

THE STANDARD

News From ETSI · Issue 1, 2018

ETSI creates City Digital Profile group on Smart Cities

Cities to procure interoperable smart solutions for their citizens

ETSI has created a new Industry Specification Group "City Digital Profile" (ISG CDP). It will help accelerate the delivery of integrated citizen services and provide a technology road map for city leaders who will benefit from standardized solutions from their suppliers.

In providing this technology framework and clear roadmap for technology investment and deployment, market confidence levels in the city infrastructure investments should increase and in addition this will give cities the possibility to replicate those solutions across domains, between

cities and on a large scale. Smart services are intended to improve the overall quality of living in the city and make them attractive to citizens, investors, business, innovators, visitors and tourists.

The City Digital Profile ISG will enable cities to procure smart solutions with confidence that those solutions will be extendable, configurable and interoperable with similar services from other cities and providers. City administrators will therefore deliver advanced services to their citizens, whilst respecting essential environmental factors, sustainability

objectives and reducing the overall cost of deployment.

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First 5G New Radio Specifications approved



3GPP has approved the first 5G specifications: the non-standalone 5G New Radio specifications were approved on 20 December 2017. Balazs Bertenyi, RAN Chair called it "an impressive achievement in a remarkably short time, with credit due particularly to the Working Groups". In the 3GPP plenary meeting at the end of December in Lisbon, Portugal,

he presented details of the group's approval of the Non-standalone 5G NR specifications and also outlined how RAN will now turn towards the completion of the first phase of 5G radio, Release 15, by June 2018.

To know more about 5G new radio, watch our CTO and 3GPP RAN and SA chairs: <http://bit.ly/2pd9GgC>

ETSI launches new group on Augmented Reality

ETSI has launched a new Industry Specification Group called Augmented Reality Framework (ISG ARF). This new group aims to synchronize efforts and identify key use cases and scenarios for developing an Augmented Reality (AR) framework with relevant components

and interfaces. It will provide technical requirements for AR specifications in order to ensure interoperable implementations that will benefit both technology providers and end-users.

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Releasing the Flow



Data protection and privacy in a data-driven economy

Come to our ETSI summit, 19 April 2018

Get a grasp of the policy and legislative landscape around data flow in EU and beyond. Discuss the interplay of data with regulation, legislation, technologies and standards. Hear viewpoints and debate with experts coming from different points of the ecosystem.

For more information:
<http://www.etsi.org/etsisummit>

Welcome to the World of Standards



Welcome to this first issue in 2018 of our newsletter, The Standard. As you can see from our cover page logo, this year marks 30 years since the foundation of the institute. While every new year offers new milestones to honour, we prefer to look forwards instead of backwards. 5G will dominate much of our work in ETSI and 3GPP in the near future. 2018 will be a major milestone for 5G, since 3GPP plan to complete the first full set of 5G specifications (3GPP Release 15) in June, and ETSI will publish them shortly afterwards. 3GPP have already finalized an initial set of 5G specifications, you can read a note about that in these pages.

Our articles in this edition will give you some insight into other new technologies which may change our day-to-day lives: augmented reality, automation, cybersecurity, quantum safe cryptography, software defined radio, smart cities and much more. We're preparing the innovation which will bring us forward another 30 years.

Once again,
I hope you enjoy this edition.



Luis Jorge Romero,
Director General, ETSI

ETSI creates City Digital Profile group on Smart Cities Continued (from page 1)

Cities to procure interoperable smart solutions for their citizens

"I am excited that this group will enable city leaders and suppliers to work together to embrace mass market replication of citizen centric systems that are innovative, agile and creative while also fully standards compliant, secure, resilient and cost effective," says Paul Copping, chair of the City Digital Profile ISG.

Initial cross domain city applications will include:

- Health and social care (disability entitlement; housing benefit and rent payment; housing condition, assisted living and vulnerability)
- Building management and connected homes
- Urban lighting
- Water and waste management and energy
- Transportation and mobility
- Environmental issues such as pollution and resource optimization

Other key issues such as citizen related data retention and privacy protection will also be considered, in cooperation with such groups as oneM2M, the ETSI founded partnership project and the ETSI Technical Committee Cyber.



ETSI launches new group on Augmented Reality Continued (from page 1)

The group held its kick-off meeting on 30 November and 1 December 2017, and elected Ms Muriel Deschanel from bcom as chair of the group and Ralf Schäfer from Fraunhofer HHI as the vice chair. The work of the ISG will start with an analysis of the AR standards landscape, the analysis of use case requirements and obstacles, and the development of a framework architecture.

"There are huge differences in AR applications but mapping digital information with the real world implies the use of a set of common components offering functionalities such as tracking, registration, pose estimation, localization, 3D reconstruction or data injection. The development of such a framework will allow components from different providers to interoperate through the defined interfaces." says Ms Deschanel, chair of the ISG ARF. *"This will in turn avoid the creation of vertical siloes and market fragmentation and enable players in the eco-system to offer parts of an overall AR solution."*

Augmented Reality is the ability to mix in real-time spatially registered digital content with the real world. AR technologies and applications will play an essential role in Industry 4.0, and the success of smart cities and smart homes. Mobility, retail, healthcare, education, public safety are other examples of domains where AR will bring significant value. AR is quickly advancing into a new phase of enabling context-rich user experiences that combine sensors, wearable computing, the Internet of Things and artificial intelligence. That capability is a unique opportunity of value creation. The need for transparent and reliable interworking between different AR components is key to the successful roll-out of such services.

Participation in the Augmented Reality Industry Specification Group is open to all ETSI members as well as organizations who are not members. For information on how to participate please contact ISGsupport@etsi.org

Smart to Future Cities

EUROPE'S ONLY CITY CENTRIC EVENT FOR CITIZEN CENTRIC SMART CITIES

25 - 26 April 2018,
Radisson Blu
Portman Square,
London

25-26 April 2018, Radisson Blu Portman Square, London

Join us for Europe's only city centric event for citizen centric smart cities. The event will focus on practical, scalable applications of smart city initiatives to improve infrastructure and quality of life.

Several ETSI groups and speakers will debate during the session on Accelerating Smart City Deployments Through Standards-Based Technology Solutions, in the afternoon of 26 April.

Visit the event's website to know more:

<https://tmt.knect365.com/smart-future-cities/>

ETSI and OpenFog Consortium collaborate on Fog and Edge applications



Leading organizations in fog and multi-access edge computing sign MOU to share work related to global standards development for fog-enabled mobile edge applications and technologies

ETSI and the OpenFog Consortium will collaborate to develop fog-enabled mobile edge applications and technologies. The two organizations have recently signed a Memorandum of Understanding (MOU) with intent to benefit organizations working to develop 5G, mission-critical and data-dense applications through fog computing and networking and thus reduce technical overlap across the multitude of domains.

"This OpenFog-ETSI MOU is a significant step in our efforts to build interoperability for efficient and reliable networks and intelligent endpoints operating along the Cloud-to-Things continuum," said Helder Antunes, chairman of the OpenFog Consortium and Senior Director, Cisco. "We're now positioned to leverage our respective work to give the industry a cohesive set of standards around fog computing in mobile environments, while eliminating any redundancy in our respective efforts."

"Establishing a cooperation framework with OpenFog represents a significant step towards adoption of our standards by the industry," said Alex Reznik, Chairman of ETSI MEC ISG. "This alignment of a leading industry consortium and a leading standards setting organization in the fog/edge space should make it easier for both application developers and infrastructure solution providers to develop towards a common, open and interoperable edge computing environment."

OpenFog will work with the ETSI Multi-access Edge Computing (MEC) Industry Specification Group (ISG). The two organizations will cooperate on Information and Communication Technologies (ICT) standardization and interoperability requirements by sharing and applying selected technical work in process. MEC's work addresses multiple multi-access edge hosts deployed by different operator-owned networks which run edge applications in a collaborative manner. The OpenFog

Reference Architecture will extend the mobile edge with a physical and logical multi-layered network hierarchy of cooperating fog nodes that interface between cloud and edge, allowing for interoperability across operators.

One of the first initiatives from the agreement will be focused on Application Programming Interfaces (APIs) which support edge computing interoperability. The [recently released package of MEC APIs](#) contain important properties that can be adapted and used in the [OpenFog reference architecture](#). The ETSI MEC specifications also include an API framework which provides a framework for delivering services to be consumed or offered by locally hosted or remote authorized applications. By adopting and re-using APIs across the OpenFog and MEC architectures, it will be easier for developers to create common architectures, unify management strategies, and write a single application software modules that run on both OpenFog and MEC architectures.

ETSI hosts second NFV Plugtests event

ETSI has shown continued commitment to drive the progression of Network Functions Virtualisation (NFV) technology through our efforts to ensure that widespread interoperability is supported. Following on from the success of our previous NFV interoperability Plugtests™ gathering, ETSI has just finalized the second event.

This latest NFV Plugtests event was held at ETSI, in Sophia Antipolis, France, between 15 and 19 January. Once again the primary objective was to provide a valuable opportunity for extensive multi-party interoperability testing to be carried out. Representatives from vendors and several open source communities were able to evaluate the level of interoperability of their implementations and confirm that they adhere to the NFV specifications that are being defined by ETSI. Supporting open source communities include ETSI OSM (Open Source MANO), OPNFV, OpenStack and Open Baton.

The five day interoperability session dealt with all key components of NFV deployments, including virtual network functions (VNFs), NFV infrastructure (NFVI), Virtual Infrastructure Managers

(VIMs) and management and orchestration (MANO) solutions. Over the course of the week a series of comprehensive interoperability test sessions were embarked upon. These covered the combining together of various different VNFs, NFV MANO solutions and NFV platforms.

Extending the scope of what was undertaken at the previous NFV Plugtests event, which took place earlier this year in Leganés, Spain, the sessions encompassed further important aspects that are now emerging. These included multi-site operation, network path, enhanced platform awareness, fault and performance management and NFV application programming interfaces to name a few.

A vital aspect of this latest event was the continuous and ubiquitous testing environment that attendees accessed to as they join the NFV Plugtests Programme. This exciting innovation, based on the ETSI Hub for Interoperability and Validation (HIVE), enabled remote integration and pre-testing for the event, but also further collaborative testing and validation activities such as remote interoperability testing, PoCs, demos or API validation during and between NFV Plugtests events.

In parallel, ETSI OSM organized an OSM Hackfest which supported onboarding activities focusing on Day 0/1/2 operations (install, configure, optimize) that leverage the latest capabilities offered by the OSM platform.



ETSI adds extra dimensions to virtualization of communication networks with continued NFV specification activity

The ETSI NFV Industry Specification Group (ETSI NFV ISG) has taken further steps towards establishing a ubiquitous platform upon which the global adoption of network functions virtualization (NFV) technology can be driven thanks to the completion of a series of key specifications.

Over the course of the last quarter 2017, 6 new NFV specifications have been published. These cover virtual network function (VNF) package structure, the dynamic optimization of packet flow routing, and acceleration resource management right through to hypervisor domain requirements. In addition, a total of 18 different work projects have been approved.

Central to these endeavours is the defining of unified application programming interface (API) specifications in order to ensure that widespread multi-vendor interoperability can be achieved. This will mean that the numerous integration challenges that the industry currently faces can be fully addressed, and the pace at which NFV roll-out occurs thereby accelerated.

As a direct consequence, it will lead to solutions and network services from different vendors being brought to market in the future that are all interoperable with independently developed NFV management and orchestration systems.

Two of the six latest specifications of ETSI NFV, which detail REST APIs for management and orchestration, can be accessed by visiting the following links - [ETSI GS NFV-SOL 002](#) and [ETSI GS NFV-SOL 003](#). [ETSI GS NFV-SOL 004](#), has also been completed, it specifies the format and structure of a VNF Package and is based on the OASIS TOSCA Cloud Service Archive (CSAR) format.

An OpenAPI representation of the specified APIs will also be made available on the ETSI forge, a set of collaborative tools for standardized technologies, by the end of this year.

"It is clear that NFV will thrive through being backed up by an expansive open ecosystem that encourages innovation from the broadest possible range of sources. By delivering standardized open interfaces and descriptors,

ETSI is giving new players that have not previously been involved in this sector the opportunity to make a major contribution to its ongoing progression," states Diego Lopez, Chairman ETSI NFV. "With the ground-breaking work that is now being done we are getting closer to a stage when universal integration is finally achievable and vendors' VNF solutions can be executed and managed via any orchestrator and management solution without integration problems arising. Furthermore, all of the components parts of such management/orchestration systems will be completely interoperable with one another."

The ISG continues with the development of a third release of deliverables (NFV Release 3), with objectives of providing specifications and guidance for operationalizing NFV. It will also perform in-depth studies on forward-looking topics, such as enhanced security for the entire NFV environment or considerations on applying NFV to network slicing for future 5G deployment.

ETSI completes work on VoIP emergency caller location

The standard developed in the Technical Committee Network Technologies represents an essential step to support emergency services with systematic location information delivery.



EC Mandate 493 (2011) required ETSI to develop a solution to enable the localization of VoIP emergency callers, in response to the Universal Service Directive 2002/22/EC. The potential impact on existing emergency service architectures, with the risk of high adaptation costs that a completely new technological approach could have brought, had to be carefully considered to design a viable solution. An unbalanced one could have led to important impairing in case the EC would mandate the deployment, favouring one or the other market area. Some of these touchy aspects were related to, for instance, security and opening of access to databases. A careful technical work has allowed attaining a balanced solution acceptable to all parties involved.

After the definition of the service architecture in ES 203 178 in 2015, TC NTECH has completed the work by specifying the protocols to be used at the interfaces exposed in this architecture. Consequently ES 203 283 was published at the end of November.

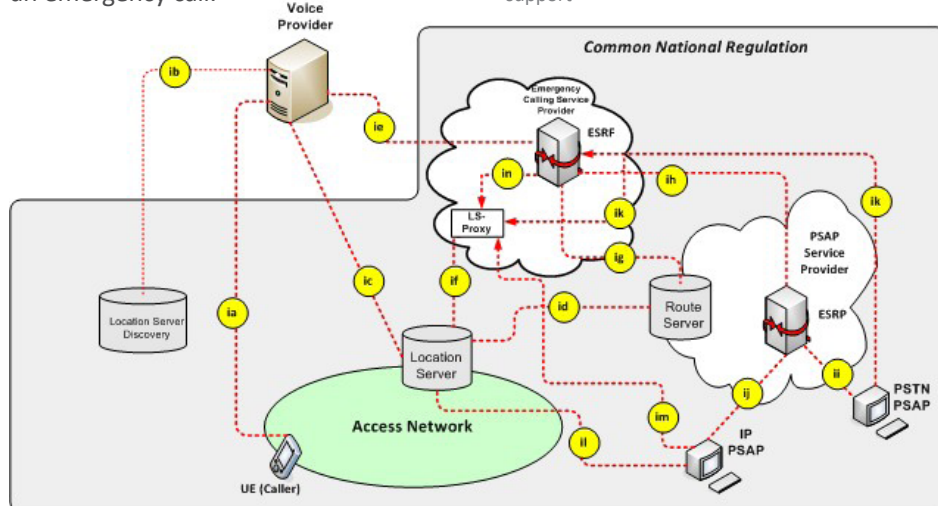
The challenge of these specifications was to conciliate the interests of network operators, who already provide the localization of emergency callers connected to their IMS networks, with those of service providers that offer VoIP call services using different types of IP platforms. The possibility for the users to benefit from VoIP service providers independently from the location and the regulatory domain poses several challenges for the definition of a suitable solution that still has to comply with traditional implementations of emergency services and legacy Public Safety Answering Points (PSAPs), as the mandate explicitly required.

TC NTECH has therefore taken into consideration all these aspects and worked out the most balanced possible solution. It allows the required opening to new market players with the definition of the needed interfaces between the access network providers, the VoIP service providers, the emergency service providers and finally the PSAPs, but is still compliant with a classic 3GPP network.

ES 203 283 leverages a number of IETF-defined protocols, some of which did not initially fulfil all the requirements identified in the service architecture specification. In order to fill this gap, TC NTECH has proposed, through contributions submitted by some of its members to IETF, updates to HELD (HTTP-enabled Location Delivery protocol) and SIP (Session Initiation Protocol). A new version of HELD (RFC 7840) now supports the provision, upon request, of routing information along with location information. SIP changes are still in the process of finalization and will allow providing information on the location information source along with the location information itself in an emergency call.

Taking into account requirements from the industry to enable the support of emergency services for private IP networks, the specifications published by ETSI in response to Mandate 493 provide a solid technical reference for enabling the determination and transport of emergency callers' location information regardless of the voice service provider they use. The provisions in the two documents also support the cases where regulation imposes an aggregation provider interfacing all active voice service providers with network providers and emergency service providers.

Architecture for VoIP emergency caller localisation support



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ETSI standards for autonomic management & control of networks and services using Artificial Intelligence (AI)

By Tayeb Ben Meriem: Orange; NTECH AFI (Evolution of Management towards Autonomic Future Internet) working group chair

This article gives an overview of the ETSI Network Technologies Technical Committee (TC NTECH) work on standards for autonomic management and control of networks and services. This includes the use of Artificial Intelligence (Cognitive Algorithms) in control-loops for real-time and predictive analytics that drive self-adaptation and dynamic policing of network resources, parameters and services.

High level view on ETSI NTECH AFI scope

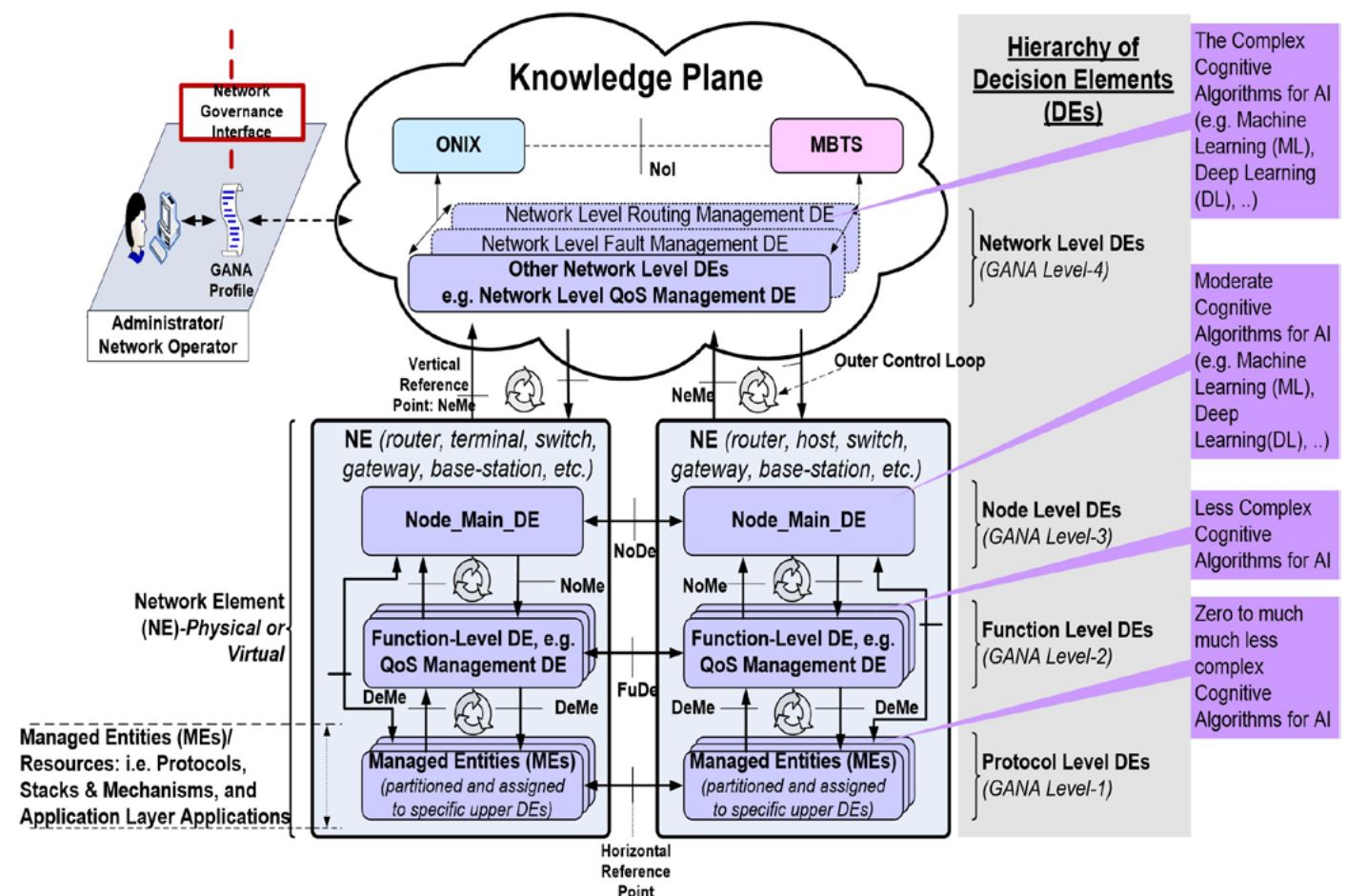
TC NTECH AFI has made significant progress in developing standards that prescribe methods and mechanisms for introducing intelligence in the management and control operations of networks and services. Namely the application of the autonomics paradigm, with the goal of prescribing design and operational principles for self-managing and self-adaptive networks that enable to achieve OPEX reduction and other benefits autonomics brings to network operators (Service Provider networks and Enterprise networks).

TC NTECH AFI focuses mainly on autonomic networking. This includes introducing network node/function self-manageability properties (e.g. self-configuration, self-diagnosis, self-repair, self-healing, self-protection, self-awareness, etc.) within network nodes/functions themselves and enabling distributed in-network self-management within the data plane network architectures. This low level intelligence (autonomics) is complemented by higher level autonomic management and control of networks and services—by which the autonomics paradigm (control loop) is introduced outside of network elements, in the outer, logically centralized, management and control planes architectures of a particular target network. The ETSI NTECH AFI GANA (Generic Autonomic Networking Architecture) reference model combines perspectives on these aspects, so as to capture the holistic picture of autonomic networking, cognitive networking and self-management design and operational principles.

GANA instantiations are performed onto evolving and future network architectures and their associated management and control architectures. Autonomics algorithms are meant to be implemented by the GANA Decision-making-Elements (DEs). Such algorithms include cognitive algorithms for Artificial Intelligence (AI) such as Machine Learning and Deep Learning, and other algorithms that can be employed in DEs' closed-loop operations. This model helps to achieve closed-loop (Autonomic) service assurance through the complementary abstraction levels for introducing self-management functionality and closed-loops.

Each of the ETSI NTECH AFI Technical Reports on GANA can be used by different players to implement proof of concept (PoC) demonstrations to showcase the autonomics solutions (based on standards) the industry is looking for, and to implement GANA autonomics in a particular target network architecture and its associated management and control architectures.

Snapshot of the GANA Reference Model and Autonomic Cognitive Algorithms for Artificial Intelligence (AI)



ETSI standards for autonomic management & control of networks and services using Artificial Intelligence (AI)

Continued (from page 6)

Latest and ongoing work in the group

A lot of work is being finalized in our group on GANA; GANA instantiations onto various network architectures and their associated management and control architectures; including scenarios, use cases and requirements for Autonomic/Self-Managing Future Internet (see [ETSI TS 103 194](#)).

An [ETSI white paper](#) provides a description of GANA concepts and describes the two categories of players the GANA model is addressing: suppliers/vendors of GANA functional blocks, and providers of assets required by the developers of GANA functional blocks.

The GANA white paper and other technical reports also describe relationships between GANA and other complementary networking paradigms such as SON (Self-Organizing Networks), SDN (Software-Defined Networking), NFV (Network Functions Virtualization), E2E Orchestration, network analytics, Big Data, and other paradigms. Business drivers for autonomic networking, an implementation guide for GANA, GANA instantiation onto the BroadBand Forum (BBF) architecture scenarios and insights on GANA integration with SDN and NFV are some of our latest or upcoming reports.

NTECH AFI is also in relation with 3GPP SA2 and SA5. Feedback was included in [TR 103 404](#). This technical report addresses Autonomicity and Self-Management in the backhaul and core network parts of the 3GPP architecture.

Artificial Intelligence (AI) in GANA is also a topic we look into with respect to how AI plays a role in GANA DEs, the Model Based Translation Service (MBTS) part of GANA, Data Analytics on various entities in the network and its management and control systems, including data collectors, and cognition modules and cognitive algorithms in general.

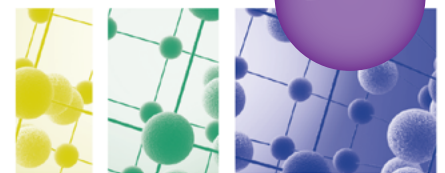
NTECH AFI launched a PoC framework that can be used by different payers to respond to the call for autonomic PoCs available at <http://ntechwiki.etsi.org/>.

Collaborating with other organizations

The working group NTECH AFI work plan in 2018 and beyond will be dedicated mainly to testing and trialling activities through the AFI PoC framework and through collaborations with other SDOs on joint efforts in testing related activities. We will also seek to close gaps in standards, gaps exposed in the integration of GANA autonomicity with emerging

complementary networking paradigms and when instantiating GANA onto emerging and future network architectures and their associated management and control architectures. Another consideration that could be pursued would be to see how Open Source communities could be encouraged to help launch activities that bring GANA autonomicity into their frameworks.

Zero Touch & Carrier Automation Congress



**20-23 March 2018,
Madrid, Spain**

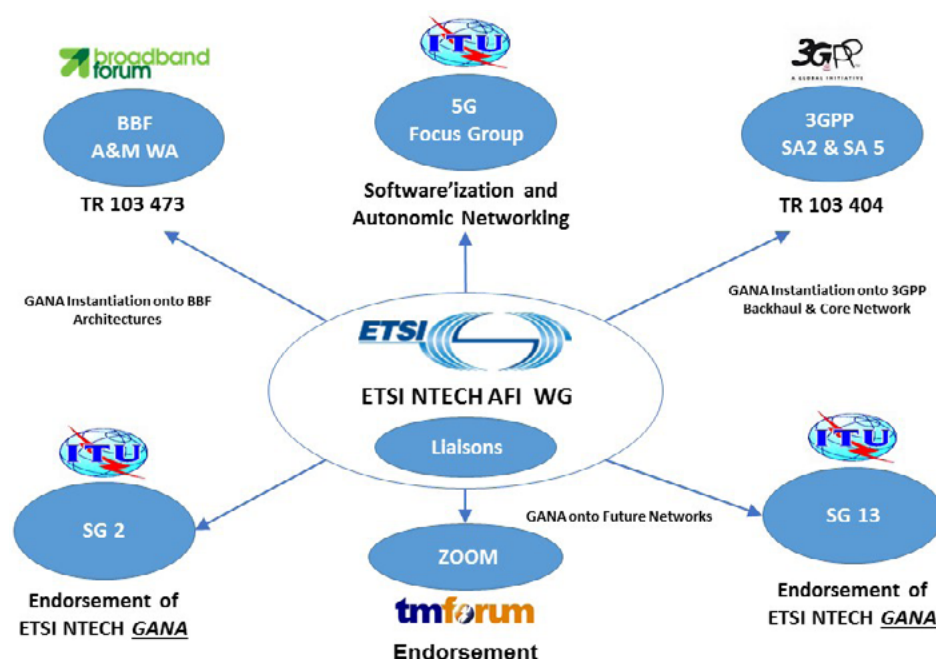
ETSI is pleased to endorse Layer123's very first Zero Touch & Carrier Automation Congress.

It is time for a fresh focus to create the future of Network & Service Management – practical and collaborative approaches founded in production network reality – so join the market makers at the start of the Zero Touch journey!

Our Director General, Mr. Luis Jorge Romero will be a speaker at the event. Our groups ZSM, ENI and OSM will also feature in the agenda.

To know more, visit their website at:

www.layer123.com/zta



Key Liaisons established between TC NTECH AFI WG and Groups in other SDO/Fora

Software Radio Reconfiguration enables upgrades to in-vehicle and IoT radio systems

Most new cars sold today offer connectivity as a feature, whether standard or optional. Customers expect their navigation systems to be connected, to download real time traffic information and map updates. Vehicle manufacturers increasingly provide remote diagnostics and vehicle software updates. And yet a fundamental problem remains: today these vehicles use 2G, 3G or 4G mobile networks to connect, while long before the end of their useful lives, 5G networks will be more common. The complete lifecycle of a vehicle is significantly longer than that of a mobile device, and completely out of step.

ETSI's Technical Committee for Reconfigurable Radio Systems has developed a system which can help solve this and similar issues. ETSI's Software Radio Reconfiguration model provides a modular and scalable solution to the challenge of deploying and using software radio systems. The solution, described in a recent ETSI white paper and in the EN 303 146 series of European Standards, allows a gradual and stepwise deployment of software reconfigurable radio. This enables device manufacturers to gradually implement software reconfigurable radios, developing confidence at each step of the way.

The ETSI Software Radio Reconfiguration model provides solutions to the following issues which all software radio systems must address:

- How to transfer and install radio software components in a secure way
- How to provide access to new software components to a user/operator
- How to deal with device certification and type approval when new radio software components can modify the radio behaviour of a device
- How to provide software portability and achieve efficient radio performance
- How to gradually evolve a system towards software reconfigurability

With the use of software reconfigurable radio, the radio system on board a vehicle can evolve and improve over time, with new software upgrades. Software reconfigurable radios will also help in other situations. For example, security concerns may require the upgrade and patching of radio systems deployed in the field. Yet manual intervention would be costly in the case

of vehicles, or even impossible in the case of inaccessible IoT devices.

An overview of the ETSI model and the solutions and functionality it offers is provided in the recent ETSI White Paper "Software Radio Reconfiguration: A highly efficient and modular software reconfiguration approach for mobile devices", available from the ETSI website. ETSI also held a webinar on this subject, on 8 December 2017. The recording can be viewed on the ETSI website.



ETSI launches Zero Touch Network and Service Management group

Enabling agile, efficient and qualitative management and automation of future services

ETSI is pleased to announce that it has created the Zero touch network and Service Management Industry Specification Group (ISG ZSM). The ETSI ISG ZSM will initially focus on the 5G end-to-end network and service management such as network slicing management and will extend to the management for future network generations. The goal is to have all operational processes and tasks - delivery, deployment, configuration, assurance, and optimization - executed automatically, ideally with 100% automation.

The group will define a new, future-proof, horizontal and vertical end-to-end operable framework enabling agile, efficient and qualitative management and automation of emerging and future networks and services. Horizontal end-to-end refers to cross-domain, cross-technology aspects. Vertical end-to-end refers to cross-layer aspects, from the resource-oriented up to the customer-oriented layers. The ZeroTouch NSM group will also facilitate the coordination and cooperation between relevant standardization bodies and open source projects.

The challenges introduced by the disruptive deployment of 5G trigger the need for network transformation and a radical change in the way networks and services are managed and orchestrated. These challenges are driven by the wide range of 5G requirements, including massive seemingly infinite capacity, imperceptible latency, demand for personalized services and unmatched degree of experience, global web-scale

reach and support for massive machine communication. Networks need to evolve towards programmable, software-driven, service-based and holistically-managed architectures, using the technology enablers and catalysts, such as NFV, SDN and MEC. New business models, including those enabled by technology breakthroughs such as Network Slicing, support new markets and impose unprecedented operational agility and higher cooperation across network domains. The resulting exponential increase in overall complexity makes automation a necessity.

"There are many issues that are currently hindering the automation of operations and Network and Service Management functionalities that need to be addressed at an industry level," says Klaus Martiny, convenor of the ETSI ISG ZSM. "A primary goal of the ISG ZSM is to identify requirements on the necessary management architecture and interfaces to support the end-to-end zero touch network and service management in a multi-vendor environment. It is important as well that existing solutions will be considered".

The kick off Meeting of ISG ZSM took place at ETSI on 10-12 January 2018. Participation in the Zero touch network and Service Management Industry Specification Group is open to all ETSI members as well as organizations who are not members. For information on how to participate please contact ISGsupport@etsi.org. The current list of ISG participants is available [here](#).

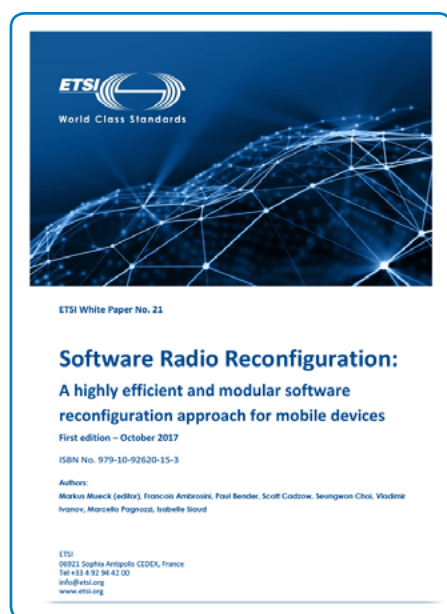
Latest ETSI White Papers

Software Radio Reconfiguration: A highly efficient and modular software reconfiguration approach for mobile devices

Developed by several authors, this white paper outlines ETSI's framework developed to enable reconfiguration of wireless equipment through software. It identifies some use cases which would benefit from software radio reconfiguration, together with some of the challenges that must be faced when deploying Software Radio Reconfiguration technology. It also presents the ETSI solution in more detail, and examines how it addresses specific challenges. [Read here](#).

Improved operator experience through Experiential Networked Intelligence (ENI)

Developed by several authors, this white paper draws attention to the need to improve the operator experience. The use of artificial intelligence (AI) techniques in the network management system could help solve some of the problems of future network deployment and operation based on the "observe-orient-decide-act" control model. [Read here](#).



ETSI General Assembly re-elects Dirk Weiler as Board Chairman



At their 70th General Assembly held on 28-29 November 2017, ETSI members selected a new Board and reelected Dirk Weiler of Nokia as Chairman of the ETSI Board.

Dirk has held various ETSI leadership positions during the last decade. He has chaired the ETSI IPR Special Committee since 2008 and has been Chairman of the Board since 2014. Dirk served as the Chairman of the ETSI General Assembly from 2010 to 2014.

Dirk is a member of the CEN-CENELEC-ETSI Joint Presidents' Group, member of the DIN Presidential Committee FOKUS. ICT and the ETSI representative to the European Commission's ICT Multi-Stakeholder Platform. He is Head of Standards Policy in Nokia, where he is responsible for standardization policy and Nokia's membership portfolio. Prior to 2007 Dirk held various management positions in the areas of development, research, intellectual property, standardization and marketing in the communication business of Siemens. Dirk has worked actively in standardization for over 30 years on technical, strategic and policy issues in organizations such as ETSI, 3GPP, ITU and OMA. Dirk has been working in mobile communications since he joined Siemens in 1985 starting with the development of the Mobile Communication System C450.

The ETSI Board meets regularly and operates under powers delegated by the ETSI General Assembly, in particular being responsible for managing ETSI's technical committees. The Board

consists of up to 30 members, including two seats reserved for representatives of SMEs and of Users. Members of the ETSI Board are elected for a three-year term of office.

ETSI Director General, Mr. Luis Jorge Romero, works closely with the leaders of the General Assembly and the Board in the management of the institute.

The members of the ETSI Board for the new mandate period 2017-2020 are:

- Niels ANDERSEN, Anemone Technology
- Rémi ARQUEVAUX, Ministère de l'Economie et des Finances, France
- Howard BENN, Samsung R&D Institute UK
- Jorge BONIFACIO, PT Portugal SGPS SA
- Angel BOVEDA, Wireless partners S.L.L.
- Chris CLIFTON, Sony Europe Ltd
- Axel FERRAZZINI, GovStrat SPRL
- Jochen FRIEDRICH, IBM Europe
- Lindsay FROST, NEC Europe Ltd
- Marc GRANT, AT&T GNS Belgium SPRL
- Simon HICKS, Department for Digital, Culture, Media and Sports, UK
- Kevin HOLLEY, BT plc
- Jamshid KHUN-JUSH, Qualcomm CDMA Technologies GmbH
- Magnus MADFORS, Ericsson Telefonaktiebolaget LM
- Pierpaolo MARCHESE, Telecom Italia
- Markus MUECK, Intel Deutschland GmbH
- Adrian NEAL, Vodafone Group plc
- Neviana NIKOLOSKI, Phonak Communications AG
- Gabrielle OWEN, Ministry of Economic Affairs, Netherlands
- Heinz POLSTERER, Deutsche Telekom AG
- Dominique ROCHE, eG4U
- Nick SAMPSON, Orange;
- Alain STARON, Veolia Environnement SA
- Christian TOCHE, Huawei Technologies France
- Sebastiano TOFFALETTI, SBS aisbl;
- Bogdan TOPIČ, SIST
- Isabelle VALET-HARPER, Microsoft Europe SARL
- Dirk WEILER, Nokia Solutions and Networks GmbH & Co. KG
- Helene WORKMAN, Apple (UK) Ltd
- Christoph WÖSTE, BMWi, Germany

Quantum-Safe Security: Technology Standards Overview

Mark Pecen - Chairman, ETSI TC Cyber Working Group for Quantum Safe Cryptography (QSC)

1. The Importance of Technology Standards

Technology standards and the standardization process itself are used for multiple reasons. A primary reason is to ensure that the several components of an Information and Communication Technology (ICT) system, for example, can be made to be interoperable over a broad scale, over large geographic distances, using equipment and software from multiple manufacturers.

This concept of mass interoperability creates what economists call “network externalities”, by which a greater and greater interconnection of nodes in a network results in greater economic utility value over time. For example, a wireless communication system that serves a single country having a population of around 65 million such as France, may deliver a certain degree of economic utility value to people within that country. But imagine the utility value of a wireless communication system that permits global communication, and one that can put any user in touch with any other user on the network from almost any reasonably populated country almost instantly. This global interoperability is exactly what we have today with our cellular broadband communication systems. More than 5 billion individual subscribers are connected by wireless technologies that were standardized by ETSI members and International Telecommunication Union (ITU) beginning in the 1980s.

Because of the tremendous success of standards such as Global System for Mobile Telecommunication (GSM), Universal Mobile Telecommunications System (UMTS or 3rd Generation wireless) and Long Term Evolution (LTE or 4th Generation Wireless) there has been a major worldwide shift in technology standardization activities over the past 30 years. This shift is manifested as a distinct migration of ICT standards away from local standards, which are standards that are specific to a single country or region, to global standards that can ideally be used almost anywhere in the world. Furthermore, commercial enterprises have seen the benefits of global-scale market access when a technology becomes a global standard. Industry players often participate in the standardization process by collaborating globally with partners, and even competitors in the same field,

in order to benefit from the resulting market access, some of which is created by massive interoperability.

Standards are of paramount importance for specialty areas such as cryptography and cyber security

Standards are of paramount importance for specialty areas such as cryptography and cyber security. This is partly due to the precise degree of implementation considerations required to ensure successful interoperability, reasonable resilience against side-channel attacks for a given implementation, and acceptable levels of performance. In addition to the above goals, certification standards must be addressed. For example, in Canada there exists the Cryptographic Module Validation Program (CMVP). The CMVP is a programme jointly managed by Communications Security Establishment (CSE) in Canada and the National Institute of Standards and Technology (NIST) in the United States. The purpose of this programme is to ensure the validation of cryptographic modules to the Federal Information Processing Standard (FIPS) 140-1 and FIPS 140-2, and other cryptography based standards. Programmes such as the CMVP help to ensure that a certain level of security can be achieved, and that products specified to offer a certain level of security can be verified as being able to meet those specified security requirements.

2. Survey of Quantum-Safe Cryptographic Standards Activities

2.1. ETSI

Probably the initial efforts to develop quantum-safe standards were focused on Quantum Key Distribution (QKD); a technique for exchanging cryptographic keys for symmetric key cryptography by utilizing basic quantum mechanical properties of electromagnetic radiation. These initial efforts were begun in ETSI in 2007 with the creation of the Industry Specification Group for Quantum Key Distribution (ISG QKD).

In 2015, ETSI members decided to accelerate the standardization of quantum-safe cryptography by creating a new Industry Specification Group on Quantum-Safe Cryptography (ISG QSC). The primary focus of ISG QSC is the implementation issues, architecture,

and other practical aspects of quantum-safe cryptographic services that will be encountered by industry. Industry members affected by this work includes companies and government users of quantum-safe cryptography who use or create quantum-safe systems and services. The scope of this industry specification group includes analysis into the performance considerations, implementation capabilities, benchmarking, and practical architectural considerations for specific applications. Therefore, the group focuses on questions and recommendations that include analysis of the consequences of deploying, for example, a certain primitive, key-exchange method, protocol, etc. for a specific purpose. The work feeds into other ETSI groups and projects such as 3GPP and other standards bodies such as the ITU and the Internet Engineering Task Force (IETF). The objectives of the QSC does not include the development of cryptographic primitives, nor do they focus on QKD, as these are propositions best left to academia and other groups who specialize in those areas. The ISG QSC became the working group for Quantum-Safe Cryptography (WG QSC) of ETSI Technical Committee Cyber in March 2017.

To date, WG QSC has published five Group and/or Technical Reports pertaining to the various aspects of the industry forming around quantum-safe cryptography. These reports include analyses of cryptographic primitive families that are believed to be secure against attacks by quantum computers, as well as case studies regarding the deployment of certain quantum-safe primitives for specific applications and the consequences of those deployments in terms of implementation complexity and performance. In addition, ETSI standardized risk assessment techniques were applied to the quantum computing threat, as well as an analysis of symmetric-key cryptography in relation to the capabilities of future quantum computers.

Access to the current published work of WG QSC can be found here:

[ETSI GR QSC 001](#)

[ETSI GR QSC 003](#)

[ETSI GR QSC 004](#)

[ETSI GR QSC 006](#)

[ETSI TR 103 570](#)

Quantum-Safe Security: Technology Standards Overview

Continued (from page 10)

2.2. National Institute of Standards and Technology (NIST)

The National Institute of Standards and Technology (NIST) is an agency of the United States government focusing on the evaluation of technology and technology standards. NIST is the originator and maintenance organization for security algorithm certification and accreditation via their Federal Information Processing Standard (FIPS) 140-1 and FIPS 140-2 programs.

A few months after the creation of the ETSI QSC in March of 2015, NIST formally announced its post-quantum cryptography standardization project. The first milestone of the NIST post-quantum standardization project was end of 2017, which is the deadline set by NIST to receive proposals for quantum-safe cryptographic standards. This process is similar to former initiatives of NIST on the standardization of cryptographic primitives, such as the Advanced Encryption Standard (AES), and Secure Hash Algorithm-3 (SHA3).

The first part of this NIST project is an open call for proposals for quantum-safe cryptographic algorithms. In the second part, NIST's internal experts will review the submitted proposals. At the same time, NIST will monitor progress by the quantum-safe cryptography community and encourage research by organizing conferences and workshops. According to the timeline laid out by NIST, new quantum-safe cryptographic standards should be completed between 2022 and 2024.

This NIST project for quantum-safe algorithm selection differs from previous NIST initiatives in the sense that the process will likely result in multiple quantum-safe cryptographic standards as opposed to a single standard as in the SHA3 and AES competitions.



2.3. International Telecommunication Union (ITU)

The International Telecommunication Union (ITU) is a specialized agency within the United Nations that is a public-private partnership. The ITU's membership includes 193 countries and almost 800 private-sector entities and academic institutions. The ITU Telecom (ITU-T) sector Study Group 17 (SG17) coordinates security related work across all ITU-T Study Groups and liaises and cooperates with other standards-development organizations worldwide.

Progress towards quantum-safe cryptographic standards began in ITU-T SG17 in 2017 with the introduction of an optional extension to the X.509 digital certificate. This optional extension will allow the next version of X.509 to support two Public Key Infrastructure (PKI) modes: one for the existing certificate structure and processing requirements, and another for the quantum-safe certificate structure and processing requirements. The next version will be available middle of 2018.

2.4. Internet Engineering Task Force (IETF)

The Internet Engineering Task Force (IETF) is responsible for developing and maintaining standards for network and transport layer protocols and related signaling and management functions incidental to their operation. These include important and ubiquitous Internet communications protocols such as Transport Layer Security (TLS), Internet Protocol Security (IPSec) and Secure/Multipurpose Internet Mail Extensions (S/MIME). Recently, there have been some studies on quantum-safe cryptography in the IETF's Crypto Forum Research Group (CFRG); a general forum for discussing and reviewing uses of cryptographic and security mechanisms. Since 2013, several IETF Internet-Drafts related to quantum-safe cryptography have been actively discussed in the CFRG. This work includes: hash-based digital signatures, new initiatives to make TLS quantum-secure, and educational documents about the quantum threat in general.

2.5. International Standards Organization (ISO)

The International Standards Organization (ISO) is an independent, non-governmental, international organization headquartered in Geneva, Switzerland with a membership of 162 different national standards bodies on a country-by-country basis. ISO aims to bring together experts to share knowledge and develop voluntary, consensus-based, market relevant international standards. ISO is a large organization that develops and publishes a wide variety of international standards, including business procedures and operations, best practices for manufacturing, technology and more.

The standardization of quantum-safe cryptography is currently being discussed within the ISO/IEC JTC 1/SC 27 WG2 working group on cryptography and security mechanisms. At present, ISO is in a study period on quantum-safe cryptography and is collecting feedback from delegates regarding the principal requirements for quantum-safe cryptosystems in general, as well as the vision for future standardization. It is anticipated that ISO will begin more formal activities regarding quantum-safe cryptography and best practices shortly.

2.6. Accredited Standards Committee X9 Inc. (X9)

The Accredited Standards Committee X9 Inc., more commonly known as X9 is a standards body accredited by the American National Standards Institute (ANSI). X9 is dedicated to the development, maintenance, and advocacy of standards for financial industries. Headquartered in Annapolis Minnesota USA, X9 standards are used not only in the Americas, but also by financial sectors globally; facilitating worldwide financial interoperability.

Recently, X9 began a new initiative to standardize blockchain technologies for use in financial industry. The first step of this initiative is to standardize the common terminology used in blockchains and Distributed Ledger Technology (DLT). X9 intends to publish a technical report on the matter in the coming months.

Adopting TDL in practice with the TDL Open Source project

As software becomes critical in more and more industrial technologies, ensuring high quality of software components through testing is of the highest importance. ETSI's Technical Committee Methods for Testing and Specification (TC MTS) has more than 20 years of experience in creating standards to enable effective and open testing for conformance and interoperability in standardized and proprietary technologies.

To continue this activity and to tackle new challenges, in 2015 the Test Description Language (TDL) was launched by TC MTS. TDL offers a standardized language for the specification of high-level test descriptions as well as test objectives. TDL enables the creation of well-defined and portable test descriptions without the need of software development skills.

In October 2017 ETSI launched the TDL Open Source Project (TOP), an Open Source implementation of TDL tools to lower the barrier to entry for both users and tool vendors using this new language. This Open Source toolset comprises graphical and textual editors as well as other supporting facilities. The TOP toolset is developed as a set of plugins based on the Eclipse platform and related technologies, such as Xtext and Sirius, that are well known and developer friendly.

TOP is openly accessible at the [TDL website](#), hosted and managed at ETSI. It is distributed under the Eclipse Public License (EPLv1). This enables users and developers to download and use the toolset and encourages contributions from the community to extend the functionalities of the available tools, as well as to create new tools. In the first month, the TOP toolset was downloaded more than 100 times.



2018 will be an important year for TDL. Through the Open Source project and a growing user base, TDL is expected to take its place alongside the well-established ETSI TTCN-3 language and broaden the scope of ETSI testing technologies for standardization and the industry. As a first milestone along the way, the newly created TST Working Group in TC MTS has decided to use TDL as the description and publication format for their standardized test suites. In particular, TST WG plans to leverage TDL Test Objectives extension to describe the test purposes on functional and non-functional (such as performance, security) features in their work programme.

ETSI Open Source MANO announces Release THREE

Expedites adoption in production environments

In November, the ETSI Open Source MANO group (ETSI OSM) announced the general availability of [OSM Release THREE](#), keeping the pace of a release every 6 months. This release includes a large set of new capabilities as well as numerous enhancements in terms of scalability, performance, resiliency, security and user experience that facilitate its adoption in production environments.

"OSM Release THREE provides a highly functional and reliable component for NFV Orchestration that enables all industry players to accelerate their deployment plans, with no need to change their target architectures for NFV infrastructure or OSS transformation." declared Francisco-Javier Ramón, chairman of the ETSI OSM group.

OSM Release THREE features

With a new role-based access control, OSM Release THREE enables users from different service providers to access the OSM system with the appropriate set of privileges. It facilitates the adoption of complex operation workflows without compromising the security of the network or its operations.



Release THREE also includes the support of projects. These projects are shared spaces where users can access and operate a given set of Network Services (NS) and Virtual Network Functions (VNF), enabling collaborative work with orchestration.

The New Service Assurance and Monitoring capabilities allow the orchestrator to act on events and metrics gathered from VNFs and infrastructures, in a technology-agnostic manner. Other features such as anti-affinity rules as well as explicit port ordering and device role tagging facilitate VNF deployments, availability and resiliency.

A comprehensive description of the new features that come with OSM Release THREE can be found in the [new white paper](#) from our OSM Community.



OSM hackfest

The 1st OSM Onboarding Hackfest took place during the second ETSI NFV Plugtests® event in January 2018, at ETSI. In addition, ETSI OSM members participated in the Plugtests event, bringing their OSM implementations.

Strong community growth

Up to the delivery of Release THREE, 17 more organizations joined the community bringing the total to [83 organizations](#)! The new organizations are: Aqsacom, Astellia, Big Switch Networks, CASE CENX Inc., Citrix, CPLANE NETWORKS Inc., CTTC, Empirix Inc., iconectiv, i2CAT, Mavenir Systems, MC5G, NetNumber Inc., Sigma Systems Canada LP, Tech Mahindra, Ubiwhere Lda, WIPRO Ltd.

eCall successfully tested during ETSI and ERTICO TESTFEST in Slovenia

ETSI and [ERTICO](#) – ITS Europe organized the sixth eCall TESTFEST event, which took place from 9 to 13 October 2017, in Kranj, Slovenia. This event was hosted by [SINTESIO](#) in cooperation with [Iskratel](#), the administration of the Republic of Slovenia for Civil Protection and disaster Relief ([URSZR](#)) and [Telekom Slovenije](#).

Interoperability and eCall service harmonization are critical challenges to be taken into account for the successful deployment and operation of the eCall service. Slovenia is among the first European countries to implement the eCall solution.

Over a hundred of public safety experts attended the event. The experts, mainly from the fields of development engineering, electrical engineering, computer science, mathematics, and related sciences, came from nearly 40 companies in 15 different countries in America, Asia and EU. ERTICO – ITS Europe, a public-private partnership of 120 companies and organizations promoting and deploying Intelligent Transport Systems (ITS) in Europe, strives for a safer, smarter, and cleaner

mobility, regardless of their social, cultural, or geographical situation.

eCall is based on the European established 112 emergency number service. The European Parliament requires all new type of vehicle be equipped with eCall technology from April 2018. eCall is based on built-in sensors which are automatically triggered in the event of a collision or an accident. It is anticipated that the introduction of this system in the European Union will reduce the number of road transport fatalities by 2,500 per year.

“The eCall TESTFEST is an event dedicated to trialing the interoperability of eCall devices by different manufacturers and vendors. This event was also important to review the status of the I_HeERO project, and to test participants’ technical development activities and policy aspects, such as first experiences in the application of the solution, regulation in the area concerned, and the development of the new generation of mobile networks”, according to Jacob Bangsgaard, CEO of ERTICO – ITS Europe.

ETSI IoT Week - recorded

Presentations from our recent IoT Week event in October 2017 have been recorded and made available online. As well as recording the presentations, we have also captured the panel sessions.

Watch the videos:
www.etsi.org/news-events/videos/etsi-iot-week

Full event details:
www.etsi.org/news-events/past-events/1192-iot-week-2017

Webinars

Don't forget to follow the ETSI Webinar channel and watch our webinars on such topics as the Radio Equipment Directive or tutorials on NFV.
www.etsi.org/news-events/webinars

Videos

View all of ETSI's videos online on our YouTube channel, or our Vimeo channel:
www.youtube.com/etsiorgstandards
www.vimeo.com/etsi



ETSI signs MoU with Federation of Electrical, Electronic and Communication Industries

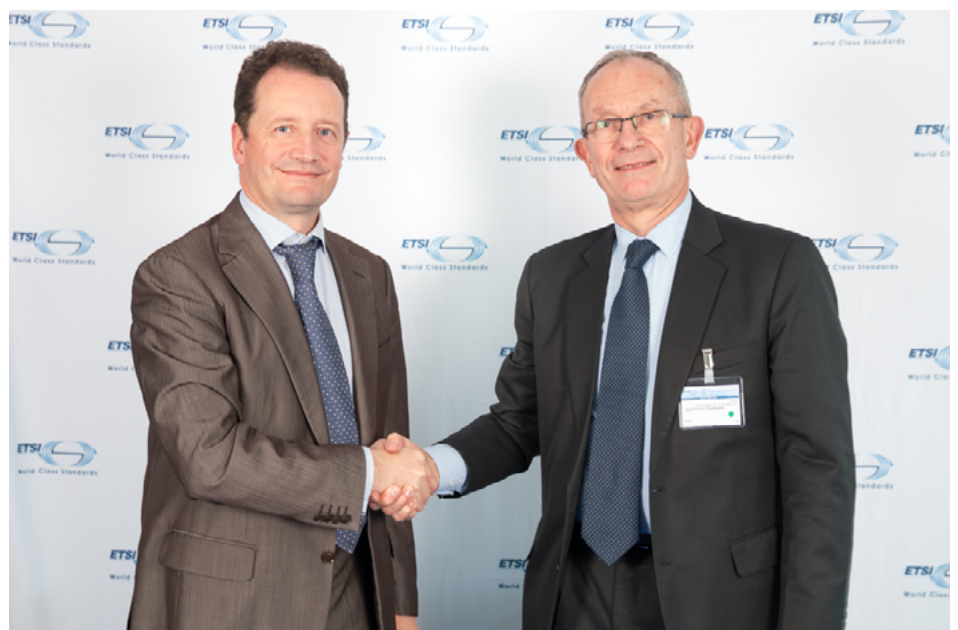
Bringing 24 trade associations comprising 3000 companies

During its 70th General Assembly in November 2017, ETSI signed a Memorandum of Understanding with the French Federation of Electrical, Electronic and Communication Industries (Fédération des Industries Électriques, Électroniques et de Communication - FIEEC), an industrial federation gathering 24 trade associations in the sectors of electrical, electronic, digital and durable consumer goods industries.

The FIEEC represents 3000 French companies (of which 87% SMEs) with 400,000 employees and a turnover of over 100 billion euros (46% exported). Innovation is a priority, with 16% of the employees and 8% of the turnover being dedicated to R&D. The FIEEC is instrumental in helping build a French industrial strategy based on economic growth and competitiveness and answering future market needs in terms of innovation through an ambitious R&D policy. New activity

sectors include renewable and energy efficiency, smart home, health, ageing

population, digital infrastructure, digital confidence and mobility.



Luis Jorge Romero, ETSI DG; Jean-Pierre Quémard, VP FIEEC

ETSI adopts Car Connectivity Consortium's MirrorLink technical specification



The Car Connectivity Consortium (CCC) and ETSI have announced the publication of the MirrorLink® specification, as ETSI Technical Specification, the [TS 103 544 series](#). Developed by the CCC, MirrorLink is an open standard for smartphone-car connectivity that allows smartphone apps to be projected on car In-Vehicle Infotainment (IVI) systems.

"MirrorLink's ability to safely connect smart phones to vehicle displays makes it a compelling addition to ETSI's portfolio," says Niels Peter Anderson, ETSI ITS chairman. *"We have released*

the MirrorLink specification through our ETSI Publicly Available Specifications process, which enables specifications from industry bodies to benefit from the increased recognition and visibility of an ETSI Technical Specification."

The CCC developed MirrorLink in collaboration with cross-industry stakeholders including car OEMs, tier-1 suppliers, phone manufacturers, and app developers. MirrorLink gives smart devices a robust and streamlined, wired and wireless mechanism for presenting applications on IVI systems. Consumers have access to smartphone applications

in a responsible way, while conforming to industry guidelines to minimize driver distraction by using voice, touch and rotary knob inputs. MirrorLink is already deployed in hundreds of millions of smart phones and millions of vehicles.

"We are pleased MirrorLink has become an ETSI Technical Specification and part of the ETSI family," said Mahfuzur Rahman, President of CCC. *"As an ETSI Technical Specification, MirrorLink adoption will expand and enable more smart phones to safely connect and interoperate with auto makers' IVI units."*

ETSI and VRARA cooperate on Virtual and Augmented Reality

The US based VR/AR Association signs Letter of Intent with ETSI

ETSI is pleased to announce that the Virtual Reality/Augmented Reality Association (VRARA) has signed a Letter of Intent to collaborate on interactive VR and AR technologies delivered over emerging 5G networks and hosted on Multi-Access Edge Computing sites. VRARA will be primarily involved with ETSI's Multi-access Edge Computing (MEC) group.

"Virtual and Augmented Reality technology holds the promise to fundamentally transform how people interact with and experience the physical world, how they are entertained, and how services are delivered to them," states Alex Reznik, ETSI MEC chairman. *"We are at the cusp of this transformation, and, yet,*

it cannot happen unless the networks that will have to support these applications can deliver the required performance, e.g. latency on the order of several milliseconds. Edge computing is necessary to deliver such performance; while mobile networks, which today already provide pervasive global connectivity, are likely to continue occupying this central role."

The partnership between ETSI, the home of the world's leading Multi-access Edge Computing standardization activity and VRARA, the world leading industry association representing the Virtual and Augmented reality industry recognizes the need to bring the two communities together. This cooperation will encourage common

member companies to pursue VR/AR focused use cases and requirements for ETSI MEC Phase 2 so as to ensure that the resulting specifications address the needs of this key industry sector. VRARA will support adoption of ETSI MEC work as appropriate and highlight benefits of Edge computing to VR/AR solution developers.

"In a recent research report we've published, we learnt that enterprise AR & VR have more receptive buyers than consumer markets, due to a strong ROI case," says Kris Kolo, Executive Director of the VR/AR Association. *"Working closely with ETSI which expertise lays in all ITC related sectors makes sense. We're really excited to start this collaboration with their MEC group."*



Critical Communications World 2018



15-17 May 2018, Berlin

Critical communications users are facing unprecedented change, as the world is facing increased threats to its safety and security.

From PMR to professional LTE, from direct mode to drones, from applications to antennas – TCCA brings them all together at Critical Communications World to drive the evolution of the industry and enhance the ability of communications to safeguard our world.

Adrian Scrase, ETSI CTO will be a speaker. Come and meet ETSI at our stand D18.

For more information visit the event website: <http://critical-communications-world.com/>

ETSI publishes cybersecurity advice on the NIS Directive



In October 2017, during the European Cyber Security Month, ETSI announced the publication of [ETSI TR 103 456](#), a technical report released by ETSI's technical committee on Cybersecurity (TC CYBER). The report provides advice on implementing the NIS directive which lays down measures for a high common level of security of network and information systems across the European Union.

[ETSI TR 103 456](#) provides guidance on the available technical specifications and those in development by major cybersecurity communities in the world which are designed to meet the legal measures and technical requirements of the NIS Directive.

The report covers several cybersecurity issues and requirements:

- Methods for structured sharing and exchange of information
- Incident notification
- Technical and organizational information system risk management
- Challenges and solutions
- Technical recommendations.

Cybersecurity risk management involves assessing a range of risks in the context of an organization's environment, understanding assets, resources and processes that are fundamental to the organization, and taking steps to ensure that the

organization continuously improves how it protects, detects threats and responds to incidents involving those assets, resources and processes.

"This new ETSI report provides a broader cyber security context building on the NIS Directive or the ENISA Standardization Gaps Report." declares Charles Brookson, chairman of ETSI TC CYBER. "ETSI has a long expertise in security matters, including the work developed in our cyber group. This report should help those striving to meet the requirements of the NIS Directive, and guide them on how to meet it."

ETSI's Technical Report is intended to be used by all who need to consider the effects, use or perform the legal transposition of the NIS Directive into national legislation, whether they be regulators, operators of essential services or digital service providers.

As ETSI is working on new technologies such as NFV, 5G or quantum computing which bring new security challenges, various ETSI groups work closely with TC CYBER and make sure security by design is included in all specifications from the beginning. TC CYBER have published 17 specifications and reports on Cybersecurity over the last 3 years.

ETSI 2018 EVENTS CALENDAR - What's on?

6-8 March	ETSI ITS Workshop	Berlin, DE
9-10 March	oneM2M Hackathon	Dallas, TX, USA
15-16 March	2nd F-Interop 6TiSCH Interoperability Event	London, UK
20 March	eIDAS meets PSD2 - Securing access to financial services with qualified certificates	Sophia Antipolis, FR
20-23 March	Zero Touch & Carrier Automation Summit	Madrid, ES
10-13 April	MPLS + SDN + NFV World Congress	Paris, FR
19 April	ETSI Summit: Releasing the Flow - Data Protection and Privacy in a Data-Driven Economy	Sophia Antipolis, FR
24-27 April	NFV & Zero Touch World Congress	Santa Clara, CA, USA
25-26 April	Smart to Future Cities	London, UK
15-17 May	Critical Communications World 2018	Berlin, DE
22-24 May	Network Virtualization Europe	London, UK
28 May - 8 June	ETSI NFV PLUGTESTS #3	Sophia Antipolis, FR
11-15 June	ETSI Security Week 2018	Sophia Antipolis, FR
12-14 June	TechXLR8: 5G World, Internet of Things World Europe, VR & AR World	London, UK
25-26 June	ETSI Seminar	Sophia Antipolis, FR
17-21 September	ITS World Congress	Copenhagen, DK
18-20 September	Edge Computing Congress	Berlin, DE
4-5 October	ETSI Workshop on Education about Standards	Sophia Antipolis, FR
8-12 October	SDN NFV World Congress	The Hague, NL
16-18 October	UCAAT 2018	Paris, FR
22-26 October	ETSI IoT Week 2018	Sophia Antipolis, FR
6-8 November	ETSI QSC Workshop	Beijing, CN

Please visit the events section of our website for further details

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ETSI, 650 Route des Lucioles,
06921 Sophia Antipolis Cedex, France.
Tel: +33 (0)4 92 94 42 00