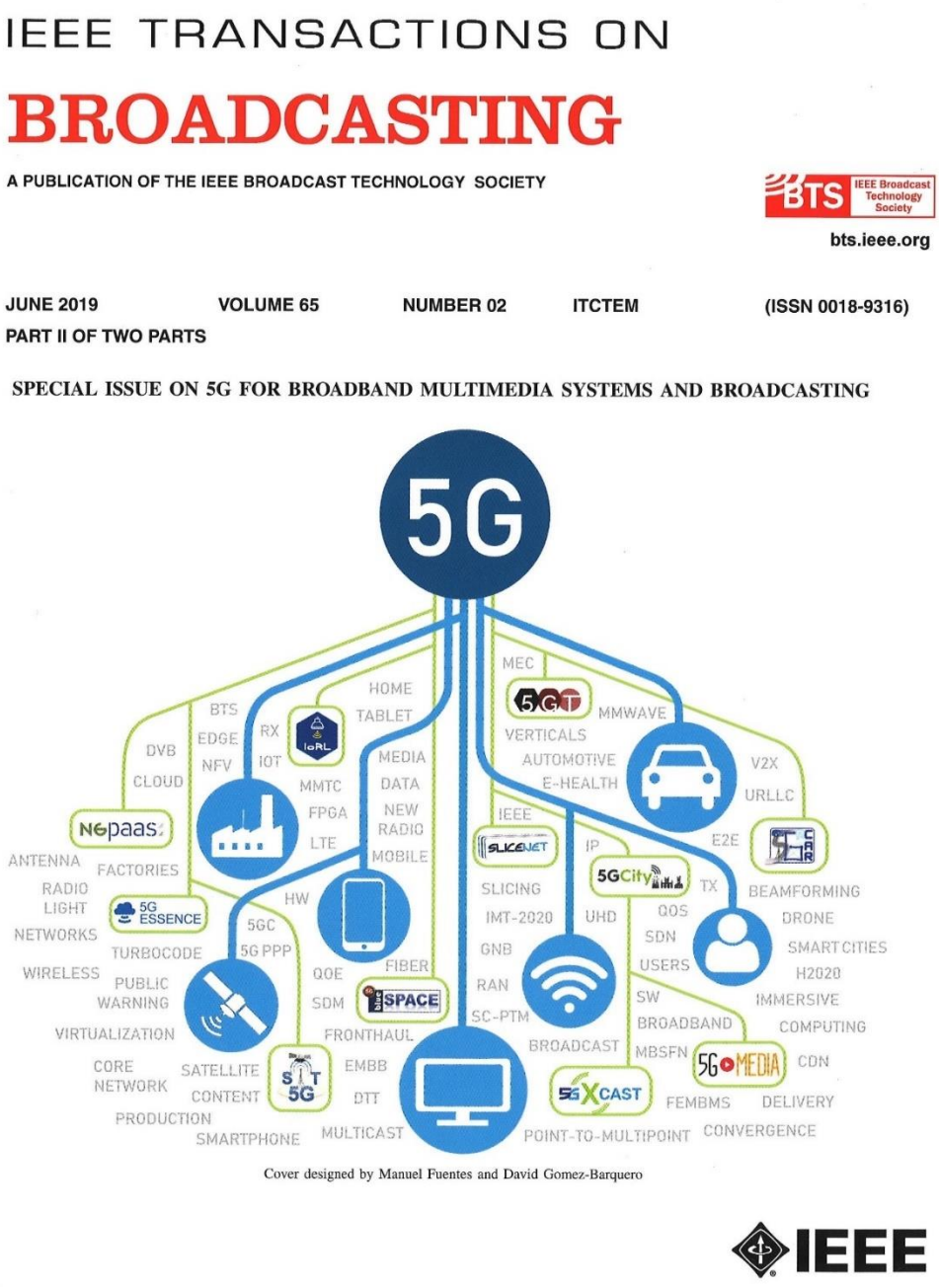


Cover designed by Manuel Fuentes and David Gomez-Barquero

IEEE

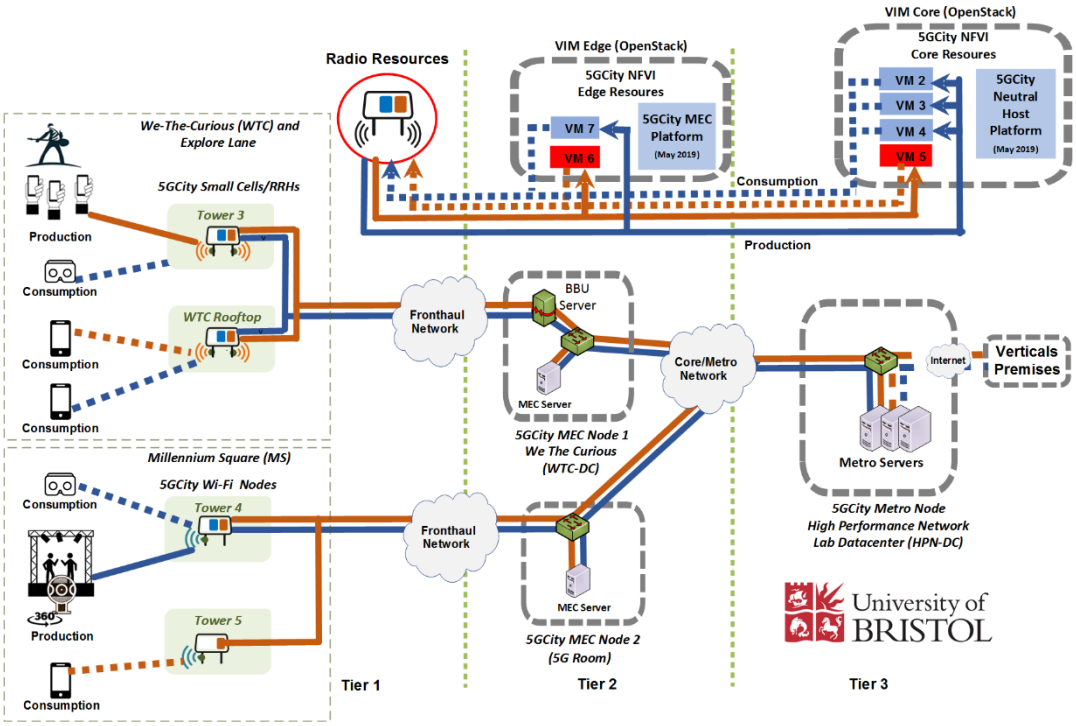
Scientific Article from 5GCity is published in Prestigious IEEE Journal.

Once again **5GCity** partners led by the University of Bristol and i2CAT, *Carlos Colman-Meixner, Hamzeh Khalili, Konstantinos Antoniou, Muhammad Shuaib Siddiqui, Apostolos Papageorgiou, Antonino Albanese , Paolo Cruschelli, Gino Carrozzo, Luca Vignaroli, Alexandre Ulisses, Pedro Santos, Jordi Colom, Ioannis Neokosmidis, David Pujals, Rita Spada, Antonio Garcia, Sergi Figuerola, Professor Reza Nejabati, and Professor Dimitra Simeonidou,* achieved an important milestone in July 2019 by publishing the article **"*Deploying a Novel 5G-Enabled Architecture on City Infrastructure for Ultra-High Definition and Immersive Media Production and Broadcasting*"** in the prestigious scientific journal IEEE Transaction on Broadcasting; special

issue on 5G for Broadband Multimedia Systems and Broadcasting from the Broadcasting Technology Society (BTS) of the Institute of Electrical and Electronical Engineering (IEEE).

The article introduces the progress of the H2020 **5GCity** project toward the designing, developing, and deploying of a sliceable, distributed cloud/edge and 5G enable radio platform with neutral hosting capability for key media Use Cases (UCs) namely related to "video acquisition and production at the edge," "immersive services," and "mobile production and transmission". In additional it describes how the developed platform and media UCs will be deployed and validated in three cities (Bristol, Lucca, and Barcelona), through real citywide pilots. An example of ongoing deployments from the **5GCity** project in Bristol is introduced and described, then followed by a series of Key Performance Indicators (KPIs) and validation methodologies. These are adopted by the project in order to demonstrate the benefits of 5G Neutral Host for infrastructure owners and media service providers.

In the following section we introduce the illustrative example of ongoing 5GCity deployment in Bristol with an example of two media UCs presented in the article.



Example of the planned pilots in the City of Bristol 5GUK Test Network composed by a 5GCity Metro Node hosted in the University of Bristol, two 5GCity MEC nodes hosted in We-The Curious science centre, 5G rooms and two clusters of radio resources of small cells and Wi-Fi nodes distributed between millennium square and Harborside. The metro network is formed by multiple optical links of 10 Gbps per link. Each UC will use a slice of the infrastructure which is formed by Virtual Network Functions (VNFs) or Virtual Machines (VMs) in the computed nodes and network resources; like, wavelength and/or Virtual Local Area Network (VLAN), virtual access points in Wi-Fi nodes and a channel in the small cells. In this example two tenants share a 5G neutral infrastructure deployed in the 5GUK Test Network.

1- Tenant 1 a video production and broadcasting at the edge, uses slice#1 in red colour which deploys and connects VMs in edge Virtual Infrastructure Management (VIM) and core VIM to host an application for multiple users (e.g., 20-50 mobile phones with 2-8 Mbps UL) acting as producers or recorders of a live event. The VMs at the edge

VIM and core VIM will aggregate and synchronize the video contribution in the 5GCity MEC node and host a virtualized video server for processing, switching, and editing in the datacentre which is accessed and operated remotely by TV producers. This connection will demand some large network bandwidth during the event (i.e., ~2 Gbps). Then, for immediate broadcasting or streaming for users or consumers, the producers will use the same slice with additional resources at the edge VIM in 5GCity MEC node to host and cache video contents populated based on the demand. The flexibility and intelligence of 5GCity dashboard could allow the fast allocation of more resources (processing and bandwidth) for production in case of an increase in the demand (more users recording the event) or more users requesting to stream.

2- The tenant 2, a 360-degree video production and broadcasting (i.e., UC#2) uses the slice#2 (blue color) to allocate resources for production in a VM at the edge VIM for transcoding, and multiple VMs at core VIM for storing, redistribution and elaboration with the remote intervention of a broadcaster or a virtual reality company. Given that the delay and flexibility demand, the tenant 2 will also request for network resources at all lampposts, hooked up with Slice#2 computing resources at edge VIM, to make the processed available for all the VR users.

Some 5GCity pilot's evaluation KPIs in deployment are:

Latency: time that takes to transfer a piece of information from a source to a destination, either in data plane or in control plane.

Reliability: percentage of packets successfully delivered to a given system entity within the time constraint required by the targeted service, divided by the total number of transmitted packets.

Service Creation Time: time needed to activate a Network Service that comprises multiple VNFs in a service chain.

Virtualised Resource Utilization of Network Slice Instance: this metric measures the utilization of virtualised resource (e.g. processor, memory, disk) that are allocated to a network slice instance.

More info:

IEEEXplore: https://ieeexplore.ieee.org/abstract/document/8671464

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Project Funded

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 761508