

Madrid, Spain, June 15, 2017

5TONIC and the 5GEx project, a joint collaboration building the future Industry 4.0

As Europe embraces the Fourth Industrial Revolution the path to digitize European industry is being laid out by pioneering initiatives such as **5TONIC**. The Madrid-based Open 5G Lab, which is headquartered at the research institute **IMDEA Networks**, provides a top-notch environment for research and innovation on the communications networks of the future. **5G** is a key enabler of the highly complex technological demands posed by the digital economy. An example of the lab's activities in this domain is the recent demonstration of advanced technology developments in 5G communications made in situ by the EU project «5G Exchange».

The H2020 5G-PPP project 5G Exchange (**5GEx**) aims to build 5G infrastructure services that will have a crucial role in making 5G happen, as they provide the foundation of all cloud and networking services. At the 5TONIC lab the project successfully presented technology developed during its first 18 months of operations.

The 5GEx project is creating an agile exchange mechanism for contracting, invoking and settling for the wholesale consumption of resources and virtual network services which can be provisioned in less than 90 minutes and rapidly invoked.

On past May 24th, the technical review of the project in its intermediate phase performed by EU authorities took place at 5TONIC. 5TONIC is part of the 5GEx sandbox, a distributed testbed composed of 14 sites -- including those of 4 European operators -- that is used by the 5GEx project to validate the solutions developed and assess their performance. During the review, 5GEx researchers presented their contributions on multi-domain and multi-provider orchestration of resources and services, including their latest contributions to the main standard development organizations (SDOs): ETSI NFV, IETF/IRTF, 3GPP and ONF.

One of the key outcomes of the project so far is the reference implementation of some of the features of the 5GEx architecture, which were demonstrated on top of the 5TONIC Lab. Using this implementation, different demos were showcased. One of them showed the benefits of moving the intelligence required to operate a couple of robots to a cloud infrastructure running at the edge of the network. This provides a flexibility key for the so-called Industry 4.0: the industry of the future.

The following organizations are members of the 5GEx project: Ericsson, ATOS, AUEB, BISDN, BME, DT, HPE, Huawei, KTH, Orange, RedZinc, Telecom Italia, Telenor, Telefónica, UC3M, UCL and MNS.

More information about the project can be found at the 5GEx's website: <http://5gex.eu/>

Source(s): IMDEA Networks Institute & 5TONIC
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Traducción al español:

[/noticias/2017/5tonic-proyecto-5gex-colaboran-construir-industria-40](#)

Original source:

[/news/2017/5tonic-and-5gex-project-joint-collaboration-building-future-industry-40](#)

About Us

IMDEA Networks Institute is a **research organization on computer and communication networks** whose multinational team is engaged in cutting-edge fundamental science and technology. As a growing, English-speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies**. Our **team** of highly-reputed researchers is designing and creating today the networks of tomorrow.

Some keywords that define us: 5G, Big Data, blockchains and distributed ledgers, cloud computing, content-delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network security, networked systems, network protocols and algorithms, network virtualization (software defined networks - SDN and network function virtualization - NFV), privacy, social networks, underwater networks, vehicular networks, wireless networks and more...

IMDEA Networks Institute

+34 91 481 6210

28918 Leganés (Madrid) Spain

mediarelations.networks@imdea.org

Avda. del Mar Mediterráneo, 22

www.networks.imdea.org

Twitter: [@IMDEA_Networks](#) | [LinkedIn](#) | [Facebook](#) | [Instagram](#) | [Flickr](#) | [YouTube](#)
