



5G Vertical User Webinar Series

Supporting Industry Verticals
on the Road to 5G Standardisation

5G User Event Series 2020-2021

Highlights and Impacts



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Acknowledgements

The success of the 5G User Event series is very much a joint effort. On behalf of FULL5G, 5G-IA and its Pre-Standardization Working Group, 5G Automotive Association, 5G Alliance for Connected Industry and Automation, Public Safety Communications Europe and, more recently, 5G Media Action Group, we'd like to say a special thank you to all our expert panellists from across the globe, who have brought essential insights into many aspects of 5G standardisation. It has been an absolute pleasure to work with you all. Thanks are owed to Dr Colin Willcock, 5G-IA Chair, Alessandro Bedeschi, 5G-IA Head Office, Dr Alexandros Kaloxylos, 5G-IA Executive Director for their valued support throughout. We also extend our thanks to Jacques Magen, INTERINNOV and Chair of the NetworkEurope SME WG for the video post-production and especially for his support in helping us reach so many IT- and Network-savvy SMEs. Thanks also go to Hans van der Veen, NEC Labs Europe and RAN specialist in the 5G-IA Pre-Standardization WG, for his regular updates on 3GPP RAN and support of the two June workshops. Last but definitely not least, special thanks to the Chair of the 5G-IA Pre-Standardization, Riccardo Trivisonno, for his support and suggestions along the way.

Executive Summary

5G networks are bringing a new disruptive ecosystem to industry verticals spanning automotive, broadcasting and media, energy, health, manufacturing, maritime, public safety, transport and others. To capture these benefits and ensure requirements feed into 3GPP standardisation, in early 2019 four Market Representation Partners got together with top experts in 3GPP¹ with a view to encouraging the community to embrace verticals, optimally capture end-user requirements and support contributions to the standardisation process. The approach is bottom-up, member-based and consensus-driven.

These MRPs are the 5G-Infrastructure Association (5G-IA²), the 5G Automotive Association (5GAA³), the 5G Alliance for Connected Industry and Automation (5G-ACIA⁴) and Public Safety Communications Europe (PSC⁵). In early July 2021, the 5G Media Action Group (5G-MAG⁶) joined us on our journey, helping us to build on our successes thus far.

With two physical events in 2019, the shift to virtual events was swiftly made in 2020, with webinars on:

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The event series is an excellent example of how we can intensify joint efforts across the ecosystem working towards convergence on global standardisation, which benefits everyone. Here we report on the main outcomes and impacts of the events so far, where we have been following diverse industry verticals through specialists suggested by associations and other members of the Programme Committee to the widest possible coverage of verticals and continuity across iterative 3GPP releases. We highlight the events on 3GPP Releases, especially Release 18, where there are important opportunities for contributions from verticals. Consensus building has been a priority throughout the series, collecting multiple viewpoints from participants as part of an open, global dialogue. We extend our deepest thanks to our large, international community for joining us on our journey and look forward to continued engagement in the future.

1 <https://www.3gpp.org/>

2 <https://5g-ppp.eu/5g-infrastructure-association/>

3 <https://5gaa.org/>

4 <https://5g-acia.org/>

5 <https://www.psc-europe.eu/>

6 <https://www.5g-mag.com/>

3GPP Progress so far: Industry Verticals and Releases 16 and 17

Webinar, May 2020



Webinar recording
Scan the QR Code

Panellists

Antonio Arcidiacono,
5G-MAG (Media Action Group)

Michael Bahr,
Siemens and 5G-ACIA WG1 Chair
(Use Cases and Requirements in 5G Alliance for
Connected Industry and Automation)

Balazs Bertenyi,
Nokia and 3GPP RAN TSG Chairman
(March 2017-March 2021)

Georg Mayer,
Huawei and 3GPP SA TSG Chairman

Webinar Chairs

Dr Maxime Flament,
CTO of 5GAA

Stephanie Parker,
Vice-Chair of the 5G-IA Pre-Standardisation WG

5G Vertical User Webinar Series

Webinar on 5th May 2020 at 11:00-12:30 CEST

3GPP Progress so far: Industry Verticals and Releases 16 & 17

Join us for insights from
Georg Mayer, 3GPP SA TSG Chair
Balazs Bertenyi, 3GPP RAN TSG Chair
Champions from industry verticals

PSC Europe
5GAA
5G IA
5GACIA

Highlights

306 people signed up for this webinar from 13 European countries and 14 countries across the globe, with the highest number of participants coming from Germany, Italy, France, India, UK and USA.

- During the global COVID-19 pandemic, the role of cellular networks has become greater than ever, with work in 3GPP working virtually at full throttle. The commitment of companies to contribute and innovate is as strong as ever.
- Practical guide for industry verticals on Releases 16 and 17 with tips on why and how to get involved in 3GPP and bring in a new set of requirements. Both TSG RAN and SA chairs take newcomers through the paces on how to define and communicate new requirements and plan their contributions through a member, consensus-building approach.
- The success of verticals in 3GPP, with membership growing exponentially, shows that processes work well. However, 3GPP welcomes newcomers and has mechanisms that can ease their entry into the right working group(s).
- Releases 16 and 17 enhance the eMBB foundation. Foundational areas: Coverage, capacity, latency, power saving, mobility. Expanded deployments: New spectrum, topologies, integrated backhaul. New services: Latency, reliability, positioning, use cases like XR.
- Broad variety of features for verticals in Releases 16 and 17, with more coming in Release 18. Release 17 has many study items in SA1 (Services), which are explicitly verticals, e.g. railway, smart energy, mission-critical communications, or have a strong impact on verticals, e.g. IoT networks, 5G timing resiliency system. In Release 17, there are continued enhancements to better support industrial IoT requirements (e.g. private networks, ultra-reliable low-latency communication (URLLC), time sensitive networking (TSN), positioning. 5G enabling technologies bring new functionalities as a toolbox, where verticals can cherry pick the functionalities they need to create new services.
- 5G New Radio (NR) is a unified, scalable air interface, allowing

coexistence of a wide range of 5G device classes. NR-Light expands the 5G device ecosystem, with lower complexity devices, e.g. smart grid, industrial cameras, healthcare monitoring.

- Strong 5G cellular technology evolution is more evident than ever. 5GNR-V2X continues the evolution to bring new benefits, e.g. advanced safety, faster travel, energy efficiency and accelerated network effect. Rel-17 will enhance C-V2X performance and expand to more road users (e.g., bicycles, scooters) with new power saving features.
- On-going developments on 5G for the Industrial Internet of Things (IIoT) come from Michael Bahr, Siemens, 3GPP rapporteur and WG leader on Use Cases and Requirements in 5G-ACIA.
- Antonio Arcidiacono, Chair of 5G-MAG, explains how 5G-enabled innovations are transforming broadcast media through enhanced services and 5G standardisation.

Webinar recording:

<https://www.youtube.com/watch?v=Q6SCUvMXnWY&t=41s>

Poll findings. The first poll sends a clear message that market interest in 5G is global, with 55% of respondents operating in markets worldwide, 32% in Europe and the rest distributed across Asia, India and North America. Understanding how many participants are already part of 3GPP was the focus of the second poll, with 57% stating they are and 25% that they are interested in becoming members. The last poll asked participants for their viewpoints on 3GPP coverage of verticals, with 25% of respondents believing there is good coverage and 57% seeing an opportunity to bring in more verticals.

5G Spectrum for Industry Verticals

Webinar, June 2020



Webinar recording
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Co-hosted with the EU 5G Observatory

Panellists

Antonio Arcidiacono,
European Broadcasting Union

Gérard Carmona,
Ministère de l'Intérieur

Sebastian Euler,
Ericsson and 5GCroCo

Reza Karimi,
Huawei and 5GAA

Frédéric Pujol,
iDATE and EU 5G Observatory

Ulrich Rehfuss,
Nokia and 5G-ACIA

Webinar Chairs

Dr David Lund,
President of Public Safety Communications Europe
(June 2019-May 2021)

Stephanie Parker,
Vice-Chair of the 5G-IA Pre-Standardisation WG



5G Vertical User Webinar Series


Thursday 18 June 2020 at 15:30 -17:30 CEST

5G Spectrum for Industry Verticals

Insights from: 5GAA, 5G-ACIA, 5G-IA and PSCE

PANELLISTS
 Frederic Pujol, EU 5G Observatory
 Reza Karimi, Huawei and 5GAA
 Ulrich Rehffuss, Nokia and 5G-ACIA
 Antonio Arcidiacono, European Broadcasting Union
 Gérard Carmona, Ministère de l'intérieur
 Sebastian Euler, Ericsson and 5GCroCo




Highlights

379 people signed up for this webinar from 13 European countries and 14 countries across the globe with the highest number of participants coming from Germany, Italy, France, as well as USA, UK, India and China. In the face of diverse spectrum requirements across verticals, some still in a nascent stage, several open questions and critical actions needed to optimise spectrum usage, this webinar brought together top-level experts in the field to help understand how to get the balance right.

- There is a pressing need for cooperation across verticals and other stakeholders to ensure the best possible use of spectrum. By joining forces, industry verticals can work out ways to optimise spectrum usage, such as combining different technologies and frequency bands, including the use of multicast and broadcast technologies.
- Optimised spectrum usage must also focus on sustainable approaches, including coverage of the entire population, spanning mobiles and vertical use cases.
- A key challenge lies in finding viable solutions that will trigger investments across operators, verticals and governments in the right measure while working out the best possible RoI. Cooperative models could be the way forward for best using this scarce resource. The key lies in prioritising smarter, combined approaches.
- There is a critical need for a common technical base and harmonisation to avoid having many different device frequencies, for example, by harmonising certain bands at the global level or across large regional areas. Nor is it possible to build devices for small markets.
- The 5GAA recommendation is that national and regional administrations ensure the availability of sufficient spectrum for mobile communication networks in the so-called low bands and mid bands to support services, including Intelligent Transport Systems (ITS), in the coming decade.

Webinar recording:

https://www.youtube.com/watch?v=0_VHSII2N5A&t=8s

Poll findings. The poll asking participants how familiar they are with spectrum requirements in their respective countries sends a clear message that the 5G community, including industry verticals, needs to be kept informed of spectrum assignments, with just 32% very familiar and 20% not at all familiar. The second poll also sends a clear message about the need for spectrum assignments to support specific 5G use cases with 90% consensus amongst poll responders. More generally on priorities for lowering entry barriers for industry verticals, respondents believe that ensuring a balance between public and private networks and spectrum harmonisation are key moving forward.

5G for Healthcare, Social Care and Public Safety

Webinar, July 2020



Webinar recording
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Panellists

Regius Professor Rahim Tafazoli,
Director of 5G Innovation Centre, University of Surrey

Dr. Med. Christoph Thuemmler,
Director, Department of Geriatric Medicine and Early
Rehabilitation at Helios Park-Klinikum Leipzig

Graham Worsley,
Safenetics Ltd, UK, 5G MANY Project (Mobile Access in
North Yorkshire)

Webinar Chairs

Dr Andreas Mueller,
Bosch and Chair of 5G-ACIA

Stephanie Parker,
Vice-Chair of the 5G-IA Pre-Standardisation WG

Thursday 15 July 2020 at 09:30 -11:00 CEST

5G for Healthcare, Social Care and Public Safety

5G Vertical User Webinar Series

Join us for insights from the medical profession, UK5G MANY project and world-renowned experts

PANELLISTS
 Prof. Dr. Med. Christoph Thümmler, Helios Park-Klinikum Leipzig
 Graham Worsley, Safenetics Ltd, UK 5G MANY Project
 Regius Professor Rahim Tafazolli, Director of the 5G Innovation Centre

PSC Europe | SGAA | 5G IA | 5G ACIA | NETWORK

Highlights

183 people signed up for this webinar on 5G for health, social care and public safety from 16 European countries and 8 countries from across the globe. The highest participation came from the UK, followed by Germany, France, Spain and the Netherlands. High turn-out from the UK is also thanks to the promotional support of the UK5G project Mobile Access in North Yorkshire (MANY).

This webinar explored several concerns around the differentiating characteristics of 5G, from massive machine type communication, to latency and reliability issues, to extreme security and privacy requirements for “mission-critical” applications and the often neglected but critically important challenges facing social care.

- 5G can bring real innovations in terms of better services and new applications in essential areas for citizens, spanning health and social care. With this in mind, we need stronger collaboration across the public and private sectors, including SMEs. Funding is essential to fill the white spots in the sector.
- Greater awareness of 5G is needed through training and education. Any solution for integrated, virtualised healthcare needs to prove that the system works. On top of this, we need harmonised regulations to level the playing field. Popularised misconceptions about 5G that are hampering adoption in the sector. Busting the Myths About 5G – Facts Versus Fiction⁷ clarifies these misconceptions in a straightforward manner.
- The 5G Health Association⁸ seeks to tackle barriers to adoption. Its white paper, 5G Health - The Need for 5G Technologies in the Healthcare Domain⁹, gives key insights into and updates on why we need 5G for future healthcare, what makes 5G different from current technologies, how 5G can be used to manage hospitals and departments within them, post-discharge services, support emergency responders. It also covers requirements and KPIs for medical applications.

- A common, global standard for digital and mobile health would go a long way in accelerating adoption in healthcare and pave the way for integrated solutions that empower both healthcare professionals and patients.

Webinar recording:

<https://www.youtube.com/watch?v=eF2qlAruYaw&t=1s>

Poll findings. The first poll asked participants about the main barriers to 5G adoption in healthcare with privacy and security issues and strict regulations in the sector being the top two. The second poll focused on the topic of future webinars asking participants to choose from technologies like edge computing and artificial intelligence (29%) from diverse industry verticals with automotive and healthcare being the most popular (both, 13%).

7 <https://www.comsoc.org/publications/ctn/truth-out-there-examining-science-around-5g-paranoia>

8 <https://5g-health.org/>

9 <https://5g-health.org/wp-content/uploads/2020/11/5G-Health-Whitepaper-V1.pdf>

3GPP Release 18: Opportunities for Industry Verticals

Webinar, November 2020



Webinar recording
Scan the QR Code

Panellists

Michael Bahr,
Siemens and 5G-ACIA WG1 Chair
(Use Cases and Requirements in 5G Alliance for
Connected Industry and Automation)

Balazs Bertenyi,
Nokia and 3GPP TSG RAN Chair
(March 2017-March 2021)

Antonio Consoli,
Huawei and 5GAA

Markus Dillinger,
Huawei Technologies Duesseldorf GmbH

Maxime Flament,
CTO of the 5G Automotive Association

Jordi Gimenz,
Technical Director of the 5G Media Action Group

Erik Guttman,
Samsung and 3GPP specialist

Prof. Dr Med Gerhard Hindricks,
Leipzig Heart Institute

Georg Mayer,
Huawei and 3GPP TSG SA Chair

Markus Mueck,
Intel, Vice-Chairman ETSI Board, 5GAA
Julian Stafford,
Technical Director, EUTC
(European Utilities and Telecom Council)

Dr Med. Christoph Thuemmler,
Director, Department of Geriatric Medicine and Early
Rehabilitation at Helios

Park-Klinikum,
Leipzig and 5G Health Association

Webinar Chairs

Stephanie Parker,
Vice-Chair of the 5G-IA Pre-Standardisation WG



Monday 30 November 2020 - 15:00 CET

3GPP Release 18: Opportunities for Industry Verticals

PANELLISTS

Georg Mayer, 3GPP TSG SA Chairman
Balazs Bertenyi, 3GPP TSG RAN Chairman
Julian Stafford, EUTC
Erik Guttman, Samsung
Maxime Flament, 5GAA CTO
Michael Bahr, Siemens and 5G-ACIA
Prof. Dr. Med. Christoph Thümmel, 5G Health Association
Jordi Gimenez, 5G-MAG Association

Join us for new requirements from industry verticals

PSC Europe 5GAA 5G IA 5GACIA

Highlights

443 people signed up for this webinar on opportunities for industry verticals to contribute to 3GPP Release 18, coming from 43 countries worldwide. The highest participation from Germany, UK, USA, Spain and France. TSG Chairmen, Georg Mayer (SA) and Balazs Bertenyi (RAN) walk participants through the state of play in Release 17 before zooming in on Release 18. For RAN Release 18, see the section on the June 2021 virtual workshop. In Release-17, work has started in the working groups of SA and CT (Core Networks and Terminals). SA2 (Architecture) is about to complete all its Release 17 items and start normative work from Q1-2021 through work items. Release 18 studies in SA1, which collects and analyses requirements, are progressing towards completion of the many items. No firm timeline for Release 18 was set at the time of the webinar with RAN, SA and CT meetings planned in December 2020 during the Plenary Meeting. A new Release 17 timeline will be agreed and new Release 18 Stage 1 Study Items (SA1) approved.

Examples of Release 18 Study Items in SA1¹⁰ related to verticals or impacting on them are:

- Study on Supporting of Railway Smart Station Services
- Study on Off-Network for Rail
- Study on vehicle-mounted relays
- Study on FRMCS Evolution. Future Railway Mobile Communication System (FRMCS) is the future worldwide telecommunication system designed by UIC (International Union of Railways).
- Guidelines for Extra-territorial 5G Systems
- Study on Personal IoT Networks
- Study on 5G Timing Resiliency System
- Study on sharing administrative configuration between interconnected MCX Service systems
- Study on 5G Smart Energy and Infrastructure

Examples of Release 18 Study Items in SA1 and SA6¹¹ related to verticals are:

- Study on 5G Networks Providing Access to Localised Services
- Subscriber-aware Northbound API access
- Study of Interconnection and Migration Aspects for Railways
- Study of Gateway UE function for Mission Critical Communication
- Maxime Flament, 5GAA CTO, joined by members Markus Mueck (Intel; Vice-Chairman ETSI Board; 3GPP) and Antonio Consoli (Huawei), share new requirements from the automotive sector. For example, enhancements to the existing Predictive QoS mechanism will enable the sending of information on Quality of Service (QoS) prediction to the User Equipment (UE) through standard interfaces, as well as the co-existence of reactions to QoS predictions at the network and application layers. Predicting future QoS demands, e.g. by location, will allow the efficient management of resources. Other enhancements will enable a vehicle running a V2X application to pre-check alternative routes depending on the requested QoS. Supporting the collection of sidelink QoS measurement data to the network will generate more accurate QoS predictions on the sidelink.
- Jordi Gimenez, Head of Technology at 5G-MAG, highlights requirements geared towards further enhancing non-public networks (NPN), QoS delivery for multicast service and edge computing. Enhancements related to satellite and integrated access backhaul need to focus on multicast/broadcast support, continuation of work on NR-NTN, including additional architectural options for non-terrestrial networks (NTN). Future standardisation on edge computing should focus on distributed computing, traffic awareness, adaptation to device capabilities; Network Data Analytics Function (NWDAF), machine learning and

artificial intelligence. Network and user monitoring will become native in the 3GPP 5G system.

- As a new member of 3GPP via ETSI, the Technical Director of EUTC¹², Julian Stafford, joined by SA1 specialist Erik Guttman, Samsung, share insights into on-going work on smart energy infrastructure. Examples of new requirements span very high availability (99.999-99.9999%) for feeder automation and other distribution automation use cases, and power line differential protection. Other requirements include low latency, e.g. differential protection in distribution 5ms with an accuracy of <1ms and <2ms asymmetry, QoS policy aspects and monitoring for 5GLAN (VLAN) service, as well as 10,000 per square km density, e.g., for advanced metering. Other requirements with greater specificity are expected to emerge as the study progresses.
- Michael Bahr, Siemens, 5G-ACIA and 3GPP Rapporteur, highlighted requirements for manufacturing already covered in Releases 16 and 17 and further requirements in Release 18, such as traceability/tracking of vertical requirements in stages 2 and 3, spanning fully decentralised time sensitive networking (TSN) configuration model, centralised concept for ProSe/sideline usable across diverse verticals. Other requirements relate to new industrial 5G use cases for uplink video communication, e.g. machine vision use case with a focus on quality control, as well on-going work in 5G-ACIA, e.g. 5G network exposure interface; industrial 5G device; contributions to evaluation models.
- Dr Med. Christoph Thümmel, Helios Park Klinikum and the 5G Health Association, gives an overview of how healthcare is progressing towards standardisation as a latecomer to 5G. Joined by Prof. Dr Med. Gerhard Hindricks, Leipzig Heart Institute and Markus Dillinger, Huawei, he highlights the importance of driving 5G-enabled innovations in healthcare to improve patient outcomes through 5G-eHealthSax, an initiative funded by Saxony region, running from January 2020-December 2022). 5G-eHealthSax is building a Test-Bed for XG Health-Technology in Leipzig and validating it with use cases. It is also implementing an Indoor and Outdoor XG Campus Network using 3,7/3,8 GHz. The testbed will be expanded to unfold economic activity, offer impartial information to the public and help enhance and facilitate economic activities. An assessment of healthcare standardisation in 3GPP and elsewhere will pinpoint gaps, define new requirements and drive new inputs as the association plans to join ETSI and 3GPP.

Webinar recording:

<https://www.youtube.com/watch?v=ul55CDqAz7M&t=24s>

Poll findings. Given the broad participation, the first poll asked again who from the audience is a member of 3GPP (48%) and who is interested in joining (29%). The second poll asked participants their viewpoints on lowering barriers to 5G adoption by verticals. 44% believe strong partnerships between verticals and the telecom industry is the most effective way forward, followed by 37% who think supporting verticals in 5G standardisation is also important. The polls confirm findings from the first webinar on Releases 16 and 17 in May 2020.

10 <https://www.3gpp.org/dynareport/TSG-WG-S1-wis.htm?Itemid=438>

11 <https://www.3gpp.org/DynaReport/TSG-WG-S6-wis.htm?Itemid=683>

12 <https://eutc.org/>

Edge Computing - Industry Vertical Viewpoints

Webinar, April 2021



Webinar recording
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Panellists

Leonardo Gomes Baltar,
Intel and 5GAA (5G Automotive Association)
MEC4AUTO WI Lead and WG1 Vice Chair

Samita Chakrabati,
Verizon and 5G-ACIA (5G Alliance for Connected Industry
and Automation) Lead Technical Delegate/Rapporteur of
Industrial Edge Use cases and Requirements Study in WG1

Nurit Sprecher,
Nokia, Co-founder of ETSI MEC, Co-chair of ETSI ZSM
(multi-access edge computing; zero touch network and
service management)

Said Tabet,
Board Member, Vice Chair Liaison Relationship Committee,
AECC (Automotive Edge Computing Consortium); Chief
Architect Global CTO Office, Distinguished Engineer, Dell
Technologies

Gabriel Yu Yang,
Technical Steering Committee Chair, Edge Gallery

Webinar Chairs

Dr. David Lund,
President of Public Safety Communications Europe
(June 2019-May 2021) and Coordinator of Broadway
Horizon 2020

Stephanie Parker,
Vice-Chair of the 5G-IA Pre-Standardisation WG

Tuesday 20 April 2021 15:00 CEST PART 1

Edge Computing: Industry Vertical Viewpoints

5G Vertical User Webinar Series

PANELLISTS
Leonardo Gomes Baltar, Intel and 5GAA WG 1 Vice-Chair
Nurit Sprecher, Nokia
Samita Chakrabarti, 5G-ACIA
Gabriel YuYang, Edge Gallery
Said Tabet, Dell Technologies and Automotive Edge Computing Consortium

CO-CHAIRS
Stephanie Parker, Trust-IT, & 5G-IA Pre-Standardization WG Vice-Chair
Dr David Lund, President of Public Safety Communication Europe

Join us for insights on real-world examples

PSC Europe 5GAA 5G IA 5GACIA

Highlights

229 people signed up for the webinar part 1 on Edge Computing: Industry Viewpoints from 29 countries worldwide. The highest participation comes from Greece, Spain, UK, Greece and Italy.

This webinar is a deep dive on the edge computing landscape, highlighting on-going work in automotive, manufacturing and the Industrial Internet of Things, as well as standardisation work in ETSI and open-source approaches.

- Leonardo Gomes Baltar, Intel and 5GAA gives insights on MEC4AUTO, enabling edge computing to support cellular V2X use cases. 5GAA has a dedicated work item on this because it offers cloud capabilities at the edge of the network; it is a key supporting technology for many V2X services for connected vehicles and automated driving. .
- Samita Chakrabarti, Verizon and 5G ACIA, zooms in on the applicability of 5G industrial edge computing. The use-case and requirements studies are considering input from 3GPP TS 22.104, TR 22.832 and TR 22.804, ETSI MEC Enterprise use-cases and 5G-ACIA defined key use-cases:
- Need for virtualisation and offloading of applications on the premises.
- Impact of Edge computing on AR/VR applications and AI processing.
- Use-cases on Automatic Mobile Robots control, local processing using AI and computer vision.
- Said Tabet, Dell Technologies and AECC¹³ explains how this association is tackling the big data challenge, e.g. through its intelligent driving use case, which uses machine learning for a better, safer autonomous driving experience, with data collection including cruising data, control data and biometric sensor data.
- Gabriel Yu Yang, EdgeGallery¹⁴ explains how EdgeGallery is aimed at accelerating digital transformation and the commercial use of MEC by building an open source edge computing project that is compatible with "connection + computing" in the telecom industry. EdgeGallery is a carrier-led edge computing architecture and capability openness de facto standards. It is designed to lower the threshold for enterprise application deployment, build a scale, and build a 2B business ecosystem.
- Nurit Sprecher, Nokia and co-founder of ETSI MEC¹⁵ shares updates on important developments, highlighting that:
 - MEC is coherent with the ambition for openness, innovation and growth, with a common API framework for 3rd-party plug-ins and open APIs for data exposure and programmability.

- It is flexible and extensible, aligned with the overall cloud transformation, a natural element of 5G and key enabler for IoT, mission critical, vertical solutions. It also enables collaboration between operators and businesses.
- The fundamental MEC specifications are ready. ETSI MEC is widely recognised in the industry as the leading standards organisation for application enablement and edge computing.
- There are vast business opportunities at the edge. The increase in edge initiatives can use MEC to ensure common practices, drive adoption and accelerate time to market.

Industrial automation, digital twins and infrastructure control are among the top drivers for the growing interest in edge computing. Collaboration on edge computing is essential, with the 5G User Forum potentially being a focal point for educating businesses and consumers, on software and hardware and relevant standardisation.

Webinar recording:

<https://www.youtube.com/watch?v=ul55CDqAz7M&t=24s>

Poll findings. Only 16% of respondents have already implemented their commercial edge strategy, others are either developing one (26%) or exploring market opportunities (58%). The top requirements for edge are low latency (33%), service continuity (21%) and interoperability (16%). After automotive, respondents see manufacturing as an early adopter of edge (36%), followed by broadcast media, warehousing and logistics (both, 18%).

¹³ <https://aecc.org/>

¹⁴ <https://www.edgegallery.org/en/>

¹⁵ <https://www.etsi.org/technologies/multi-access-edge-computing>

5G Standardisation on Edge Computing

Webinar, April 2021



Webinar recording
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Panellists

Suresh Chitturi,
Samsung and Chair of 3GPP SA6 (Vertical Enablement)

Puneet Jain,
Intel and Chair of 3GPP SA2 (Architecture)

Webinar Chairs

Georg Mayer,
3GPP TSG SA Chair

Stephanie Parker,
Vice-Chair of the 5G-IA Pre-Standardisation WG

Thursday 22 April 2021 15:00 CEST **PART 2**

3GPP Standardisation on Edge Computing

PANELLISTS
Puneet Jain, Intel, Chairman of 3GPP SA2
Suresh Chitturi, Samsung, Chairman of 3GPP SA6

CO-CHAIRS
Georg Mayer, 3GPP SA TSG Chairman
Stephanie Parker, Trust-IT, & 5G-IA Pre-Standardization WG Vice-Chair

Join us for insights on real-world examples

PSC Europe 5GAA 5G IA 5GACIA

Highlights

191 people signed up for part 2 on 3GPP Standardisation on Edge Computing, bringing the total for this two-part series to 420. The highest number of participants came from France, Spain, Germany, UK and India. Part 2 of the webinar on edge computing is another deep dive, this time on standardisation work on edge computing within 3GPP, with short presentations and interactive discussions with top experts.

- Puneet Jain, Intel and Chair of 3GPP SA2, walks participants through 3GPP standardisation on edge computing in the 5G core, which started in Release 15.
 - Release 15 covers user plane (re)selection; Local Routing and Traffic Steering; Session and service continuity; Network capability exposure; QoS and Charging; Support of Local Area Data Network.

Study and work items in Release 17:

- Study on enhancement of support for Edge Computing in 5GC (completed in December 2020).
- Enhancement of support for Edge Computing in 5G Core network (target completion date: June 2021).
- SA2 (Stage 2) normative work is 60% complete. Target stage 2 freeze date is June 2021.
- Stage 3 is expected to finish by March 2022.
- Relevant Specifications: TR 23.748, TS 23.548, TS 23.501, TS 23.502, TS 23.503.

- Suresh Chitturi, Samsung and Chair of 3GPP, talks participants through 3GPP SA6 EDGEAPP - Architecture for enabling Edge Applications and 3GPP industry harmonisation with ETSI MEC and GSMA OPG.
 - Application developers need support for Application Clients to locate, connect and switch to the most suitable Application Server on the Edge and for Application Servers on the Edge to utilise the underlying 3GPP network to provide best possible services.
 - The Edge Enabler Layer developed by SA6 (3GPP EDGEAPP) provides such capabilities with easy to integrate APIs allowing Application Developers to focus better on application features.
 - Architecture Principles span application portability, service differentiation, flexible deployment, interworking with 3GPP.
 - Key features of EDGEAPP are: Service Provisioning; EAS Discovery; EES capability exposure; Network capability exposure; service continuity; security.
 - There is a synergy between 3GPP and ETSI MEC on respective architectures, with more details relationship in ETSI White Paper #36 (July 2020). The GSMA Whitepaper OPG.01: "Operator Platform: Telco Edge Proposal" (October 2020) details the synergy between 3GPP and GSMA OPG.

Key takeaways from the interactive discussions are:

- 5G will help technologies like edge computing and artificial intelligence to harmonise and enable them to work together much more efficiently.
- 3GPP Release 17 is foundational for edge computing but more will come in future releases given its importance in mobile communications and as we gradually move beyond 5G.
- Artificial Intelligence and edge computing can both serve as building blocks, albeit in different ways:
 - Network layer perspectives: AI can further optimise edge computing applications.
 - Application layer perspectives: Edge computing can be a building block for AI, e.g., offloading limited capabilities from the device to the network.
- Global initiatives like 3GPP can help reduce regional fragmentation, drive convergence and enable network-compliant rollouts that benefit the ecosystem around the world. As a global initiative, 3GPP is well placed to build on its strong relationships and collaborations with ETSI MEC and GSMA.
- It is essential that industry verticals get involved in 3GPP working groups, which is where key activities take place and where their requirements should be channelled. It is also important that verticals understand how their seemingly specific requirements could be relevant to other sectors. Being part of 3GPP is a complex but highly rewarding experience. It does not need to be a life-long commitment.

Webinar recording:

<https://www.youtube.com/watch?v=k3jvl5qeJZ4&t=2s>

Poll findings. 37% of respondents are not involved in standards organisations doing work on edge computing, which is also an opportunity to encourage more people to get involved. 37% are involved in 3GPP and other forums (e.g. 5GAA, 5G-ACIA, GSMA) while 26% are involved in ETSI and other forums. The second poll revealed a high consensus on the need for coordination on edge computing standardisation, with 65% seeing it as vital and 32% as quite important. Respondents were, however, uncertain about the need for further standardisation on edge, with 46% seeing a need and 43% not sure, possibly due to early-stage interest in the technology. The two-part webinar series and the online standards tracker are therefore key informative sources on the landscape, with future events needing to bring updates and feed in the results of trials around the world, on-going and planned.

Virtual Workshop on RAN Release 18 for Industry Verticals

Webinar, June 2021



Webinar recording
Scan the QR Code

Panellists

Michael Bahr,
Siemens and 5G-ACIA WG1 Chair
(Use Cases and Requirements in 5G Alliance for Connected Industry and Automation)

Thierry Berisot,
Novamint and 3GPP

Andrea Di Giglio,
Telecom Italia SpA and 5G PPP 5G-SOLUTIONS

Maxime Flament,
CTO of 5GAA (5G Automotive Association)

Erik Guttman,
Samsung and 3GPP SA1

Hyounhee Koo,
SyncTechno and 3GPP Liaison Person for IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities)

Tero Pesonen,
Chairman of Critical Communications Broadband Group at TCCA, The Critical Communications Association (joint presentation with PSCE, Public Safety Communications Europe)

Julian Stafford,
Technical Director of EUTC (European Utilities Telecom Council)

David Vargas,
BBC and 5G-MAG (5G Media Action Group)

Mathew Webb,
Huawei and 3GPP

Ingo Wendler,
Swiss Federal Railway and UIC (International Union of Railways)

Webinar Chairs

Wanshi Chen, Qualcomm as 3GPP TSG RAN Chair
(elected March 2021)

Stephanie Parker,
Vice-Chair of the 5G-IA Pre-Standardisation WG

Wednesday 23 June 2021 17:30 CEST

5G Vertical User Workshop Series

3GPP RAN Release 18 for Industry Verticals

INDUSTRIES
Automotive | Health | Manufacturing | Maritime
Media | Rail | Satellite | Utilities | Public safety

Join 3GPP MRPs to pave the way forward

PSC Europe SGAA 5G IA 5GACIA

Highlights

This virtual workshop on RAN Release 18 for Industry Verticals was by invitation to prepare them for the TSG RAN Workshop running from 28 June to 2 July 2021. 131 people signed up for it out of the 145 people invited. The workshop connected people from 24 countries worldwide, with the highest number of participants coming from Germany, USA, France, UK and Spain.

The workshop opens with a fireside chat with Wanshi Chen (Qualcomm) as new 3GPP TSG RAN Chair, zooming on 5G Advanced and opportunities to contribute to Release 18.

- As a group, RAN aims to offer services that work for diverse industries. Release 18 is a good opportunity to continue to evolve several features, targeting intermediate needs and longer term impacts to set the foundations for further evolutions as we move towards 6G in coming years.
- Since day one of 5G, 3GPP work has encompassed both traditional eMBB while accommodating vertical domain services, such as IoT, mMTC, V2X, among others. As a group, RAN encourages people to join and take part in discussions so both sides can understand each other better and work out ways to optimise the resources available.
- Requirements from vertical associations and standards specialists:
- Maxime Flament, CTO of 5GAA: Priority requirements are based on an association-wide survey aimed at building consensus across the ecosystem, spanning positioning enhancements; LTE/NR-V2X sidelink co-existence, sidelink carrier aggregation.
- Michael Bahr, Siemens and 5G-ACIA: Priority requirements include meeting increased demand for uplink services, low-power positioning devices with high precision and enhanced URLLC.
- Tero Pesonen, joint TCCA¹⁶ and PSCE: Priority requirements aim to improve coverage, availability and resilience in critical communications and public safety scenarios.
- David Vargas, BBC and 5G-MAG: Priority requirements span connection of EnTV RAN (FeMBMS) to 5G core and optimisation for simultaneous support of 5G Broadcast and NR Unicast.
- Julian Stafford, Technical Director of EUTC, and Erik Erik Guttman, Samsung and 3GPP SA1: Supporting the enhanced management of cellular networks; enabling standards-based security on the N6 interface and enabling information sharing between the energy utility and MNO during supply interruptions.
- Hyounhee Koo, SyncTechno and 3GPP Liaison Person for IALA¹⁷: Sidelink enhancements for positioning between vessels more exact information during vessel accidents; NR multicast and broadcast; non-terrestrial networks, sidelink.
- Ingo Wendler, Swiss Federal Railway and UIC¹⁸. The proposed study item for

FRMCS revolves around (1) the range of channel bandwidths less than 5 MHz to meet regulatory spectrum block allocations; (2) limitations to NR physical layer to support narrowband channel bandwidth.

- Andrea Di Giglio, Telecom Italia SpA and 5G PPP 5G-SOLUTIONS¹⁹: RAN requirements derive from use cases in living labs, e.g. future-proof design of UEs for usage in future releases; improved upload throughput; optimised performance of deterministic slicing.
- Mathew Webb, Huawei and 3GPP on passive IoT for Advanced 5G: Automated asset management and industrial sensor networks. Potential technical approaches are: envelope detection for downlink and backscatter modulation for uplink.
- Thierry Berisot, Novamint and 3GPP: Key enablers for verticals in RAN, e.g., 5G MBS/Prose (eMBB: media broadcast, public safety), Sidelink UE to UE Relay (eMBB: automotive, public safety, medical/healthcare, railway, utilities), location services such as ranging, enhanced sidelink location (eMBB: all).

Webinar recording:

<https://www.youtube.com/watch?v=7YITYv48PyU>

Poll findings. The first poll asked participants about the importance of 3GPP covering requirements for industry verticals, with most respondents saying that it's essential and quite important (64% and 32%). The second poll revealed that only a few respondents are planning follow-up collaboration or consolidation on RAN Release 18. However, there was a high turnout of verticals at the TSG RAN workshop the following week, illustrating high interest in Release 18. The third showed that 60% of respondents have already compared requirements across verticals.



Scan the QR Code to get involved in 3GPP

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

¹⁶ <https://tcca.info>

¹⁷ <https://www.iala-aism.org>

¹⁸ <https://uic.org>

¹⁹ <https://5gsolutionsproject.eu>

5G User Event Series

May 2020 - June 2021

7 virtual events

1743 registrants

1332 attendees

50 countries worldwide

21 polls

18 associations onboard
14 verticals, 4 network and business

1647 poll responses

3700+ views of recordings
(and still counting)

Top 3 countries EU27 

Top 3 countries worldwide 

The spin-off webinar with the European Technology Platform, NetworkEurope, in October 2020 on 5G and smart networks for healthcare brings the total number of registrants up to 1874. This webinar is covered in a separate report.

Further Reading



5GAA white paper, Toward fully connected vehicles: Edge computing for advanced automotive Communications (December 2017). https://5gaa.org/wp-content/uploads/2017/12/5GAA_T-170219-whitepaper-EdgeComputing_5GAA.pdf



5GAA MEC4AUTO Study on deployment options, interoperability, security and privacy (January 2021). https://5gaa.org/wp-content/uploads/2021/03/5GAA_A-200150_MEC4AUTO_Task2_TR_MEC-for-Automotive-in-Multi-Operator-Scenarios.pdf



ETSI White Paper #36, Harmonising standards for edge computing (July 2020). https://www.etsi.org/images/files/ETSIWhitePapers/ETSI_wp36_Harmonizing-standards-for-edge-computing.pdf



The GSMA Whitepaper OPG.01: "Operator Platform: Telco Edge Proposal" (October 2020). <https://www.gsma.com/futurenetworks/wp-content/uploads/2020/10/GSMA-Operator-Platform-Proposal-Oct-2020.pdf>



5GAA white paper, Toward fully connected vehicles: Edge computing for advanced automotive Communications (December 2017). https://5gaa.org/wp-content/uploads/2017/12/5GAA_T-170219-whitepaper-EdgeComputing_5GAA.pdf



5GAA MEC4AUTO Study on deployment options, interoperability, security and privacy (January 2021). https://5gaa.org/wp-content/uploads/2021/03/5GAA_A-200150_MEC4AUTO_Task2_TR_MEC-for-Automotive-in-Multi-Operator-Scenarios.pdf

5G User Forum - Programme Committee

The 5G User Forum is led by a group of highly experienced and committed people from across Europe. As experts in their respective fields, they define the 5G User series as timely events that drive commercial needs in the short to long term through 3GPP.

Roland Beutler, 5G-MAG, SWR and 3GPP

Didier Bourse, Nokia and Full5G

Raffaele De Peppe, Telecom Italia, Chair of the 5G-IA Verticals Task Force

John Favaro, Trust-IT and Full5G

Maxime Flament, CTO of 5GAA

David Lund, PSCE and 5G-IA Board

Georg Mayer, 3GPP TSG SA Chairman

Andreas Mueller, Chair of 5G-ACIA

Stephanie Parker, Vice-Chair of the 5G-IA Pre-Standardization WG, Trust-IT, Full5G

Paul Voskar, Huawei, 3GPP, 5GAA

Observers

Alessandro Bedeschi, 5G-IA Head Office

Wanshi Chen, 3GPP TSG RAN Chairman

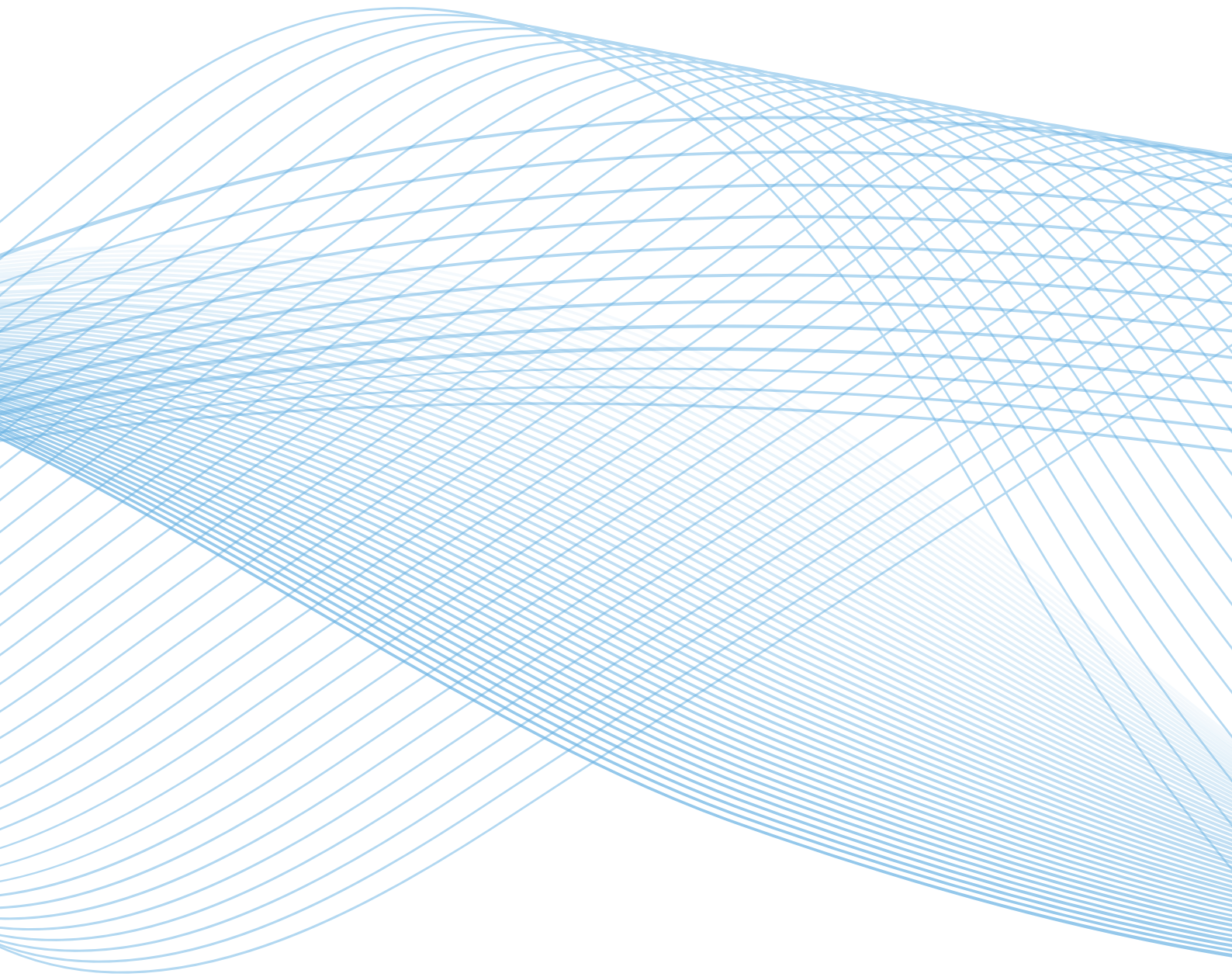
Lionel Morand, 3GPP TSG CT Chairman

Adrian Scrase, CTO of ETSI Board Member

Christian Toche, Huawei

Colin Willcock, Nokia and Chair of 5G-IA

Thank you!



The 5G Infrastructure Public Private Partnership

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