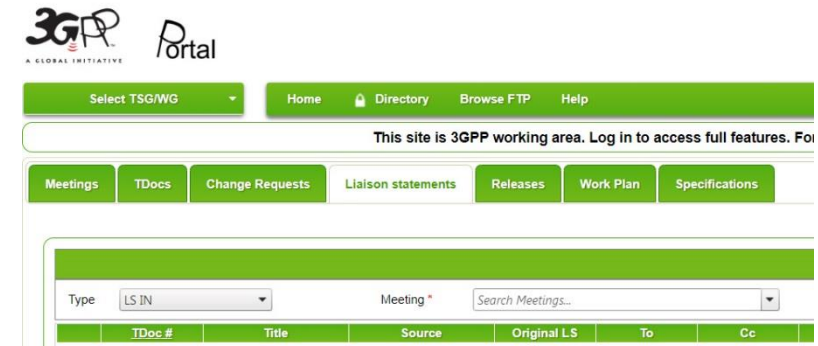
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