Enjoy!

THE ETSI MAG

THE INTERVIEW
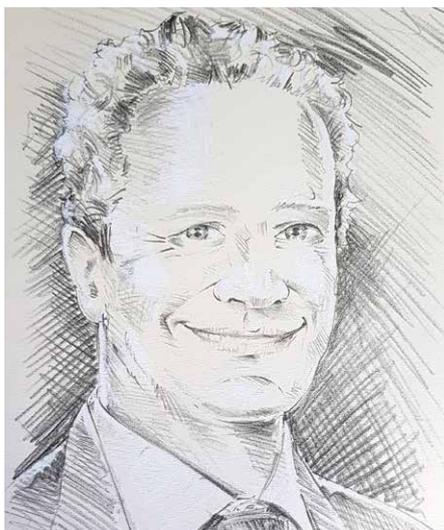*Yasunori Mochizuki, SVP, NEC - p.4-5*

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IoT
MOVING FORWARD

ETSI

Editorial

"The Internet of Things is meant to facilitate our daily life, today and in the future, in our private lives and in our work."

Dear readers,

This new edition of Enjoy! is entitled "IoT moving forward". Indeed, everything you see - and don't see - is or will potentially be an integral part of the Internet of Things. Thrilling? Challenging? Scary? We are discussing these topics in several of our articles.

We conceived objects connecting to each other and to humans with the aim of improving our lives. The Internet of Things (IoT) is meant to facilitate our daily life, today and in the future, in our private lives and in our work – including the improvement of the means of production in all sectors. Our survey outcome of Augmented Reality and our Release on smart agricultural equipment are good examples.

The IoT involves various technologies, some of them covered in 3GPP, others in ETSI's groups. European-based projects, such as the Alliance for Internet of Things Innovation (AIOTI), where ETSI plays a leading role, or the Digitizing European Industry programme are also essential to enhance trust and collaboration within the IoT ecosystem, as you can find out in two of our articles.

But as the IoT involves a plethora of actors and applications, 'Smart Cities' being a good example, the market has realized that it needs a standardized platform providing a common layer that will enable all applications to connect to different services through different access networks.

oneM2M addresses this, as do other ETSI groups on IoT. All the stakeholders need to be part of the standardization process and, taking cities again as an example, they have specific requirements that need to be expressed and catered for. Trailblazing contributions to standards, Bordeaux is sharing with us its success story on smart lighting and is organizing an event about Smart Cities in October. I also invite you to watch and share our new video on the subject.

And of course, to know more about this whole IoT ecosystem, I invite you to join us during our IoT week in October, the annual meeting of industry, researchers and users, who come together to discuss and showcase their latest developments in the Internet of Things, security issues and their solutions. The event is free, exciting and a great networking opportunity!

Enjoy reading!

Luis Jorge Romero,
ETSI's Director General

Making **SMART CITIES** sustainable

From 8-10 October, Bordeaux Metropolis, eG4U and Eurocities, in the framework of the "Sharing Cities" project, are hosting conferences and workshops on making Smart City scale up a reality.

How do you ensure that new services are citizen-centric, resilient and sustainable? How do you define clear benchmarks, collaborate effectively with industry and achieve real results?

This event, taking place in Bordeaux, will provide an overview of the latest developments in Smart City implementations and allow for open exchanges between regional and national experts on the real-life challenges of implementation. Luis Jorge Romero, Director General of ETSI will kick off these three days with the opening speech.

ETSI IoT Week
22-26 October
Sophia Antipolis (FR)

Interoperability, scalability and interworking remain key factors to the successful development of the Internet of Things.

The security and semantic interoperability provided by standards have the mission of «gluing together» the different technologies that compose the IoT ecosystem.

The ETSI IoT week is an excellent opportunity to network with other stakeholders and actively contribute to shaping the future of IoT solutions and standards.

The workshop will address IoT standardization activities in ETSI SmartM2M, oneM2M and 3GPP.

It will deal with Smart Cities, the industrial IoT, semantic interoperability, IoT connectivity, wearables and body area networks, smart energy, buildings and the environment.

It will also feature a oneM2M developers' tutorial, oneM2M implementations and product showcases.

NFV Plugtests event report

The 3rd ETSI NFV Plugtests Report is now available. The Plugtests focused on interoperability testing of multi-vendor network services and obtained higher results than in previous events, with +11% of test cases run. The event showed a significant increase of automated test sessions (+175%) and NFV API validation sessions (+125%), confirming the importance of test automation.
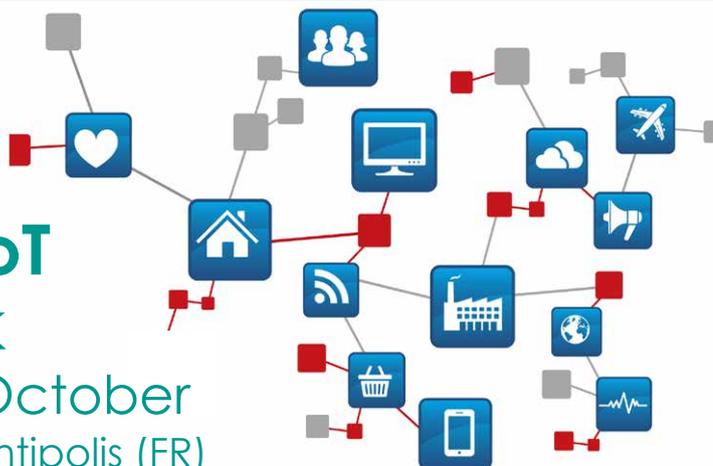
The synergy with and across open source communities also experienced important growth, thanks to the co-location of the event with the OPNFV Plugfest and the arrival of new supporting open source communities to the NFV Plugtests Programme.

World Standards **Day**

Each year on 14 October, the members of IEC, ISO and ITU celebrate World Standards Day, which is a means of paying tribute to the collaborative efforts of the thousands of experts worldwide who develop the voluntary technical agreements that are published as International Standards. CEN, CENELEC and ETSI, the European Commission and EFTA are organizing a conference on 12 October in the Albert Borschette Congress Centre in Brussels.

This year's topic is the "Fourth Industrial Revolution": Standards meet the Future. Come and discuss the role of standardization in supporting the Digital Single Market and the European Single Market.

Critical communication testing changes name

As the public safety sector evolves, ETSI is renaming its Mission Critical Push To Talk (MCPTT) testing programme to the MCX testing programme, where X stands for Mission Critical Push To Talk, Data and Video.

The MCX testing programme will offer a series of interoperability events (Plugtests™) covering data, video and interoperability with TETRA / P25 testing. Future events will include one remote session and one face-to-face session per year.

In our exclusive interview, Yasunori Mochizuki shares NEC's vision of Internet of Things for Smart Cities with us.

How does NEC see IoT today?

The IoT was hyped about five years ago, but it is now entering a new stage, not just something that bridges "things" in the real world with the Internet or Cloud. We see the IoT more seriously as the enabler for digitally transforming businesses and social systems through disruptive services.

Besides making each business smarter, value creation through data interchange across various industrial segments gives new opportunities for economic growth as well as for solving social issues, which are particularly important in mature communities like Europe and Japan.

Interview
Yasunori Mochizuki

Yasunori Mochizuki is Senior Vice President at NEC Corporation, responsible for Corporate Technology Strategy, whose main mission is to formulate the roadmap for next-generation innovations. His activity also includes management of standardization activities and acting as a council member of several Japanese standard developing organizations.

In recent years, he has put much of his effort into ecosystem development for the IoT and Smart City, in Japan, Europe and Asia. He played an important role in creating the IoT White Paper Project of IEC/MSB (IoT 2020: Smart and secure IoT platform).

To promote open and global collaboration in the IoT for Smart Cities, he became a board member of the FIWARE Foundation in 2017. He is actively involved in connecting the value creation activities of NEC for the Smart City business partners globally.

Technically, the IoT is gradually shifting from platform offerings and connectivity protocols to interoperability and harmonization amongst service providers and platforms. NEC is leveraging such emerging aspects for solutions, including Smart Cities and Value Chain Innovation.

What about NEC's value creation in Smart Cities?

NEC is delivering an IoT-based city management solution called Cloud City Operation Centre (CCOC). It is a tool to capture the city's information and manage its resources and services in a coordinated and efficient way, integrating data from diverse administrative systems, as well as sensors, including urban noise detection, crowd detection, water wastage detection, etc.

> The IoT is the key catalyst for a city's digital transformation.

NEC is a global leader in public safety solutions featuring cutting-edge biometrics and video analytics technologies. Public safety solutions take high-priority for cities all around the world and NEC's Safer City solutions deliver value in an ever-broadening range of use cases, facilities and agencies.

In our recent collaboration with Lisbon, we delivered both public safety and CCOC solutions. And the new solutions are integrated with existing city services like road traffic management and waste collection management.

Why is the IoT crucial to today's smart cities?

Simply speaking, the IoT is the key catalyst for a city's digital transformation. Traditionally, the IoT makes single-purpose services - such as water supply or bus services - more efficient and convenient to use. Cities now set their targets in a holistic sense, to build a better quality of life and a sustainable, citizen-centric community. Many cities are leveraging the shift to digital technologies to transform their complete operations. For the cities we have worked with in Europe, Argentina, Japan and elsewhere, IoT technology served to integrate services and data across existing departments. By breaking administrative walls, it became an important step for transformation.

Data, including data from IoT systems, is a new economic asset, a new opportunity for cities.

What do you see as the next key technologies in the IoT?

Firstly, all kinds of systems need to connect, to understand each other's data, and to cooperate. Technically this is called "Semantic Interoperability". It utilizes an advanced IoT protocol stack and consensus definitions of real-world things and properties.

This enables computer-reasoning solutions. Secondly, the systems need real-time situation awareness, programming models for the emerging Cloud/Edge and advanced runtime systems - including Artificial Intelligence (AI) - for the orchestration of the ICT systems.

How would NEC define ETSI's role in IoT development?

ETSI plays a special role in improving interoperability for the IoT. Its experience, gained in creating 3GPP and promoting it to be THE standard for cellular communications, is unique. ETSI plays a similar role in nurturing oneM2M.

NEC was involved from day 1. We are proud to have staff elected to the ETSI Board and to chairmanship roles in technical groups, including the Industry Specification Group for Context Information Management, which focuses on semantic interoperability for IoT data.

But most importantly, ETSI has always stood for transparency, cooperation and interoperability… which are essential for successful IoT services, that is, globally interworking, acceptable to users in terms of privacy and security and reliability.

> ETSI has always stood for transparency, cooperation and interoperability… which are essential for successful IoT services.

How do you see the future evolution of the IoT?

The value of the IoT lies in creating seamless networks of networks and delivering meaningful information where humans or supervised AI platforms can act on it. IoT technologies in the near future will be a major stepping-stone for the evolution of society and humans.

Society will benefit from Digital Twin technology, a digital representation of physical assets, where all the "things" in the world can be enhanced in cyberspace through IoT and AI capabilities. Humans will benefit from micro-sized health and environmental sensors, as well as AI-based assistants.

My mission for NEC is that those systems are used for improved quality of life, for sustainable cities, as well as for a society enabling a brighter world.

> Developing IoT technologies will be a major stepping-stone for the evolution of society and humans.

Welcome to our NEW members

🇮🇹 AgID - Italy

Agency for Digital Italy (AgID) is the technical agency of the Presidency of the Council of Ministers. The main purpose of the Agency is to guarantee the achievement of the Italian digital agenda's objectives and to contribute to the dissemination of information and communication technologies, with the aim of fostering innovation and economic growth.

🇺🇸 Casa Systems Inc. - United States

Casa Systems is pioneering advanced ultra-broadband 5G solutions for mobile, cable, fixed and converged service providers. Casa Systems develops core and access solutions that can transform any broadband network by delivering the service agility and network efficiency needed for the 5G future.

🇬🇧 CKH IOD UK - United Kingdom

CKH IOD UK includes the CK Hutchinson 3 group of Mobile Telecommunications Operators namely: THREE, Drei Austria, Hi3G Denmark, Hi3G Access and Wind Tre. CK Hutchison was amongst the world's first mobile broadband operators and is a leading global operator of mobile telecommunications and data services committed to innovation and leading-edge technology.

🇧🇪 Connective - Belgium

Connective offers solutions to generate, digitally sign and exchange so-called "smart contracts" in an easy and flexible way. The Connective Digital Transaction Management solution is a software platform that offers identification and identity verification services (Identity Services), digital content generation (Smart Documents) and electronic signatures (eSignatures). It is intuitive, compliant and secure.

🇰🇷 Daegu University – South Korea

Daegu University is a private university in South Korea. It includes undergraduate colleges in the humanities, law, public administration, economics and business administration, the social sciences, the natural sciences, engineering, information and communication engineering, natural resources, the arts and design, education, and rehabilitation sciences, in addition to the health science division.

🇮🇹 Newen Srl - Italy

Newen Srl is a professional company offering energy efficiency technologies and methodologies to eliminate waste and reduce energy consumption and the associated costs.

Newen offers technical and organizational solutions for efficient plants, machinery and processes, as well as energy supply contracts.

🇩🇪 NORDSYS GmbH - Germany

NORDSYS develops solutions for Car2Car and Car2X communication. Besides planning and developing subsystems for vehicles, hard- and software solutions for the infrastructure have been developed in recent years, such as Road-Side-Units or ITS stations to be used for Car2infrastructure communication. It designs and develops software architectures for infotainment and communication systems for automotive applications.

🇬🇧 NOVAMINT - United Kingdom

Novamint is a team of architects of IT projects. They plan, design, and develop new customer usages, new technologies and new business models for such applications as blockchain, smart contracts, platforms and APIs, the IoT, CRM and IT architecture, big data or fintech.

🇸🇪 Polisen - Sweden

The Swedish Police Authority (Swedish: Polismyndigheten) is the central administrative authority for the police in Sweden. It is organized into seven police regions, responsible for law enforcement, general social order and public safety in the country.

🇺🇸 Ruckus Wireless Inc. - United States

Ruckus Networks, an ARRIS company, sells wired and wireless networking equipment and software. With its partners, it builds secure wired and wireless access networks for organizations that wish to have quality connectivity experiences for end users, as well as simplicity and lower-cost-per-connection for IT.

Turing Lovelace - USA

Turing Lovelace is a consultancy company that specializes in lawful interception standardization efforts in the areas of network function virtualization security and 5G.

Swedish Security Service – Sweden

The Swedish Security Service is a Swedish government agency reporting to the Ministry of Justice. It operates like a security agency responsible for counter-espionage, counter-terrorism, the protection of dignitaries and the constitution.

Sedam IT d.o.o. - Croatia

Sedam IT provides a range of security solutions for a number of technologies that help organizations manage an efficient and secure business. They also help to implement and develop business processes and offer software for cashbox management and customer relationship management.

Signicat AS - Norway

Signicat is a Digital Identity Service Provider of electronic identity and electronic signature solutions. The company delivers online trust-based services to the public and private sector globally. The solutions offer operational capabilities in line with international standards and requirements, such as privacy, Anti-Money Laundering (AML) and anti-terrorist legislation and regulations.

Swissphone Wireless AG - Switzerland

Swissphone produces pagers, designs alerting networks and develops software solutions. Their products and solutions support each and every stage of the alerting process, from triggering an emergency call to the coordination in the 911-centre, right through to the transmission of alerts over the network to the pagers. These solutions meet the highest demands of public safety organizations.

T&BS - France

Founded in 2014, T&BS is an independent company. Its know-how is based on its experience of a variety of IT and digital communication experts, whose expertise covers a wide range of functional domains. Specialized in digital transformation, T&BS has offices in Paris and Madrid. Providing services all around the world, T&BS serves its clients in strategic thinking and operational engagement.

Safelayer - Spain

Safelayer is a leading provider of security software for public key infrastructure (PKI), multi-factor authentication, electronic signature, data encryption and for the protection of electronic transactions. Safelayer's eID technology is used in electronic identity projects involving people and connected objects and in the adoption of trust services in Internet and mobile communications.

UBiqube - Ireland

UBiqube is a global software supplier, providing vendor-neutral, multi-domain end-to-end network and security orchestration solutions to service providers and large and medium enterprises. UBiqube has developed an open framework for the design, automation, and orchestration of services over hybrid communication infrastructures (legacy, SDN/NFV/IoT).

Uwinloc - France

Uwinloc offers integrated IoT technology for smart and efficient asset management with a battery-less tag collecting its energy from the surrounding radio field, which emits a signal to the installed beacons within the defined indoor parameters of the building. Beacons communicate with each other through radio signals allowing the UWINLOC system to locate objects.

Augmented Reality:
survey outcome

Research by ETSI members looking at the rapidly growing technique of augmented reality (AR) has revealed some interesting insights into the planned uses for, and challenges faced by, this emerging technology.

The Industry Specification Group Augmented Reality Framework (ISG ARF) was launched by ETSI in November 2017 to define an interoperability framework for AR applications and services. One of the group's first tasks was to investigate AR industrial use cases, the obstacles encountered when deploying (pilot) AR services, and requirements for interoperability. To gather input, an online

was also predicted to be enhanced by the application of AR. Participants predicted that inspection, quality control, maintenance and innovation will be the most likely fields of application for AR in their organization.

The vast majority (85%) of survey participants want the augmentations to be precisely located/registered with reference to the real-life equipment

the AR user will be exposed to difficult environmental conditions, such as rain or vibrations, during operation.

Finally, when asked to identify the top challenges to overcome for wider adoption of AR applications, the survey participants listed issues related to tracking, ergonomics and user acceptance of this new technology.

survey was conducted through the ETSI website during March and April 2018.

Most of the survey respondents expressed an interest in implementing a use case based on an augmented reality device, such as smart glasses, and had started their AR activities in 2015 or later. They identified training as the main area that would benefit from the use of AR, but higher productivity, better traceability of operations and improved quality control were also expected. Worker safety

or objects; for some applications, an accuracy of a few millimetres or even less is required. Most respondents said that sharing the viewing of augmentations between several users is desirable. Also, as most AR applications require the user to have his hands free while using the solution, this has significant implications for the use of head-mounted displays.

In terms of AR application size, these are expected to be predominantly room-scale although this may vary over time. Many survey participants believe

77 people from various countries, with a majority from Germany and France, participated in the research. The full results of the survey will be published by ETSI as part of the group report currently under development entitled "Augmented Reality Framework (ARF) Industrial use cases for AR applications and services".

■ *Nicole Le Minous, ETSI ISG ARF secretary, Muriel Deschanel, ETSI ISG ARF chair*

Traffic safety
for smart agricultural equipment

Accidents involving agricultural vehicles are not very common. However, accidents that happen in hours of darkness in rural areas are more serious, due to the lack of visibility.

How can we disseminate a warning message to passing vehicles within a surrounding area of 1,000m, when agricultural equipment is detected leaving a field and joining the road?

To address this issue, ETSI's committee on Machine-to-Machine, TC SmartM2M, with the support of the AEF (Agricultural Industry Electronics Foundation) proposed to use radio communications and ETSI's cooperative Intelligence Transport Systems (C-ITS).

Through the standardized interoperability offered by oneM2M, the ETSI TC SmartM2M developed a pilot test definition and guidelines for testing cooperation between oneM2M and agricultural equipment standards.
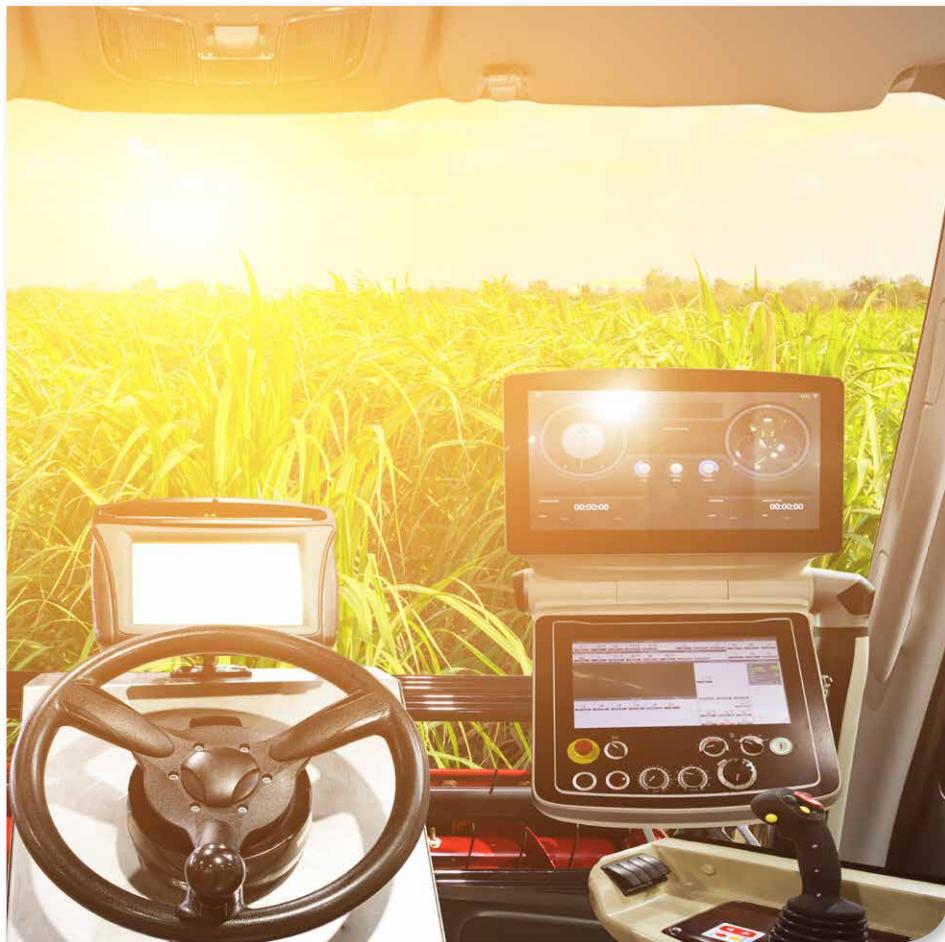
Its results are published in the ETSI Technical Report TR 103 545.

The AEF works to promote the worldwide ISO 11783 standard, "Tractors and machinery for agriculture and forestry - Serial control and communications data network" (commonly referred to as «ISO Bus» or «ISOBUS»). The AEF also coordinates enhanced certification tests for compliance with the standard.

ISO 11783 specifies communications between agricultural machinery, mainly tractors and their implements, as well as the data transfer between these mobile machines and farming software applications.

The Intelligence Transport Systems and oneM2M environments, combined with AEF-certified products, constituted the proper environment to broadcast the warning message from agricultural equipment to the on-road vehicles via Cooperative ITS.

A specialized engine control unit (ECU) in the agricultural equipment analyses and detects the safety situation through the oneM2M platform. When appropriate, a warning notification is sent to neighbouring vehicles of a "slow vehicle" event.

With ETSI TR 103 545, the technical preparation of the pilot is completed. It includes a detailed definition of the scenario, the cross-domain interworking reference model of the ECU and a data model.

The data model is compliant with the ETSI Smart Appliances REFerence (SAREF) and oneM2M-based ontologies. The report also includes guidelines for running the pilot test.

The next step is to demonstrate the interoperability of smart agriculture and smart mobility using the oneM2M platform through a pilot test implemented on a tractor and a car, illustrating the case where agricultural equipment joins a road from a field.

■ *Michelle Wetterwald, Netellany/FBConsulting, Christophe Gossard & Manuel Gorius (John Deere)*

Accessibility requirements for ICT
Now for websites and mobile applications

A new version of ETSI specification EN 301 549 on accessibility requirements for ICT products and services now includes the design of websites and mobile applications.

This standard was jointly developed with CEN and CENELEC. It addresses people with vision issues, hearing or vocal disabilities as well as those with limited manipulation, strength or reach capabilities. It also considers photosensitive users and people with limited cognition.

The new version of the standard was developed to harmonize European requirements for accessibility of websites and mobile applications based on W3C's Web Content Accessibility Guidelines. It serves as the primary document to show conformance with the essential requirements of the European Web Accessibility Directive (2016/2102) which shall be applicable to public sector websites starting from September 2019.

EN 301 549 summarizes technology-neutral requirements which need to be fulfilled by device and service designers to make their products and services accessible to the widest possible range of users, in particular people with disabilities. It covers a large scope of needs, ranging from hardware-related requirements to those related to special applications like Real Time Text Communication.

ETSI's Technical Committee Human Factors, in charge of coordinating the work on this specification, is already working on a future revision with the target of broadening the area of applicability of the accessibility standard beyond public website design and public procurement.

New cryptographic standards
to protect personal data

ETSI's Technical Committee on Cybersecurity has recently released two specifications on Attribute-Based Encryption (ABE) that describe how to protect personal data securely. Attribute-based encryption is a key enabler technology for access control systems where a lot of data are being exchanged on multiple devices, as will happen for 5G and the Internet of Things.

Attribute-based encryption is based on a system where data can only be decrypted if the set of attributes of the user key matches the attributes of the encryption. For instance, access to employee pay data will only be granted to the role of Human Resources Employee working in the payroll department of a company, who has been there for one year or more. Because attribute-based encryption enforces access control at a mathematical level, it provides better security assurance than software-based solutions and it also requires less data space.

The first specification, ETSI TS 103 458, describes high-level requirements for attribute-based encryption. One objective is to provide user identity protection by preventing disclosure to an unauthorized entity. The specification defines personal data protection on IoT devices, cloud and mobile services, where secure access to data is given to multiple parties. The second specification, ETSI TS 103 532, specifies trust models, functions and protocols using attribute-based encryption to control access to data, thus increasing data security and privacy. Both specifications enable compliance with the General Data Protection Regulation.

IOT

MOVING FORWARD

The Internet of Things (IoT) is made up of an ever-increasing number of everyday objects embedded with intelligence, sensors and actuators that are able to collect and exchange data about themselves and/or the environment in which they reside

From the initial Internet-connected vending machines of the 80s, and the first use of the term IoT in the late 90s, both business and technology have been playing catch-up with the original vision of connecting everything to the Internet.

Last year we have seen the number of IoT connected things outnumbering the world's population with over 8 billion connected objects deployed globally in 2017. Current predictions estimate that there will be well over 20 billion devices connected by 2020.

With such levels of interest and investment, it is useful to consider "what's coming next for the IoT". Our use case on IoT deployments in Bordeaux illustrates how the IoT can be applied to our cities and their citizens. Read more on pages 12,13 and 14.

IoT Moving Forward

The IoT is evolving and will undoubtedly impact all sectors of the economy, including consumer, medical, automotive, manufacturing and cities. It is becoming essential to address issues such as connectivity, data interoperability, security, as well as the integration of innovative technologies such as Artificial Intelligence and Blockchain.

IoT everywhere

Although most IoT devices deployed today are aimed at the consumer market, there are already many examples of the IoT being applied to industrial domains such as manufacturing and asset tracking, as well as agriculture, medical and connected autonomous transport systems.

Each domain has its own specific requirements, and the key is to enable the interoperability and sharing of data between these domains and develop horizontal solutions.

Smart City use case

Smart Cities provide a good IoT use case, as they collect and process huge volumes of data from many different sources, such as sensors and cameras. This data must be efficiently sorted, stored and analysed in order to help improve life in the city. The management of context information is vital to enable applications to make meaningful use of the city data.

This includes understanding what is described by the data, what was measured, when, where, by what, the time of validity, ownership, and more.

This extends the interoperability of multiple applications by helping Smart Cities to integrate their existing services and data, as well as enabling third-parties to develop new services from city data portals.

To address this topic, ETSI has created a group on cross-cutting Context Information Management (ISG CIM).

Connectivity Essential

The user connecting IoT devices to the network generally requires long range, low data rates, low energy consumption and cost effectiveness. Early IoT deployments relied on proprietary low-power, wide-area network (LPWAN) solutions. Now, standardized LPWAN technologies are being addressed in ETSI and 3GPP.

In addition to network connectivity, there are several initiatives examining IoT service layer standards. oneM2M is addressing topics such as device management and secure data exchange, and providing the middleware between multiple connectivity networks and any number of IoT applications. The most recent oneM2M Release 3 covers the extended Cellular IoT features that have come from 3GPP in their recent releases.

AI as an enabler

The usefulness of IoT data is greatly increased by the integration of Artificial Intelligence mechanisms that help with data mining, predictive analytics and the automation of routine tasks and responses.

Machine learning is able to identify patterns in IoT data and to detect anomalies that can be used to make well informed operational decisions with little human intervention.

Other AI technologies, such as speech recognition, and face/pattern detection, can help extract insights from data sources, such as CCTV (closed-circuit television) cameras or connected home devices. This raises the issues of the security and privacy of that data.

Security at stake

With the Internet of Things, hackers now have potentially billions of IoT devices and connections to exploit, using simple security flaws, such as unpatched software and default credentials, in order

to launch large-scale DDoS (Distributed Denial of Service) attacks.

Several technical solutions exist today and a number of groups, including ETSI TC Cyber and the oneM2M group, are currently addressing the issue of standards for IoT Security. Educating the end users is essential to help them protect their IoT devices, by providing advice on secure passwords, privacy settings, software updates or Wi-Fi usage, to give but a few examples.

Also, new technologies such as Blockchain, are seen by some as a "new hope" for IoT security, whereby devices could use smart contracts to exchange information.

These private and public distributed ledger technologies enable devices to autonomously secure direct communications using reliable time-stamped contractual handshakes, without the need for a centralized authority.

Standardization is a "must"

Standardization is one of the biggest challenges in helping the IoT grow under the best possible conditions, as it requires a multitude of technologies to interwork seamlessly, and a single standard cannot cover every aspect of the IoT.

At the European level, the AIOTI (Alliance for IoT Innovation) WG03 has provided an overview of the current IoT Standards and Open Source landscapes.

In order to make the Internet of Things a reality, "global" standards are required. These standards need to be developed

by all the relevant stakeholders, including industry, academia, government and regulatory bodies. Broad participation in the development of standards for the Internet of Things is key, as many new actors are involved. For example, cities have specific requirements and may not be familiar with standards. However, they need to be involved, to express their requirements and to work on the standards that will provide them with open and interoperable products and solutions for their future.

As the IoT continues to develop, and focus shifts from experimentation to business deployments, we should see the associated costs of devices and systems drop, as their performance increases. This is in part enabled by the global standards that help to simplify technology choices and to encourage economies of scale.

To know how the IoT is moving forward, come to the ETSI IoT week!

■ *David Boswarthick, ETSI's Director Committee Support Centre*
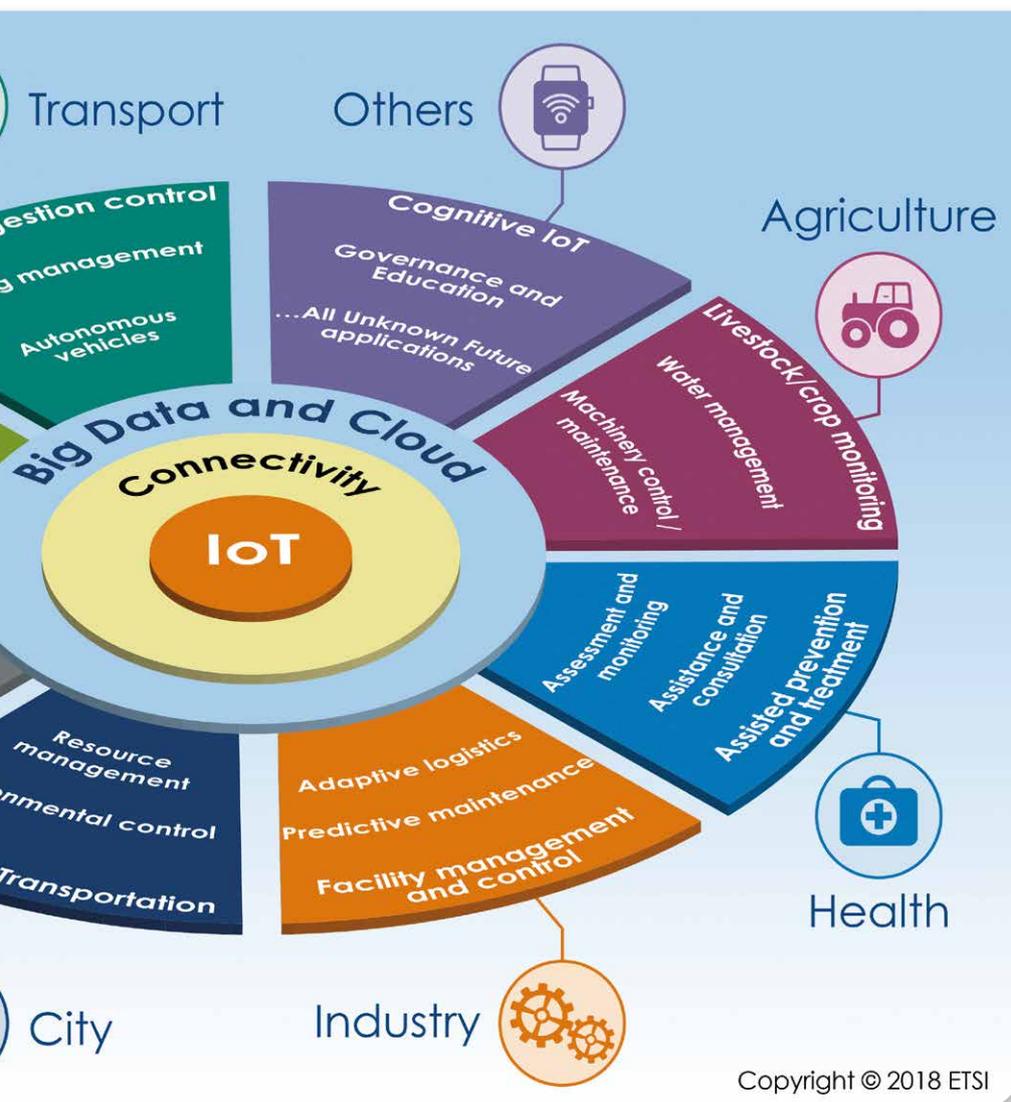
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Smart lighting in Bordeaux,
"A first tangible oneM2M outcome for cities"

In 2017, the public lighting department of Bordeaux Metropolis and the City of Bordeaux received public funding to deploy an IoT experiment in a reference district of the city. A first use case of smart lighting that will lead to other use cases.
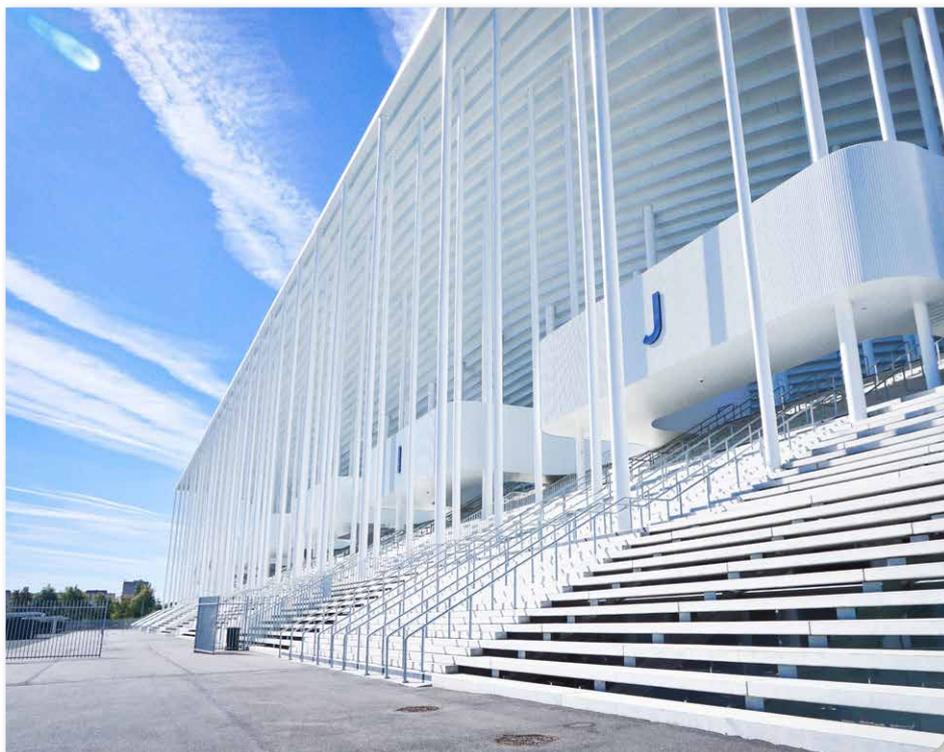
The experiment consisted of deploying a street lighting service comprising 220 lampposts in the Le Lac district of Bordeaux. This district hosts public facilities used for events and major trade fairs and exhibitions. The facilities around the lake include the Exhibition Centre, the Convention Centre, a hotel district, the Floral Park, and sports facilities, such as the iconic Matmut Atlantique football stadium and the Vélodrome stadium.
Very quickly, significant energy and financial savings were identified, as this district does not need lighting on a permanent basis. The street lights are only switched on during events or when street sensors detect vehicles or pedestrians.

The experiment was a real success. And as the saying goes, "appetite comes with eating". It led other city departments to express an interest in connecting several operational technologies based on the Internet of Things model and standards.

The identified use cases include:

- The supervision of boilers for a group of schools and sports facilities
- Electric vehicle charging stations
- Access control gates
- Water, electricity and gas meters
- Points for the collection of voluntary contributions of goods
- Waste collection bins

To pilot all these sensors and actuators, Bordeaux City's Digital Department studied the network requirements and how the network could be optimized for deployment, given the volume and diversity of the operational technologies to be connected. The department quickly discovered that the operational technologies available on the market used different connectivity and data model technologies or protocols, such as KNX, DLMS/Cosem, Dali, BACnet, Modbus or others.

The City of Bordeaux, which is involved in ETSI's work and in its partnership project oneM2M, wanted to have an interoperable IoT solution based on the oneM2M Release 2 standard.

The relevant technical clause was included in the call for tender. oneM2M provides a standard-based glue between diverse operational technologies.
It is very encouraging to see that interoperability standards such as oneM2M allow communities to invest, on a large scale, with confidence in the sustainability and extension of services offered to users, at the pace allowed by the financial capacities and the political priorities of the moment.

The rollout of the different sensors, network and data store was launched at the beginning of June 2018. The Bordeaux Metropolis staff in charge of the project are now eager to analyse and draw conclusions on the possibility of extending the scope of this experiment on a larger scale on its territory.

■ *Christophe Colinet, Smart City Project Manager, City of Bordeaux*

Seizing the mobile opportunity
with the **EBU**

Broadcasters need to work closely with the mobile industry in order to turn the opportunities presented by new mobile technologies into tangible benefits for both sectors and the end user.

Reaching as wide an audience as possible is an imperative for all broadcasters. Public service media, which form the membership of the European Broadcasting Union, also have an obligation to make their content universally available to the public. To do so, they use both conventional broadcast networks and the public telecommunications infrastructure. This, however, increases operational complexity and drives up distribution costs.

The current mobile environment is particularly challenging for public service broadcasters in this regard. The ever-growing rates of content consumed on mobile devices are a strong incentive for broadcasters to be present in that space, but to make large-scale media distribution over mobile networks viable, further technical developments were needed.

In 2015, 3GPP initiated a study that aimed to enhance support for TV services. This prompted the EBU to mobilise its members and become actively involved in 3GPP. Our high-level requirements found support among their members and were included in Release 14.

They encompassed substantial enhancements to LTE evolved Multimedia Broadcast Multicast Service (eMBMS), the broadcast mode in the 3GPP system, and to the service layer, to enable support for commonly used TV delivery formats. European broadcasters have since engaged in a number of tests and trials of LTE eMBMS in order to gain a better understanding of the new system and its utility for content distribution.

But as mobile technology evolves, so do other content distribution systems, such as digital terrestrial television or satellite, and significant benefits might be obtained from using the mobile technology in conjunction with those systems – possibly leading to convergent solutions.

ETSI and the EBU, building on their long-standing partnership in the development of broadcasting standards, recognise the need to explore the deployment opportunities of converged networks, and to include all interested parties. This led to the creation of the ETSI Industry Specification Group on "Mobile and Broadcast Convergence", which was open to broadcasters, network operators, infrastructure vendors and equipment manufacturers alike.

As the Group Report concludes, for innovative convergent solutions to materialize, stakeholders from different parts of the industry need to agree on a common vision for new services. This is especially true in the case of 5G. The EBU and its members are committed to continue their contribution to ETSI and 3GPP activities in order to foster collaboration with the mobile industry and to realize win-win scenarios wherever possible.

■ *Darko Ratkaj, EBU, Senior project manager, Technology & Innovation*

IoT over 3GPP systems
early progress has served us well

The IoT is also being addressed in 3GPP. This article gives a brief introduction to some of the ways that machine communications have been covered in our groups.

If 5G is to revolutionize the way objects in the factory, on campus, in business or within our towns and cities will communicate across the network, the story behind that disruption is actually one of a more evolutionary kind of progress.

The rise of the machine has been on the minds of 3GPP experts since as far back as 2006, when our first study on facilitating machine-to-machine communication for GSM and UMTS was published.
Since then, the 3GPP groups have completed over 190 study items and work items on the subject.

Along the way, a major milestone was passed in 3GPP Release-13, with the completion of three technologies for machine communication over mobile networks: Extended Coverage GSM for the IoT (EC-GSM-IoT), enhanced machine-type communications (eMTC) and Narrowband IoT (NB-IoT).

Extended GSM coverage

The EC-GSM-IoT feature for pre-3G networks was developed to improve coverage indoors and to deliver improvements that extend the range of low data-rate transmissions.

Enhanced machine-type communications

The eMTC feature allows for coexistence with LTE services within the same spectrum. Also known as LTE Machine-Type Communications (LTE-M), this feature is reducing device complexity in order to make the LTE spectrum competitive for MTC applications.

Narrowband IoT

NB-IoT aims at reducing costs even further than was achieved with eMTC. This new feature is designed to consume less power and bandwidth, offering spectrum flexibility (not just for LTE), optimized for low data rates with ultra-low device complexity..

With these three options, we have standardized solutions for machine communications. This is an achievement that was vitally important to avoid the potential market fragmentation that would have resulted from operators adopting the proprietary and potentially non-interoperable technologies that were coming to market at the same time as our 3GPP solutions.

So, job done? Not really. Now 3GPP groups are starting to improve on these features, to ensure that enhanced machine-type communications and Narrowband IoT can successfully migrate to the evolving core network - the Next-Generation Core - with specific slices for the IoT, including services that will rely on dedicated low-latency resources.

In 2018, support for Ultra-Reliable Low-Latency Communication (URLLC) has been introduced, to allow for new 'use cases', such as augmented reality, virtual reality, autonomous machines and various modes of transport to be supported.

Beyond that, a study of the needs of the Industrial Internet of Things from 5G NR (new radio) is now underway.

To look more closely at the IoT and machine-type communication specifications and reports from the 3GPP groups, visit the work plan page on the 3GPP website.

■ *Kevin Flynn, Communications Professional 3GPP*

Achieving IoT interoperability
with oneM2M

Whether it's smart wearables, connected cars and machines, consumer electronics or smart city deployments, there's no denying the IoT is growing rapidly.

However, creating true value for enterprises and consumers while ensuring a safe and secure experience does not come without challenges – and device providers, service providers or application developers must address these in their IoT strategies.

Safe, secure and valuable

As technology advances, cybersecurity is one of the biggest prohibitors to mass IoT adoption with new security challenges, requirements and issues arising with each deployment. Parks Associates' 'Network Security' survey revealed that almost half of consumers rank data security and privacy issues as top concerns about connecting their devices.

Due to the nature of IoT sensors and actuators – which directly impact on people's living and working environments – IoT players can no longer put security on the backburner. This is particularly true in industrial environments, where security glitches could potentially result in life-threatening situations.

The other big must is delivering an experience that truly enhances end-users' environments. Machine-to-Machine technology is complex, including a wide range of functions and numerous devices and servers.

This complexity needs to be hidden from end-users via a simple, easy-to-use interface which allows operational control through one system. If end-users need to operate multiple, complex systems or the experience is disjointed, this adds stress and additional actions which will inhibit adoption.

Framework makes the dream work

A horizontal linking of data through a universal, standards-based approach is key in delivering these requirements, enabling multiple devices from various industries to be brought together on the same platform and share data to improve end-user experience and security.

oneM2M provides this framework, creating an abstraction layer which allows every component in the deployment to communicate. This harmonizes data models to offer a cross-vertical and multi-vendor interoperability authentication of each application or device, improving the value data sharing brings to end-users in a secure and controlled manner. The abstraction layer also hides complexity from app developers, spurring innovation.

oneM2M's latest set of specifications, Release 3 – which has just been published – further builds on oneM2M's ultimate goal opening up the IoT ecosystem and improving the business case for players looking to launch services.

The latest set of specifications brings dramatically enhanced 3GPP interworking – in particular cellular IoT – and new capabilities to unlock value in industrial and smart-home applications.

■ *Patrick Van de Wille, Chair of Marcom at oneM2M*

IoT Security Summit

October 16 – 17, 2018, Dallas Fairmont, TX

Now in its fourth year, IoT Security Summit 2018 is heading to Texas. The event will welcome 250+ decision makers, influencers, and investors, 80+ speakers, and 30+ exhibitors and startups.

Focusing on establishing full stack, cloud-to-edge-security, the conference agenda will include topics such as Identity & Access Management (IAM), Blockchain, AI, Identity of Things (IDoT) and Quantum Computing.

To register, visit their website.

AIOTI

AIOTI's objective is to strengthen the dialogue and interaction among Internet of Things (IoT) players in Europe, and thus contribute to the creation of a dynamic European ecosystem to speed up the take-up of IoT. ETSI has been part of the Alliance for Internet of Things Innovation (www.aioti.eu) since its inception.

With the active support of the European Commission (EC), since 2015, the Alliance has published reports covering IoT policy and standards issues where ETSI played a catalyst role. It also provides recommendations for future collaborations in the IoT Focus Area of the European Union-funded research and innovation programme.

Within AIOTI, the AIOTI "IoT Standardization" working group (WG03), chaired by ETSI, identifies and makes recommendations to address existing IoT standards, analyses gaps in standardization, and develops strategies.

This group does not develop standards but builds consensus based on participation, contribution and an open way of working. Its vision is to be recognized as a major contributor to the worldwide interoperability, security, privacy and safety of IoT systems and applications. Addressing the challenges of the IoT today, it aims to increase confidence in IoT markets, providing guidelines for users and showcasing successful applications.

ETSI is playing a key role to make the AIOTI "IoT Standardization" working group a standardization partner to the European Commission, including both policy and research aspects. ETSI helped the group to become the leading forum for exchanging information about standards, implementations and innovation in IoT.

■ *Patrick Guillemin, ETSI's Technical Officer and IoT Coordinator*

Digitizing European Industry…"interoperably"!

To what extent are bytes going to drive moving floors and supply chains?

A modern manufacturing economy is almost unimaginable without interoperable digital tools and the data economy.

For planning, design, 3D-printing, sensing, control, energy supply, logistics, payments and - completing the cycle - the circular economy, interoperable standards are essential.

In the European Union, the political decision was made in April 2011, in the Digital Single Market package, to promote and coordinate growth and interoperability in standardization to "unlock the full potential of the fourth industrial revolution".

That work is being brought forward in a special joint working group of the Multi-stakeholder Platform - responsible for drafting the annual ICT Rolling Plan for Standardization, as well as recommending non-ESO specifications for EC usage - and the Digitizing European Industry programme.

ETSI is an active contributor to that platform. The Multi-stakeholder Platform DEI working group held a special open workshop in June, with others planned, where ETSI and many other standards development organizations were represented. The goal of the Digitizing European Industry group is, by November this year, to create an overview of the myriad of existing standards, study gaps and overlaps, and impact the next ICT Rolling Plan as well as the Horizon2020 project definition.

For more information: https://ec.europa.eu/priorities/digital-single-market_en

■ *Lindsay Frost, ETSI Board Member*

New ETSI video: **Smart Cities Made Simple**

ETSI is pleased to introduce the first video of a series. Its unique style positions ETSI as an innovative organization and paves the way to our new communication strategy focusing on social media. It also aims at educating a wider audience on the value added of standards.

In an increasingly urbanized world, where cutting-edge technologies are everywhere, cities are facing new economic, environmental and infrastructure challenges. But one of the main challenges for cities that truly want to go smarter, will be to ensure that they always keep a human-focused approach. How? Our video explains it all in a simple and fun way, on ETSI Youtube channel.

White paper:
Quantum

Quantum cryptography provides an ensemble of protocols, such as quantum key distribution, quantum random number generation, closed group digital signatures, long-term secure data storage and multi-party secure computation, which are robust against future algorithmic and computational advances, including the emergence of quantum computers.

The White Paper "Implementation Security of Quantum Cryptography" summarizes the status of quantum cryptography implementation security and outlines the current understanding of the best practices related to it.

White paper:
eHealth

Medical technology has often been viewed as a niche market, paling into commercial insignificance when compared to 'life-style' devices, and complicated by issues surrounding medical device regulation and government procurement practices.

To facilitate the growth of sensors, at the heart of many sectors, we need robust technical standards. The White Paper entitled "The argument in favour of eHealth standardization in ETSI" highlights the role of standards in eHealth technology today.

White paper:
Multi-access Edge Computing

Multi-access Edge Computing (MEC) complements the corporate data centre by providing computing, storage, networking and data analytics at locations closer to the data source and points of consumption. MEC solutions enable enterprises to manage their security and compliance requirements effectively.

The White Paper "MEC in an Enterprise Setting: a Solution Outline" gives an overview of MEC deployments in the enterprise environment, presenting several use cases and options. It also highlights key challenges and how to overcome them with MEC APIs.

The ETSI Work Programme 2018-2019
is now available!

Our Work Programme brochure provides an overview of our current standardization projects. These include the development of technologies which have had a major global impact. But we are also exploring the latest emerging areas to keep in step with market demand.

The work of our committees is constantly evolving and the most up to date version of our upcoming standards and specifications is available online via our database. You can download the Work Programme brochure on our website or request a hard copy at info@etsi.org.
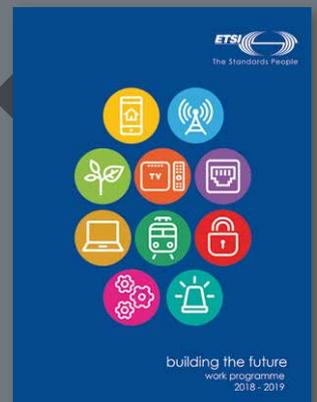
Latest news in the
Secretariat

Preparing the next generation of standards professionals

Standardization has become a key business process in the ICT industry. Step into any ETSI committee meeting, and you will encounter individuals with a wealth of professional experience, both in their technical areas, and in standardization processes. They acquired their technical knowledge through education, training and life-long learning. But it is unlikely they received much formal education or training in standardization, beyond attending the ETSI Seminar (strongly recommended!) or other such courses.

To try to remedy this situation and prepare a new generation of standards professionals, ETSI, with the support of the European Commission and the EFTA Secretariat, has been running a project to develop teaching material for a comprehensive education course on ICT standardization.

This material could be used in a standards-focused module in engineering and scientific education. Parts of it could also be used in business and legal education. The material, a textbook and a comprehensive set of slides, is available from the ETSI website free of charge, and is designed to be adapted by lecturers and teachers according to their specific needs.

The teaching material was presented to a selection of academics, researchers and lecturers at a conference in ETSI on 4-5 October, Boosting ICT Business and Innovation: A Comprehensive Approach to Standardization Education in Europe. The material is being trialled in universities and we expect its usage to grow as we update and promote it over the coming years.

■ *Ultan Mulligan, ETSI's Director of Innovation*

The brand new ETSI website
is coming soon!

ETSI's objectives and goals are getting more challenging every year... and they include our website. We are excited to announce that a new and refreshed website will be launched in Q4 2018.
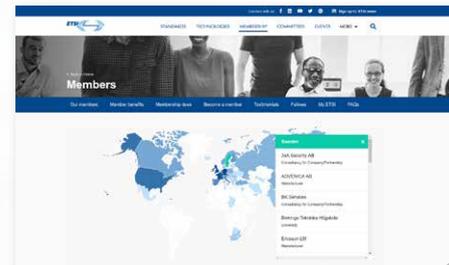

Why a new website?
Because we value performance and change and we want our new website to reflect ETSI's five strategic objectives: being at the heart of digital, being global, versatile, inclusive and an enabler of standards. Our website is an important medium to strengthen the ETSI brand by showcasing our comprehensive work to the world and what The Standards People can achieve together.

The updated site includes various improvements, with a better user experience for both mobile and desktop devices, and compliance with our updated specification on web accessibility, EN 301 549. We have also enhanced the structure to offer easier navigation.

What is coming?
A homepage with a modern design, a new section promoting in a better way the work in our technical bodies, a full media library, revamped pages for events, technologies and membership, and much more!

■ *Sabine Dahmen-Lhuissier, ETSI's web communications professional*

Shorter and easier process for IPR declaration

In the world of Intellectual Property Rights, one major issue for patent holders is that their declarations get reflected as soon as possible.

The current ETSI tool, relying mostly on human manual input, cannot be easily automated or linked to patent holders' databases. Therefore, with the increasing number of IPR declarations, patent holders have expressed their need for an automatic, large-scale declaration tool. The Bulk Upload feature is designed to make this process easier and shorten the time needed to finalize an IPR Declaration.

At the same time, it will ensure that all the data provided are linked to the standards information in the ETSI Database, and patents information from the European Patents Office (EPO).

Bulk standard/patent disclosures will be uploaded using a template, that voluntary member organizations (Panasonic, Huawei, Qualcomm, Orange, InterDigital, Nokia, Apple, ZTE, Ericsson, BlackBerry, Fraunhofer and IBM) have tested and helped improve with their feedback.

This new feature will be deployed and tested this autumn and should be up and running by the end of the year.

■ *Philippe Cavé, ETSI's IT Functional Analyst*

Specialist Task Forces:
what for?

Our groups sometimes need to accelerate the production of standards in strategic areas, when their development requires specific technical competences, and/or if the time scale cannot be achieved through the normal voluntary contribution of the delegates. To address this need, ETSI has created Specialist Task Forces (STF). They can be proposed by ETSI members, through the committee they report to, or requested by the European Commission (EC) and the European Free Trade Association (EFTA), which are also funding organizations.

Task force members are recruited through an open Call for Expertise, which is being sent to all ETSI members and available on our website. Applications may come from an ETSI member or an external organization, but need to be supported by an ETSI member. Once selected, the service providers enter into an agreement with ETSI and their remuneration is based upon the timely and qualitative achievement of milestones. The specification drafts they produce go through the normal approval process of their committee.

Over 40 STFs are currently active or under creation in ETSI. They comprise more than 140 service providers while six ETSI secretariat staff members offer them the relevant administrative and financial support.

■ *Youssouf Sakho, ETSI's Funded Projects Support Director*

Hear from us in conferences
and meet with us at exhibitions.

Find more information and register on our website at:
www.etsi.org/news-events

October 2018

ETSI IoT Week
22-26 Oct., ETSI, Sophia Antipolis, FR

The ETSI IoT Week, the evolution of our highly successful M2M/IoT Workshop series, has become the must-attend event for anyone involved in IoT and who appreciates the value of standards-enabled technologies and deployments. The event will include a oneM2M Developers' Tutorial, IoT Security and Privacy Workshop, Smart Body Area Networks Workshop, IoT Workshop and oneM2M Showcases.

Fourth OSM Hackfest
29 Oct - 2 Nov, Palo Alto, US

This OSM Hackfest, hosted by VMware, will allow new users to get familiar with OSM Rel FOUR and exercise all the main and more advanced functionalities, with a big focus on VNF on-boarding activities. In addition, experienced users and developers will have the opportunity to hack into OSM, fine-tune, test and demonstrate Release FIVE and experimental features on the OSM Remote Labs network

November 2018

Joint ETSI / IQC Quantum Safe Workshop
6-8 Nov., Beijing, CN

Organized by ETSI in partnership with IQC and Chongqing University, the event will start with an Executive Track on 6 November and will be followed by an in depth Technical Track on 7-8 November 2018.

NGMN Industry Conference & Exhibition
6-8 Nov., Vancouver, CA

Endorsed by ETSI, this event will be the place for thought leaders of the ICT industry to present their views and visions on 5G business and strategy, 5G architecture and technology as well as 5G experience from first deployments and field trials.

#Berlin5GWeek
12-16 Nov., Berlin, DE

Endorsed by ETSI, this event series discusses the newest network and software enabling technologies such as Software Defined Networks, Network Function Virtualization, Edge Computing, Industrial IoT, and 5G in the context of various industry verticals. This year the #Berlin5GWeek will feature the 2nd Edge Computing Forum, 2nd Industrial IoT Forum, as well as the 9th FOKUS FUSECO Forum.

December 2018

MCX Plugtests #3
3 Dec 2018-31 Jan 2019, remote

MCX Plugtests 3, which incorporates MCPTT, mission-critical data and mission-critical video, will be the first remote testing session following two face-to-face Plugtests events, MCPTT#1 and #2. The MCX Plugtests 3 will conduct over-the-top testing. Virtual private network (VPN) connections will be established amongst the participants in October and November. Remote testing sessions will be conducted in December and January with a pause during the last week in December

ICT 2018 Conference
4-6 Dec, Vienna, AU

This conference organized by the European Commission will address topics such as artificial intelligence, next-generation Internet, digital skills and high-performance computing. Speakers from policy circles, academia, civil society and industry will highlight their perspectives and priorities, and discuss how each can contribute to the successful digital transformation of Europe. Come and meet us on our stand!

Joint ETSI - OSA Workshop
11-13 Dec, ETSI, Sophia Antipolis, FR

This workshop, on Open Implementations and Standardization, between ETSI and the OpenAirInterface Software Alliance (OSA), will bring the 5G standardization and implementation communities together to reflect on the role of open implementations such as OpenAirInterface in support of the development of standards. A one-day pre-event training on Open implementation of 5G on general-purpose processors will take place on the first day

January 2019

India m2m + IoT forum
15-16 Jan, New Delhi, IN

Endorsed by ETSI, this forum aims at enriching the m2m and IoT ecosystem with market intelligence, technology trends, success stories and capacity building, and offers the best opportunity for branding and positioning, learning and sharing, connecting and networking with eminent peers, senior decision-makers from central and state government agencies and departments and industry experts.

First mWT Plugtests™event
21-24 Jan, ETSI, Sophia Antipolis, FR

This edition of the Plugtests event will focus on proving the ability of Software Defined Networks (SDN) to operate from an end-to-end service point of view. This is the first event focusing on the advantages of using a standard Northbound Interface (NBI): the ability to leverage the vast library of existing data models, elimination of most interoperability issues, true multi-vendor/multi-technology operation.

NG112 Emergency Communications Plugtests™ event
28 Jan -1 Feb, ETSI, Sophia Antipolis, FR

This event, in cooperation with the European Emergency Number Association (EENA), will see a testing campaign based on the use cases developed by ETSI and EENA, and is a unique chance for vendors of emergency communication equipment to test their product against different implementations and scenarios. The concept of "Next Generation 112" (NG112) is a potential answer to content-rich emergency calling

ETSI SNAPSHOT

2017 - YTD: September 2018

830 members
→ **+63 YTD**

26% SMEs

60 technical groups

2760 standards
→ **+1127 YTD**

+730 standards under development

24 million standards' downloads
→ **+12** million YTD

574 meetings

ETSI
650 Route des Lucioles
06560 Valbonne France
Tel: +33 (0)4 92 94 42 00

3420 participants

99 partnerships

61 conferences & Plugtests
→ **+45 YTD**

@ETSI Secretariat

122 people

50% women

15 nationalities

66 countries

About ETSI

ETSI provides members with an open and inclusive environment to support the timely development, ratification and testing of globally applicable standards for ICT-enabled systems, applications and services across all sectors of industry and society. We are a not-for-profit body with more than 800 member organizations worldwide, drawn from 66 countries and five continents. Members comprise a diversified pool of large and small private companies, research entities, academia, government and public organizations.

ETSI is one of only three bodies officially recognized by the EU as a European Standards Organization (ESO).
For more information please visit: www.etsi.org

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to contribute, to be removed from the list of hard copies or subscribe to it, contact us at: enjoy@etsi.org

ETSI
The Standards People

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