



5G CITY

Grant Agreement No.761508 5GCity/H2020-ICT-2016-2017/H2020-ICT-2016-2

D6.3 – Dissemination, Exploitaion and Standardization activities

Dissemination Level	
<input checked="" type="checkbox"/>	PU: Public
<input type="checkbox"/>	PP: Restricted to other programme participants (including the Commission Services)
<input type="checkbox"/>	RE: Restricted to a group specified by the consortium (including the Commission Services)
<input type="checkbox"/>	CO: Confidential, only for members of the consortium (including the Commission Services)

Grant Agreement no: 761508	Project Acronym: 5G CITY	Project title: 5G CITY
---	---------------------------------------	----------------------------------

Lead Beneficiary: NXW	Document version: V1.0
------------------------------	-------------------------------

WP6

D6.3 – Dissemination, Exploitation and Standardization activities M12
--

Start date of the project: 01/06/2017 (duration 30 months)	Contractual delivery date: 12 Month	Actual delivery date: 31/05/2018
---	---	--

Editor name: Paolo Cruschelli (NXW)
--

List of Contributors

Participant	Short Name	Contributor
Nextworks	NXW	Gino Carrozzo, Paolo Cruschelli, Elio Francesconi
Comunicare Digitale	CoDi	Andrea M. Michelozzi, Carla Bressan
ADLINK	ADL	Angelo Corsaro
i2CAT	I2CAT	Shuaib Siddiqui, Jose Miguel Sanjuan
MOG	MOG	Alexandre Ulisses
Wind Tre	WIND3	Maria Rita Spada
Italtel	ITL	Antonino Albanese
Rai	RAI	Luca Vignaroli
Barcelona IMI	IMI	Raul Pertierra
ADLINK	ADLINK	Angelo Corsaro
Univ Bristol	UNIVBRI	Carlos Colman Meixner
Comune di Lucca	LUCCA	Mauro Di Bugno, Stefania Attanasio
Accelleran	XLRN	Antonio Garcia
Retevision I S.A.	Retevision I	David Pujals Avila

List of Reviewers

Participant	Short Name	Contributor
i2CAT	i2CAT	Shuaib Siddiqui
i2CAT	i2CAT	Jose Miguel Sanjuan

Change History

Version	Date	Partners	Description/Comments
0.1.	26/03/2018	NXW	Table of Content
0.2	02/05/2018	CODI	Partner contribution
0.3	03/05/2018	MOG	Partner contribution
0.4	03/05/2018	ITL	Partner contribution
0.5	04/05/2018	WIND3	Partner contribution
0.6	16/05/2018	NXW	Partner contribution and overall integration
0.7	17/05/2018	NXW	Partner contribution and overall integration
0.8	27/05/2018	ADL	Partner contribution
0.9	28/05/2018	RAI	Partner contribution
0.91	28/05/2018	XLRN	Partner contribution
0.92	28/05/2018	IMI	Partner contribution

0.10	29/05/18	NXW	Integration of partners 'contributions
0.11 - final	30/05/2018	NXW	Final integration and editing of sections
1.0.1	23/11/2018	NXW	Added summary table for tracking submitted, accepted and rejected contributions in dissemination (Sec. 2.1) and standards (Sec. 3) Added missing authors Minor editorial fixes

DISCLAIMER OF WARRANTIES

This document has been prepared by 5GCity project partners as an account of work carried out within the framework of the contract no 761508.

Neither Project Coordinator, nor any signatory party of 5GCity Project Consortium Agreement, nor any person acting on behalf of any of them:

- makes any warranty or representation whatsoever, express or implied,
 - with respect to the use of any information, apparatus, method, process, or similar item disclosed in this document, including merchantability and fitness for a particular purpose, or
 - that such use does not infringe on or interfere with privately owned rights, including any party's intellectual property, or
- that this document is suitable to any particular user's circumstance; or
- assumes responsibility for any damages or other liability whatsoever (including any consequential damages, even if Project Coordinator or any representative of a signatory party of the 5GCity Project Consortium Agreement, has been advised of the possibility of such damages) resulting from your selection or use of this document or any information, apparatus, method, process, or similar item disclosed in this document.

5GCity has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 761508. The content of this deliverable does not reflect the official opinion of the European Union. Responsibility for the information and views expressed in the deliverable lies entirely with the author(s).

Table of Contents

Executive Summary	7
1. Introduction	9
1.1. <i>Changes from version 1.0</i>	9
2. Dissemination and Communication Activities	10
2.1. <i>Scientific Publications</i>	10
2.2. <i>Participation to Talks/Panels/Webinars/Workshops</i>	12
2.3. <i>Demonstrations</i>	18
2.3.1. <i>Unikraft demonstrations</i>	18
2.3.2. <i>Mobile World Congress 2018</i>	18
2.3.3. <i>Other demos</i>	19
2.4. <i>5G PPP Collaborations and 5G IA activities</i>	21
2.5. <i>Liaison Activities with Projects</i>	23
2.5.1. <i>Bristol Layered Realities Weekend</i>	23
2.6. <i>Communications via public Web Site</i>	24
2.7. <i>Communications via Social Networks</i>	26
2.8. <i>Newsletters and Technical Blog</i>	28
2.9. <i>Other dissemination activities by the partners</i>	29
2.10. <i>Updated dissemination plan for next period</i>	31
3. Standardization and Open Source Project Activities	34
3.1. <i>Edge Computing and Smart Cities</i>	34
3.1.1. <i>5GCity contribution to Eclipse IoT Consortium</i>	35
3.2. <i>5G-RAN</i>	37
3.3. <i>Cloud and Orchestration</i>	37
3.4. <i>Media and Broadcasting</i>	37
3.5. <i>Collaboration with Open Source Communities</i>	37
4. Exploitation Activities	38
4.1. <i>i2CAT</i>	38
4.2. <i>NEC</i>	39
4.3. <i>VOSYS</i>	39
4.4. <i>ADLINK</i>	40
4.5. <i>Cellnex ReteVision</i>	40
4.6. <i>University of Bristol / Bristol Is Open</i>	40
4.7. <i>Nextworks</i>	41
4.8. <i>LUCCA</i>	42
4.9. <i>Italtel</i>	42
4.10. <i>Barcelona – IMI</i>	44
4.11. <i>Barcelona TV</i>	44
4.12. <i>MOG</i>	44
4.13. <i>RAI</i>	46
4.14. <i>INCITIES</i>	47

4.15.	<i>WIND3</i>	47
4.16.	<i>Accelleran</i>	48
4.17.	<i>Comunicare Digitale</i>	49
4.18.	<i>UbiWhere</i>	50
5.	Conclusions	52
5.1.	<i>Progress on 5GCity KPIs</i>	52
6.	Abbreviations and Definitions	55
6.1.	<i>Abbreviations</i>	55
6.2.	<i>Definitions</i>	55

List of tables

Table 1 – Scientific publications accepted or published during project Year 1.....	12
Table 2 – 5GCity partners event participation during Year 1.....	18
Table 3 – 5GCity collaborations within 5G PPP area	21
Table 4 – 5GCity presentations and mentions within 5G PPP.....	22
Table 5 – 5GCity information shared on the 5G PPP website	23
Table 6 – 5GCity liaison with other projects	23
Table 7 – 5GCity partners attendance to additional events	30
Table 8 – 5GCity planned participation to upcoming events	32
Table 9 – Summary of contributions to standards in Year 1	34
Table 10 – KPI progress as derived from 5GCity objectives	53
Table 11 – 5GCity objectives dissemination specific objectives.....	54

List of Figures

Figure 1 – S. Kuenzer by NEC at FOSDEM2018.....	18
Figure 2 – Accelleran at MWC2018	19
Figure 3 – i2CAT and 5GBarcelona at MWC2018.....	19
Figure 4 – Accelleran at CBRS Meeting 2018 in Washington (USA)	20
Figure 5 – Accelleran at Small Cell World Summit/Small Cell Forum Plenaries 2018 London (UK)	20
Figure 6 – UK Layered Realities 5G showcase	24
Figure 7 – 5GCity.eu landing webpage	25
Figure 8 - @5GCity Twitter Followers in Europe	26
Figure 9 - @5GCity Twitter followers in Eurasia.....	26
Figure 10 - @5GCity Twitter followers in America	27
Figure 11 - Twitter @5GCity impressions during the Mobile World Congress 2018.....	27
Figure 12 – 5GCity newsletter 1, March 2018.....	28
Figure 13 – 5GCity newsletter 2, May 2018	28
Figure 14 – 5GCity blog entry “From service design to network slices”	29
Figure 15 - 5GCity brochure Barcelona	30
Figure 16 - 5GCity brochure Bristol	30
Figure 17 - 5GCity brochure Lucca.....	31
Figure 18 - 5GCity – Rollups for three cities ready for Events participation	31
Figure 19 – IoT Developers Survey 2018 (available at http://bit.ly/2sinK6Q)	35
Figure 20 – IIoT Connectivity Core Standards (source http://bit.ly/2IW2t9O)	36

Executive Summary

Dissemination, standardization and exploitation activities are essential for the success of any 5G PPP project and they are key success factors for 5GCity in particular: in fact, the specific nature of the research carried out in it (optimized edge/core virtualization; orchestration, SDK and dashboard) applied to three live city trials (Barcelona – ES, Bristol – UK and Lucca - IT) makes the project unique and critical to prepare the next stage of 5G roll-out in Europe.

5GCity is developing an architecture for the 5G-ready city in which network SDN/NFV solutions, multi-access edge computing (MEC), and optimized lightweight virtualization platforms (e.g. based on unikernels) are all integrated to manage and orchestrate a distributed 5G cloud and radio platform. Apart from the usual telecommunication providers, the 5GCity solution has key stakeholders in the municipalities and in the broadcasting verticals. Municipalities quite often own and manage the best urban spaces to host 5G Small Cells and are undergoing a digital transformation towards becoming Smart Cities, in which various value-added services, powered by 5G technologies, can be designed for the benefit of the end customers, i.e., the citizens. Broadcasters are the primary group of Verticals who can run advanced 5G-based services in the Smart Cities.

The strategy we have applied to execute various dissemination and communication activities in this Year 1 has primarily focused on the promotion of project concepts and objectives in various forums, international events and social channels, in order to attract the identified target audience from the scientific and industrial sectors in scope with our use cases and raise awareness on 5GCity ideas and planned results. The standardization and exploitation activities of this Year 1 have been preliminary, being mostly aimed at establishing our position in the various working groups and market sectors in order to prepare a subsequent phase of promotion and reuse of 5GCity results in the next period, i.e. once the development and integration will be completed and solutions tested in city trials.

Key results achieved by the project in this first year can be summarized as in the following:

- **8 scientific papers** have been published or accepted to relevant conferences and important events, out of 9 submitted.
- 5GCity presentations, keynotes and panels have been given **15 important and well-known international events**; other 6 event participations have been just planned for the period May-November 2018
- **6 demos** have been executed (Bristol Layered Reality Weekend – first UK public 5G trial; 2 Unikraft demos; 3 other demos at MWC, CBRS Meeting and Small Cell World Summit); 4 more demos just planned until Nov 2018 (3 of which at EUCNC 2018)
- **5GCity website** launched at M1 and heavily restyled for MWC2018 to extend the amount and visibility of project information made available to visitors, including a **Technical Blog**, which has started to be periodically populated from Q1-2018
- **2 Newsletters** produced and highly advertised in the large 5GCity network of contacts
- Bold presence of the project on social channels: more than **800 tweets** reaching **560 followers** and achieving **+138,7% profile visits** (@5GCity Twitter account is the one with more followers inside the 5G ecosystem; **66 members on LinkedIn** 5GCity group, achieving an **86,4% group visits**).
- Actively **contributed to 11 between boards and Working Groups of the 5G PPP and 5G IA**, with continuous involvement in the production of programme level technical and strategic results (positioning papers, events, etc.).
- Established **liaison with Open source projects at XEN and OpenIoT conference**
- Bootstrapped Unikraft as Xen Project under the Linux Foundation (<https://www.xenproject.org/developers/teams/unikraft.html>)
- Contributed to **Eclipse IoT Consortium** and formed the **Eclipse fog05 Project** (<http://projects.eclipse.org/proposals/eclipse-fog05>)

-
- Contributed to **ETSI Specialist Task Forces** set up to work on **gap analysis between OpenStack APIs and NFV interfaces**, and on **MEC Testing Framework**
 - Contributed to **Open Fog Consortium Reference Architecture**
 - Executed preliminary individual exploitation actions related to the initial results and research topics of 5GCity

The achieved results confirm the strategic plan defined in Deliverable D6.1 and D6.2, as well as a good progress on all the KPIs set by the project in this area (see section 5.1 for details).

During this Year 1 the consortium has created a solid position in the 5G arena, generating huge expectations from its results in various areas and particularly in: 5G/NFV/MEC standardization, 5G trial assessment and exploitation of 5G technologies in Smart Cities environments.

A significant number of activities is just planned and confirmed for the next period, in terms of demos, workshops and scientific dissemination, which will further maximise the impact of the project in the community and prepare Vertical stakeholders to the next stage of 5G roll-out.

1. Introduction

This document reports on the achievements of the 5GCity project in Year 1 (Jun 2017-May 2018) for all communication, dissemination, standardization and exploitation activities.

The document is organized in four chapters corresponding to different types of activities as follows:

- Chapter 2 reports on the dissemination and communication and public activities undertaken jointly by the consortium and individually by the partners in Year 1
- Chapter 3 summarizes standardization activities and partners' strategies pursued by the partners towards SDO working on 5GCity related topics
- Chapter 4 details initial exploitation activities executed by the partners in relation to the knowledge and results generated within 5GCity during the first project year

For each chapter, a brief outline of the plans for Year 2 is provided, which implements the strategy outlined in previous Deliverable D6.2 for the promotion of the R&D executed in the project to key stakeholders.

The conclusion of the report summarizes the key relevant aspects and strategic achievements in this area, and also provides an overview on the level of fulfilment of 5GCity KPIs which have been set in the Description of the Action.

1.1. Changes from version 1.0

This updated version of the deliverable D6.3 introduces minor changes to complete the information provided on the dissemination and standardization activities. In particular,

- The list of scientific papers produced in Year 1 that is presented in Sec 2.1 has been augmented with information on the paper on Neutral Hosting business model, which was prepared for EUCNC 2018 but not accepted for publication. This work will be enhanced in Year 2 and submitted for publication to other relevant conferences, including extended material on business modelling and related analysis on the applicability of the Neutral Host model to operator's market.
- The summary of standardization actions executed in Year 1 has been added in Sec. 3 Table 9 to highlight and track contribution by 5GCity partners to Standards bodies and related Working Groups.

2. Dissemination and Communication Activities

The Dissemination and Communication activities during the first year of the 5GCity project have been actively carried out by consortium partners with the aim to establish a bold project visibility in the scientific, industrial and vertical community working on 5G.

The entire consortium and partners individually have been involved in many activities, ranging from event and standards participation, to keynote presentations and roundtables, have produced a significant number of scientific papers and prepared material for key exhibition events of the 5G community. The project communication has been focused to stress the unique selling points of the project across various channels (website, socials, local communities, large worldwide conferences and exhibitions), to reach the target stakeholders in Media and Smart City market areas with highlights and public presentations of the project use cases and the initial technical results in terms of architecture and city infrastructure design. The active involvement in the 5GPPP and its various Working Groups (WG), in the 5G Infrastructure Association, and in the 5G community at large has granted further opportunities for the project team to discuss approaches and R&D directions, together with presentations of plans and results.

From day one, the activities in dissemination and communication have been given top priority in the project, allowing to properly propagate the inner value behind all the efforts and research carried out in 5GCity.

The summary of top remarkable results achieved in Year 1 is presented below, reporting on project activities in different dissemination areas:

- Scientific publications
- Participation to talks/Panels/Webinars
- Demonstrations
- 5G PPP collaborations
- Liaison with other Projects
- Communication via Project Web Site
- Communication via Social Networks (twitter, LinkedIn)
- Newsletter and technical blogs

2.1. Scientific Publications

During the first 12 months of project activity, a total of **9 papers have been submitted** to relevant conferences and important events, **8 of which have been published or accepted**. The list of accepted and published scientific publications is reported in Table 1.

#	Type	Title	Authors	Conference	Status
1	Poster	Techno Economic Assessment of Immersive Video Services in 5G Converged Optical/Wireless Networks	I. Neokosmidis (INC), T. Rokkas (INC), P. Paglierani (ITL), Claudio Meani (ITL), K M. Nasr (UoS), Klaus Moessner UoS, M Shuaib Siddiqui (i2CAT), P. Sayyad Khodashenas (i2CAT)	Optical Fiber Communications (OFC) 2018 San Diego, California, USA, March 3-7, 2018	Published
2	Conference Paper	A novel pflua-based OpenFlow implementation for VOSYSwitch	Jérémy Fanguède, Michele Paolino, Dimitar Dimitrov and Daniel Raho	The Third IEEE International Conference on Fog and Mobile Edge	Published

#	Type	Title	Authors	Conference	Status
				Computing (FMEC 2018) Barcelona, Spain, April 23-26, 2018	
3	Conference Paper	Are 5G Networks, and the Neutral Host Model, the Solution to the Shrinking Telecom Market?	Ioannis Neokosmidis, Theodoros Rokkas, Dimitris Xydias, Antonino Albanese, Muhammad Shuaib Siddiqui, Carlos Colman-Meixner, Dimitra Simeonidou	3RD WORKSHOP ON "5G – PUTTING INTELLIGENCE TO THE NETWORK EDGE" (5G-PINE 2018 within AIAI 2018 conference) Rhodes, Greece, May 25-27, 2018	Published
4	Conference Paper	5G City: A novel 5G-enabled architecture for ultra-high definition and immersive media on city infrastructure	Carlos Colman Meixner, Pedro Diogo, Shuaib Siddiqui, Antonino Albanese, Hamzeh Khalili, Alex Mavromatis, Luca Vignaroli, Alexandre Ullisses, Jordi Colom, Reza Nejabati and Dimitra Simeonidou	IEEE International Symposium on Broadband Multimedia Systems and Broadcasting 2018 (BMSB2018) Valencia, Spain June 6-8, 2018	Published
5	Conference Paper	Virtualized Infrastructure Managers for edge computing: OpenVIM and OpenStack comparison	Teodora Sechkova, Michele Paolino and Daniel Raho	IEEE International Symposium on Broadband Multimedia Systems and Broadcasting 2018 (BMSB2018) Valencia, Spain June 6-8, 2018	Published
6	Conference Paper	Enabling Vertical Industries Adoption of 5G Technologies: a Cartography of evolving solutions	Anastasios Zafeiropoulos, Panagiotis Gouvas, Eleni Fotopoulou, George Tsiolis, Thanos Xirofotou, Jose Bonnet, Gino Carrozzo, Stamatia Rizou, Anastasius Gavras, Maria Barros, Xavier Costa-Perez, Athul Prasad, Marco Gramaglia, Anna Tzanakaki, Dimitra Simeonidou, John Cosmas, Mikael Fallgren, Raul Muñoz, Ricard Vilalta	The European Conference on Network Communications (EUCNC2018) Ljubljana, Slovenia June 18-21, 2018	Published
7	Conference Paper	fog05: Unifying the computing, networking and storage fabrics end-to-end	Angelo Corsaro, Gabriele Baldoni	3rd Cloudification of the Internet of Things Conference (CloT2018)	Accepted

#	Type	Title	Authors	Conference	Status
				Paris, France, July 2-4	
8	Conference Paper	Design considerations for an energy-aware SDN-based architecture in 5G EPON nodes (Invited)	Hamzeh Khalili, Pouria Sayyad Khodashenas, David Rincon, Shuaib Siddiqui, Jose Ramon Piney and Sebastia Sallent	20th Anniversary International Conference on Transparent Optical Networks (ICTON 2018) Bucharest, Romania July 1-5, 2018	Accepted
9	Conference Paper	5G City: A Novel Distributed Cloud and Edge Platform for 5G Neutral Host	Carlos Colman-Meixner, Shuaib Siddiqui, Paolo Cruschelli, Antonino Albanese, Maria Rita Spada, Teodora Sechkova, Hamzeh Khalili, Luca Vignaroli, David Pujals, Alberto Hernando, Nicola Ciulli, Simon Prior, Alex Mavromatis and Dimitra Simeonidou	The European Conference on Network Communications (EUCNC2018) Ljubljana, Slovenia June 18-21, 2018	Rejected


Table 1 – Scientific publications accepted or published during project Year 1

The single rejected paper presents the initial work of the project on the Neutral Hosting business model. The plan is to enhance it in Year 2 and submit for publication to other relevant conferences with extended material derived from the analysis of the applicability of the Neutral Host model to operator's market.







2.2. Participation to Talks/Panels/Webinars/Workshops




Regarding event participation, the consortium has been represented in **15 important and well-known events** during Year 1, having the possibility to give there 5GCity presentation, keynotes, panel discussion and demonstrations. Other 6 event participations have been just planned for the period May-November 2018, as detailed in section 2.10.


The complete list of events with 5GCity participation have been reported in Table 2.




	Title	5GCity partner i2Cat: "A distributed cloud & radio platform for 5G neutral hosts"	
1	Type	Invited talk	
	Speaker/Attendees	Sergi Figuerola - i2Cat	
	Event	EUCNC-17	
	Date	12-15 June, 2017	
	Place	Oulu, Finland	
	Link	https://www.eucnc.eu/2017/www.eucnc.eu/	
	Documents	https://5g-ppp.eu/eucnc-2017-oulu-presentations/	
			

		https://5g-ppp.eu/wp-content/uploads/2017/06/5GCity_5G_PPP_P2_EuCNC.pdf	
2	Title	'5G CITY & A NEW GREEN BROADCASTING'	
	Type	5G Dedicated Session and speaking slot during the event, media promotion, 5GCity logo/brand visibility, social promotion, dissemination	
	Speaker/Attendees	Antonio Morello – RAI, Gino Alberico – RAI, Andrea Michelozzi – CoDi	
	Event	14th European Digital Forum	
	Date	15-16 June, 2017	
	Place	Lucca, Italy	
	Link	www.comunicaredigitale.it/en	
Documents	www.comunicaredigitale.it/en/agenda-lucca-2017/ https://www.panoramaaudiovisual.com/2017/06/16/el-forum-digital-europeo-analiza-los-desafios-del-contenido-y-su-distribucion-en-un-nuevo-entorno/		
3	Title	5GCity Project presentation by MOG	
	Type	MOG Exhibition booth 5GCity project presentation	
	Speaker/Attendees	MOG's team	
	Event	IBC 2017	
	Date	15-19 Sept., 2018,	
	Place	Amsterdam, UK	
	Link	https://show.ibc.org	
Documents	https://ibc17.mapyourshow.com/7_0/exhibitor/exhibitor-details.cfm?ExhID=3827		 
4	Title	OpenFog Update – Fog computing to solve advanced IoT deployment challenges	
	Type	Invited Talk	
	Speaker/Attendees	Angelo Corsaro - ADLINK Tech.	
	Event	Edge Computing Congress	
	Date	26 Sept 2017	
	Place	Berlin, Germany	
	Link	https://tmt.knect365.com/edge-computing-congress/	
Documents	https://tmt.knect365.com/meccongress/speakers/angelo-corsaro		

5	Title	"5G Y LA NUEVA FRONTERA AUDIOVISUAL Y MULTIMEDIA. 5GMEDIA Y 5G CITY, ADELANTÁNDOSE AL FUTURO"	
	Type	Keynote project presentation and Panel discussion	
	Speaker/Attendees	Shuaib Siddiqui – i2CAT, Andrea Michelozzi – CoDi, Javier Marcos – Retevision (Cellnex)	
	Event	BIT Experience 2017	
	Date	04-05 Oct 2017	
	Place	Madrid, Spain	
	Link	http://www.ifema.es/bitexperience_01/	
Documents	http://www.ifema.es/bitexperience_06/Prensa/NotasdePrensa/INS_094523_0 https://youtu.be/ERMaSFdrhjs		
 <small>BIT EXPERIENCE 2017 - 5G y la nueva frontera audiovisual y multimedia</small>			
6	Title	"The Global Internet of the Future"	
	Type	Invited speech Ubiwhere's current and future R&I during conference	
	Speaker/Attendees	Pedro Diogo – Ubiwhere	
	Event	Visions for Future Communications Summit	
	Date	23-24 Oct 2017	
	Place	Lisbon, Portugal	
	Link	https://futurecomresearch.eu	
Documents	n/a		
 <small>Organized by NetWorld2020 with the support of 5G Infrastructure Association, European Commission.</small>			
7	Title	The Making of Fog Computing	
	Type	Keynote	
	Speaker/Attendees	Angelo Corsaro - Adlink Tech.	
	Event	Industrial IoT Forum 2017	
	Date	8 Nov 2017	
	Place	Berlin, Germany	
	Link	https://www.fokus.fraunhofer.de/en/fokus/events/iiot-forum	
Documents	https://www.fokus.fraunhofer.de/iiot-forum/speaker/corsaro		
 <small>Fraunhofer FOKUS Up to Date Upcoming Events Industrial IoT Forum 2017 + Extraordinary Matchmaking Event* Program Speaker Dr. Angelo Corsaro</small> Dr. Angelo Corsaro <small>ADLNK Inc., France</small> <small>Angelo Corsaro, Ph.D. is Chief Technology Officer (CTO) at ADLNK Technology Inc. As CTO he leads the Advanced Technology Office (ATO) and looks after corporate technology strategy and innovation. Angelo is a well-known and cited expert in the area of high performance and large scale distributed systems, IoT, Edge/Fog Computing. He is a well-published author with well over 100 of publications on refereed journals, conferences, workshops, and magazines. Angelo is the founder and co-chair of the DDS Special Interest Group, a member of the OMG Board of Directors and a member of the ECC Technical Advisory Board.</small> <small>Contact Person</small>  <small>Dr. Angelo Corsaro</small> <small>ADLNK Inc., France</small>			
8	Title	5GCity Project presentation	
	Type	5GCity presentation by i2Cat (Sergi Figuerola) at IMI booth attended by Antonio Garcia.	
	Speaker/Attendees	Sergi Figuerola – i2Cat, Laura Vidal – IMI, Antonio Garcia – Accelleran, Gabriele Piscitelly - Accelleran	
 <small>smart city expo WORLD CONGRESS 14-16 NOVEMBER 2017 BARCELONA GRAN VIA VENUE</small> 			

	Event	SMARTCITY Expo World Congress	
	Date	14-16 Nov 2017	
	Place	Barcelona, Spain	
	Link	http://www.smartcityexpo.com/en/	
	Documents	Figuerola interview: https://youtu.be/UIYT-OHsMOK	
9	Title	5GCity partner Adlink: speech	
	Type	Invited speech	
	Speaker/Attendees	Gabriele Baldoni - Adlink	
	Event	Global Mobile Broadband Forum 2017	
	Date	15-16 Nov 2017	
	Place	London, UK	
	Link	https://www.mobileworldlive.com/huaweis-global-mobile-broadband-forum-2017/	
Documents	http://www.huawei.com/minisite/hwmbbf17/assert_4/files/MBB_Invitation_letter_en.pdf		
10	Title	5GCity partners Accelleran, Cellnex, Italtel, i2Cat: promotion, flyers & roll-up at MWC'18	
	Type	<p>Accelleran had a booth at Belgium Pavilion 7G71 and presented demos on neutral host, virtualisation, MEC on live 3.5GHz commercial spectrum and cabled 2.6GHz with Small Cells and smartphones</p> <p>Accelleran showed operating 3.5GHz Small Cell in IMI lampost with MEC video server and 3.5GHz smartphone (Belgium Pavilion)</p> <p>Cellnext had a booth where showcased the Project with some description slides at the front TV Screen and had Project leaflets for the interested attendants.</p>	
	Speaker/Attendees	<p>Antonio Garcia – Accelleran, Trevor Moore – Accelleran, David Pujals - Cellnex Telecom, Javier Marcos -Cellnex Telecom</p> <p>Interview Domenico Favuzzi - Italtel</p>	
	Event	MWC'18	
	Date	27 Feb - 1 Mar, 2018	
	Place	Barcelona, Spain	
	Link	www.mobileworldcongress.com	
	Documents	Footage of Barcelona TV (betevé) coverage in the evening news Friday 02/03/2018:	
		 	

		http://beteve.cat/5GCity-fanals-antenes-telefonía-prova-pilot/ Italtel - https://youtu.be/IH021SEpjHw	
11	Title	Use Cases for Smart Cities to improve the 5G ecosystem using a strong partnership between industrial and research area	
	Type	Keynote	
	Speaker/Attendees	Maria Rita Spada – Wind Tre	
	Event	IEEE 5G SUMMIT, Trento Italy	
	Date	6 March, 2018	
	Place	Trento, Italy	
	Link	http://www.5gsummit.org/trento/	
Documents	https://www.5GCity.eu/wp-content/uploads/2018/04/Trento-IEEE-2018.pdf		 
12	Title	'Toward 5G from research and market opportunities'	
	Type	Keynote	
	Speaker/Attendees	Paolo Comi - Italtel	
	Event	IEEE 5G SUMMIT, Trento Italy	
	Date	6 March, 2018	
	Place	Trento, Italy	
	Link	http://www.5gsummit.org/trento/	
Documents	http://www.italtel.com/towards-5g-from-research-and-market-opportunities/ https://www.5GCity.eu/2018/03/21/towards-5g-from-research-and-market-opportunities/		 
13	Title	Conference Session- Italia 5G: 5G opportunità di sviluppo cooperativo	
	Type	Moderation, Keynote Sessions and Roundtable	
	Speaker/Attendees	Andrea Michelozzi – CODI - Session organization & moderation Presentations: Rita Spada - Wind Tre: <i>La fine del Digital divide. I piani dell'industria</i> Gino Alberico - RAI: <i>5G, Città e Nuovi servizi Media</i> Mauro di Bugno - Comune di Lucca: <i>Il 5G come Sviluppo delle Città del 2020</i> Gino Carrozzo – Nextworks: <i>5G: L'Industria e la Città</i>	
	Event	IOTHINGS MILAN	
			

	Date	10-11 April 2018, Milan	
	Place	Milan, Italy	
	Link	http://www.iothingsmilan.com	
	Documents	http://www.iothingsmilan.com/programma-2018/#italia5g Alberico- Rai: https://www.5GCity.eu/project-material/Spada – Wind Tre: https://www.5GCity.eu/wp-content/uploads/2018/04/Mise-5g-Eng_Draft_5G_CITY_Milano_20180410_Final.pdf Carrozzo- Nextworks: https://www.5GCity.eu/project-material/	
14	Title	Neutral Host/Edge Small Cell live demos using US CBRS regulatory shared spectrum access system	
	Type	Live demos and discussions on neutral host use case	
	Speaker/Attendees	Antonio Garcia – XLRN , Frederic van Durme - XLRN	
	Event	CBRS Alliance Annual Member’s meeting	
	Date	8th-10th May	
	Place	Washington, USA	
	Link	https://www.cbrsalliance.org	
	Documents	http://www.accelleran.com/accelleran-federatedwireless-athonet-end-to-end/	
15	Title	Neutral Host/Edge Small Cell live demos with realtime L3 switching between server and small cell	
	Type	Live demos and discussions on neutral host use case. Accelleran awarded SCF “Outstanding Innovation in Small Cell Technology Architecture or Technology” in SCF Awards 2018	
	Speaker/Attendees	Antonio Garcia – XLRN, Frederic van Durme – XLRN, Trevor Moore – XLRN, Jeff Land – XLRN	
	Event	Small Cell World Summit 2018 / Small Cell Forum Plenary	
	Date	22nd-24th May	
	Place	London, UK	
	Link	http://www.scwsworld.com https://www.smallcellforum.org/events/awards-2018/winners-2018/	
	Documents	Accelleran won Small Cell Forum Award in the category “Outstanding innovation in small cell technology or architecture” for	

		<p>their “Accelleran Carrier and mission-critical grade architecture-agnostic small cell RAN-vRAN software solutions”</p> <p>See http://www.accelerant.com/accelerant-scf-award-winner/</p>	
--	--	--	--

Table 2 – 5GCity partners event participation during Year 1

2.3. Demonstrations

Though the project was in its early stage of design and development of the 5GCity innovations, **7 demonstrations of 5GCity related enabling technologies** have been carried out during Year 1.

These showcases have been held primarily by partners, leveraging on relevant background to be evolved in 5GCity and foreground of the Year 1 technical activity.

2.3.1. Unikraft demonstrations

NEC has led this showcase activity on UNIKRAFT, the open source incubation project under the auspices of the Xen Project and Linux Foundation which allows to automatically build unikernels/specialized OSes/images to be used in 5GCity. During Year 1, NEC researchers have run 2 public demonstrations of UNIKRAFT and have confirmed plans for a third demo in fall 2018:

- Simon Kuenzer by NEC gave a Presentations and demos of Unikraft at FOSDEM 2018 (the largest open source conference in the world) in Brussels (BE) on February 3rd, 2018;
- F. Huici by NEC gave a presentation and demos on Unikraft - Unleashing the Power of Unikernels at QCon 2018 in London (UK) on March 7th, 2018;
- [*planned*] F. Huici will give a presentation and demos of Unikraft at Embedded Linux Conference in Edinburg (UK) on October 24th, 2018.



Figure 1 – S. Kuenzer by NEC at FOSDEM2018

2.3.2. Mobile World Congress 2018

From Feb 27th till Mar 1st 2018, 5GCity partners have participated at the MWC18 event in Barcelona (ES), with presentations, booths and significant networking within the 5G PPP and the 5G Barcelona infrastructure.

Acceleran have demonstrated live 3.5GHz smartphone video streaming from 3.5GHz Small Cell and local video server integrated on City of Barcelona lamppost plus demos on neutral host/slicing/edge in small cells in 3.5GHz and 2.6 GHz.



Figure 2 – Accelleran at MWC2018

Relevision had a booth where the 5GCity project has been presented to delegates, Italtel has showed updated 5G video application while NEC has highlighted Industrial IoT opportunities with 5G.

i2CAT, in their role of one of the founding members of the 5GBarcelona alliance, have demonstrated at the Mobile World Capital Barcelona stand in MWC2018 how they will transform the metropolitan area of Barcelona into an open and neutral laboratory for the validation and adoption of 5G technologies and services.



Figure 3 – i2CAT and 5GBarcelona at MWC2018

2.3.3. Other demos

On May 8th-10th 2018, Accelleran was showing live neutral host and edge private LTE uses cases at CBRS Meeting in Washington D.C. (USA) together with CBRS Shared Spectrum Access System.



Figure 4 – Acceleran at CBRS Meeting 2018 in Washington (USA)

On May 22nd-24th 2018, Acceleran was awarded the SCF Award “Outstanding Innovation in Small Cell Architecture or Technology” for their “Carrier and mission critical grade architecture agnostic RAN/vRAN solutions” at the Small Cell World Summit/Small Cell Forum Plenaries in London (UK). Acceleran was showing also realtime L3 switching between server and small cell together with neutral host, slicing and edge use cases.

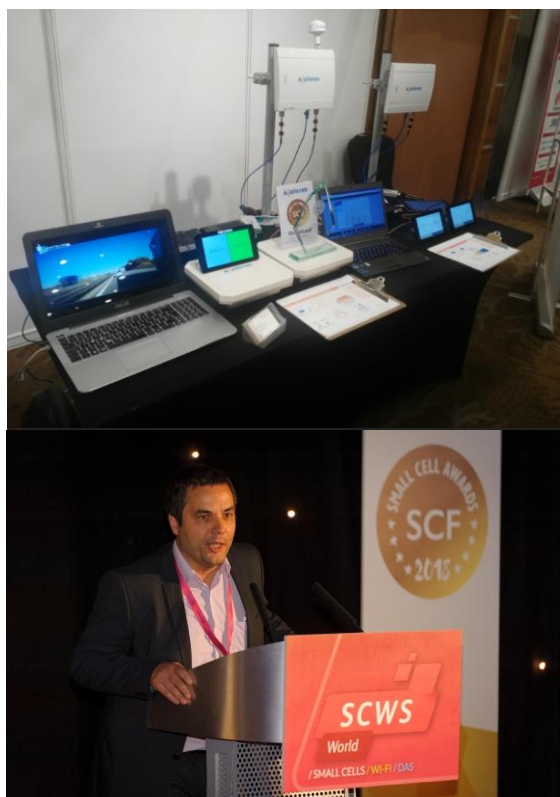


Figure 5 – Acceleran at Small Cell World Summit/Small Cell Forum Plenaries 2018 London (UK)

2.4. 5G PPP Collaborations and 5G IA activities

Regarding the liaison with 5G PPP projects and the participation to 5G PPP activities, the consortium has actively contributed to various Working Groups and events, participating to the planned face to face meetings and task forces since the project's kick-off in June 2017.

In particular, 5GCity has participated to various key Working Groups of the 5G PPP through designated representative partners as briefly reported in the following table:

Area	Working Group	5GCity representative	Main activities
5G PPP	Steering Board	i2CAT (S. Figuerola and S. Siddiqui) - PC	<ul style="list-style-type: none"> • Main program coordination • Annual Program report • EUCNC 2018 coordination • Face to face meetings • Periodic conference calls
5G PPP	Technical Board	NXW (G. Carrozzo) deputy TM	<ul style="list-style-type: none"> • Project cartography • Program and project KPIs analysis and assessment • Golden Nuggets • Cross-project technical coordination • Annual Program report • EUCNC 2018 technical contributions • Face to face meetings • Periodic conference calls
5G PPP	5G PPP COMMS	CODI (C. Bressan)	<ul style="list-style-type: none"> • Periodic conference calls • Coordinated communication initiatives
5G PPP	Architecture	Italtel (A. Albanese)	<ul style="list-style-type: none"> • Discussion on new architecture whitepaper • EUCNC 2018 technical contributions • Periodic conference calls
5G PPP	Network Management and QoS	UW (T. Batista)	<ul style="list-style-type: none"> • Discussion on new NetMgmt whitepaper • Periodic conference calls
5G PPP	Software Networks (SDN/NFV)	VYOSYS (M. Paolino) UW (R. Preto) i2CAT (S. Siddiqui)	<ul style="list-style-type: none"> • Discussion on new whitepaper • Periodic conference calls
5G IA	Pre-standards	BCN IMI (M. Lamarca)	<ul style="list-style-type: none"> • Periodic conference calls
5G IA	Trials WG	NXW (N. Ciulli) i2CAT (A. Betzler)	<ul style="list-style-type: none"> • Trials pre-structuring model • Periodic conference calls
5G IA	Security	i2CAT (S. Siddiqui) – <i>temp assignment</i>	<ul style="list-style-type: none"> • Discussion on new Security whitepaper • Periodic conference calls
5G IA	Vision and Societal Challenges	INCITES (T. Rokkas)	<ul style="list-style-type: none"> • Periodic conference calls
Networld 2020	SME WG	NXW (N. Ciulli, G. Carrozzo)	<ul style="list-style-type: none"> • EUCNC 2018 SME coordinated presence and dissemination • Periodic conference calls

Table 3 – 5GCity collaborations within 5G PPP area

In addition to the aforementioned WG activities and contributions to joint 5G PPP results (i.e. whitepapers, disseminations, presentations, etc.), 5GCity has frequently promoted its research through and within 5G PPP with the additional contributions reported in Table 4.

Title	5GCity Project Overview
Type	Keynote

Speaker/ Attendees	Shuaib Siddiqui – i2CAT
Event	5G PPP Phase 2 Kick-off and Collaboration Meeting
Date	1 June 2017
Place	Brussels, Belgium
Link	https://5g-ppp.eu/5g-ppp-phase-2-projects/
Documents	https://www.5GCity.eu/2017/07/10/5gppp-phase-2-kick-off-collaboration-meeting/ https://www.5GCity.eu/wp-content/uploads/2017/08/5G_PPP_P2_Collaboration_KO_01062017B.pdf
Title	Interview Partner 5GCity
Type	Video shot by the Euro-5G & To-Euro-5G projects.
Speaker/ Attendees	Nicola Ciulli – Nextworks
Event	EuCNC2017
Date	7 Oct 2017
Place	Oulu, Finland
Documents	https://youtu.be/tx_5iyDZPM4

Table 4 – 5GCity presentations and mentions within 5G PPP

The relation with 5G PPP coordination teams has been productive and regular. Special focus has been put on the collaboration via social channels. Several news regarding the 5GCity project have been published and shared among the 5G PPP web (see Table 5) and social networks, and – reciprocally – 5GCity has reflected many program level news posts and tweets in collaboration with 5G PPP communication office. The significant number of interactions between 5GCity and the 5G PPP on social network platforms (LinkedIn, Twitter), with a consistent number of 5G PPP re-tweets and posts related to 5GCity relevant topics, clearly demonstrate the interest of 5G PPP community in 5GCity activities and research plan.

Title	5GCity Newsletter
Type	Newsletter
Publication date	29 March, 2018
Documents	https://5g-ppp.eu/5GCity-newsletter/
Title	5GCity@IoTThings
Type	News
Publication date	9 April, 2018
Event	IoTThings Milan
Date	10-11 April 2018
Place	Publication on 5G PPP website and socials Twitter and LinkedIn
Link	www.iothingsmilan.com
Documents	https://5g-ppp.eu/5gcityiothings/ https://5g-ppp.eu/event/5gcityiothings/
Title	5GCity Blog Post
Type	Blog

Publication date	19 April, 2018
Documents	https://5g-ppp.eu/from-service-design-to-network-slices-software-development-kits-for-5g-cities/

Table 5 – 5GCity information shared on the 5G PPP website

More on a technical side, 5GCity has made initial contacts with 5GTANGO project (<https://5gtango.eu/>) for a potential collaboration. In this regard, preliminary ideas were exchanged for topics of interests for both projects, e.g., on Service Development Kit (SDK) design and functionalities, as this is addressed by both projects. Further meetings have been planned, leveraging on the opportunity for face-to-face discussions around EuCNC 2018 to progress on more technical details.

2.5. Liaison Activities with Projects

In addition to the initial contacts with other 5G PPP projects from Phase 1 and Phase 2 and the joint organization of workshops at BMSB2018 and EUCNC2018, the consortium has established through individual partners' actions, additional liaison activities with different institution and organizations, aiming at promoting particularly the initial software results and assets to be used for 5GCity NFVI.

The major achievements of the period are summarized Table 6:

Title	Unikraft Presentation
Type	Official release as Xen incubator project under the auspices of the Linux Foundation. Interviews with journalists, press releases, tech blog, wiki and webpage written up.
Speaker Attendees	Simon Kuenzer - NEC Felipe Huici - NEC Florian Schmidt -NEC
Event	Unikraft Release
Date	5 December, 2017
Place	Heidelberg, Germany
Link	http://sysml.neclab.eu/
Documents	https://www.xenproject.org/developers/teams/unikraft.html
Title	Mixed Critical IoT Edge Systems Through Virtualization
Type	Speech at Open source community
Speaker Attendees	Jeremy Fanguede - VOSYS
Event	Linux Foundation OpenIoT Conference 2018
Date	12-14 March, 2018
Place	Portland, USA
Link	https://events.linuxfoundation.org/events/elc-openiot-north-america-2018/program/schedule/
Documents	https://schd.ws/hosted_files/elciotna18/cf/mixed_criticality_openiot_VOSYS_2018-03-14.pdf

Table 6 – 5GCity liaison with other projects

2.5.1. Bristol Layered Realities Weekend

On 17th March 2018, an important demonstration called “**Layered Realities Weekend – a 5G Showcase**” was held in Bristol (UK), organized and led by University of Bristol’s Smart Internet Lab team. The “5G

Showcase” was a public demonstration of the 5GUK Test network project which is funded by the UK Government’s Department for Digital, Culture, Media and Sport (DCMS) under the ‘5GUK Testbeds and Trials Programme’. The University of Bristol’s Smart Internet Lab is an active partner in 5GCity and their experience in the 5GUK trial is direct impact in 5GCity to develop the Bristol infrastructure for our usecases. Through this event Bristol managed to become the first public 5G experience in UK and Europe.

Bristol shows off world’s first 5G urban network

Researchers at the University of Bristol have demonstrated what they claim is the world’s first end-to-end 5G urban network.

The university’s Smart Internet Lab has used technology from American semiconductor firm Xilinx to develop a “flexible and programmable 5G testbed”.

Read more on www.5gcity.eu



Figure 6 – UK Layered Realities 5G showcase

2.6. Communications via public Web Site

5GCity’s website (<http://www.5GCity.eu>) has a major role in the dissemination & communication activities of the project. It is an eye-catching website that was launched in June 2017, when the project started. It contains all the information about the 5GCity activities (past, on-going, upcoming), developments, and results.


[i LEARN MORE ABOUT 5GCITY](#)

DOWNLOAD THE NEWSLETTER

5G City - Developing and deploying

[READ IT HERE](#)

Figure 7 – 5GCity.eu landing webpage

The main objectives of the 5GCity website are:

- To build & deploy constant and permanent information and data to help 5GCity dissemination and promotion;
- To distribute information, data, presentations, news, ideas periodically to keep high the attention upon the project;
- To public, making available through the project’s website all dissemination material (flyers, rollups, press releases, etc.);
- To circulate the information from all partners to amplify the power of the various activities;
- To strengthen an enlarge the networking, media & press contacts, creating a “5G universe”;
- To be visible and active online, offline, and in the public sphere of relations of the “5G universe”;

Before the Mobile World Congress 2018 in Barcelona, the website has been heavily restyled with new and additional information and sections (i.e. Blog, Newsletters) in order to maximise and increase the impact of 5GCity communication for the world leading conference and exhibition on 5G technologies. The news and events section were made more dynamic, as well as the promotion and engagement with the 5GCity social platforms (Twitter and LinkedIn).

All information released from the website is licensed via a Creative Commons license (likely the “CC BY” license) for maximum dissemination and use of licensed presentations.

As expressed in prior deliverables, the consortium plans to maintain the web site active for a minimum of two years after project’s end in order to ensure the sustainability of the project results.

2.7. Communications via Social Networks

Due to the increasing importance and impact of social channels on the visibility of innovative and trending actions on 5G, the consortium has put special attention on social media relationship and invested a significant effort to build a wide and active community of followers interested in project's activities.

The principal 5GCity social networks selected by the consortium are Twitter, LinkedIn, YouTube, and ResearchGate. Among them, Twitter and LinkedIn have received the greatest attention during the Year 1, stimulating the conversation between the scientific community, institutions, industry, and specialized media.

The 5GCity Twitter account, with more than **800 tweets** - increasing, since Feb 2018 has been very active. A sign that it is the most effective and immediate tool in disseminating news, events, and achievements from all project partners.

In May 2018, the impressions average on 5GCity posts reached 77,87k from the last 4 months, with 560 followers (May 15, 2018), result of an intensive campaign in Twitter and LinkedIn which put great attention to give meaningful contributions to share upon partners, enlarging the 5G community.

As the biggest and remarkable accomplishment, @5GCity Twitter account is the one with more followers inside the 5G ecosystem.

Figure 8, Figure 9 and Figure 10 presents the dispersion of the followers of 5GCity twitter account across the different geographic areas of Europe, Eurasia and America.

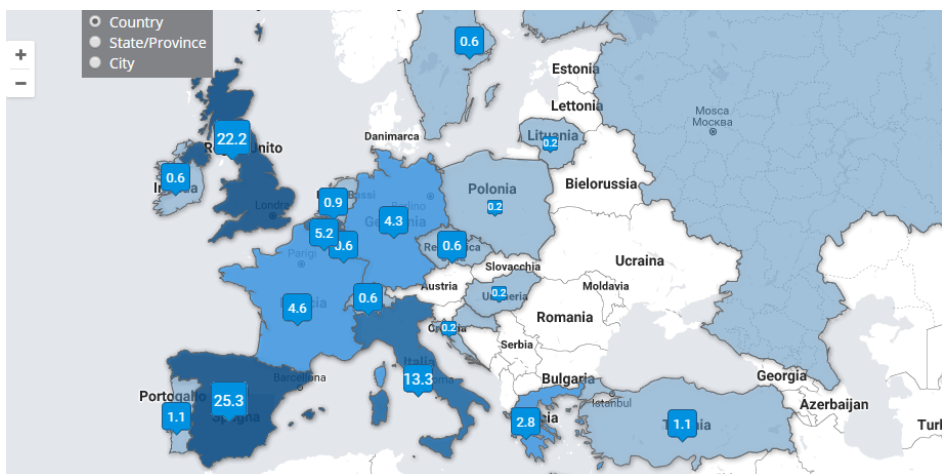


Figure 8 – @5GCity Twitter Followers in Europe



Figure 9 – @5GCity Twitter followers in Eurasia



Figure 10 – @5GCity Twitter followers in America

During the MWC 2018 in Barcelona the 5GCity partners’ involvement and participation at the event were so important that an intense social interaction was carried out especially on Twitter in those dates.

The great activity carried on strengthening 5GCity presence on social network platforms joined with the participation to well-known events, is clearly depicted in Figure 11. Since Feb 2018, Twitter activities have increased at **+ 1932% /Im**, stimulating **impressions at + 115,2%** and double up followers from 215 to 560 of today, with a **+138,7% profile visits**.

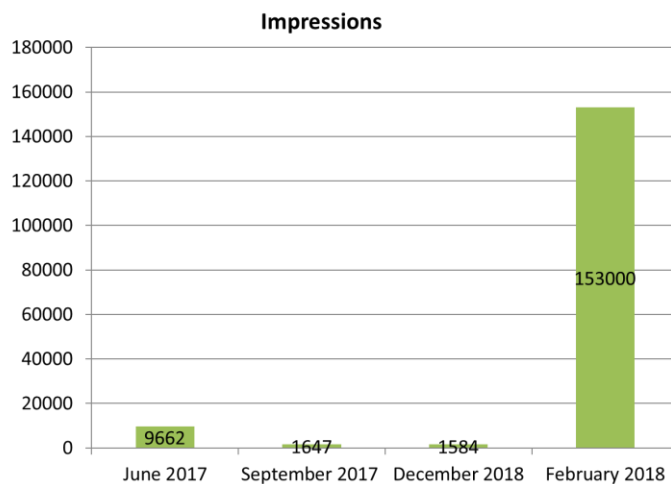


Figure 11 – Twitter @5GCity impressions during the Mobile World Congress 2018.

5GCity LinkedIn group members are increasing as well. Although the group growth seems slow, its members have passed in this first year from 41 (in Feb, 2018) to **66 members** (20 April, 2018).

Comments have been posted to start shaking group activities, stimulating discussion and networking. It is desirable that members double from the actual 66 to 110 before June 2018. At the moment, it has reached an **86,4% group visits**.

2.8. Newsletters and Technical Blog

A first 5GCity Newsletter was delivered on March 6th 2018 and an updated version on March 21st, which were both published in the 5GCity website, shared over all Consortium partners mailing list, 5GCity socials, and 5G PPP network. A second 5GCity Newsletter has been delivered at the end of May 2018.



Figure 12 – 5GCity newsletter 1, March 2018



Figure 13 – 5GCity newsletter 2, May 2018

The first 5GCity newsletter contains a description of 5G relevant topics, as well as an indication of past/current/next events coupled with a well updated news and social section. In particular, the following main topics have been covered:

- Unikraft - Specialized Operating Systems and Virtual Machines
- 5GCity: The Run of the Neutral Host in the Cities
- Lucca 5GCity - High-Resolution Cameras

In the second newsletter, we have addressed:

- inCITES published paper "Are 5G Networks, and the Neutral Host Model, the Solution to the Shrinking Telecom Market?" to be presented at the 5GPINE workshop of the 14th AIAI conference, Rhodes, Greece, 25-27 May 2018.
- VOSYS' published paper "A novel OpenFlow implementation based on pflua for VOSYSwitch" presented at the Third IEEE International Conference on Fog and Mobile Edge Computing (FMEC 2018), Barcelona, Spain, April 23-26, 2018.

- Project participation at "IoT Milan" last 10-11 April in Milano, where the 5GCity project was presented in a dedicated section ITALIA5G, moderated by Comunicare Digitale.
- Project participation to (1) the HPSR Unikraft Hackathon in Bucharest, June 17th; (2) the Xen Summit in Jiangning on June 20-22th; (3) EuCNC2018, Ljubjana from June 18th to the 21st.
- Results from adding functionality to Unikraft. Highlights of micro-libraries that will be added, support for unit testing, support for high-level languages such as Python, and support for multiple types of schedulers.

Beside the 5GCity Newsletters, another powerful tool to convey 5GCity topics and make them ready for the main dissemination channels is the 5GCity Technical Blog.

Since April 2018, and with the greatest support and collaboration from 5GCity technical partners, the Technical Blog has been published in the 5GCity Website. The technical blog issues relevant posts on important topics related to the project design and development, to keep consortium members and 5G community informed at all time.

On April 2018 it was published on 5GCity website, the first Blog contribution by Nextworks entitled: 'From service design to network slices: Software Development Kits for 5G Cities'.

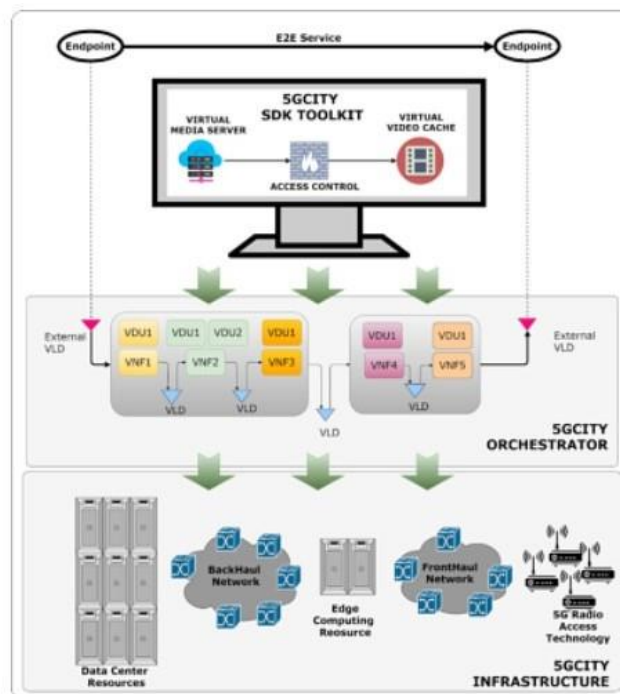


Figure 14 – 5GCity blog entry “From service design to network slices”

2.9. Other dissemination activities by the partners

Apart from the aforementioned events and activities, during the first year of the project partners have also individually put a great effort to export 5GCity-related topics across well-known events. A great amount of visual and social communication was shared by partners to enhance their participation and engagement in the 5GCity project.

5GCity attendance to past events are listed in Table 7.

Date & Location	Event	Attendees
8 Nov 2017	IoT Forum 2017	Angelo Corsaro, ADLINK Tech.
26 Sept 2017	Edge Computing Congress	Angelo Corsaro, ADLINK Tech.
12-15 June 2017 Oulu (FIN)	EUCNC-17	Theodoros Rokkas (inCITES)
5th December	Unikraft Release	Simon Kuenzer, Felipe Huici, Florian Schmidt (NEC)
27 Feb - 1 Mar Barcelona	MWC'18	Antonio Garcia, Trevor Moore, (Accelleran) David Pujals, Javier Marcos (Cellnex Telecom)
12-14th March, Portland	Linux Foundation OpenIoT Conference 2018	Jeremy Fanguede (VOSYS)
25-26 April, Malaga (ESP)	5G Forum	Oscar Pallarols, Javier Marcos, Luis Moreno, David Pujals (Cellnex)

Table 7 – 5GCity partners attendance to additional events

Moreover, common dissemination material has been produced during the last months to establish a project branding to be reused in events. Brochures have been produced and a rollup layout was elaborated especially for Barcelona city during the Mobile World Congress 2018.



Figure 15 - 5GCity brochure Barcelona



Figure 16 - 5GCity brochure Bristol



Figure 17 - 5GCity brochure Lucca

Three more versions are ready: Lucca, Bristol and a version with the three cities together, for all events participation.



Figure 18 - 5GCity – Rollups for three cities ready for Events participation

2.10. Updated dissemination plan for next period

As part of a continuous planning and improvement of the 5GCity dissemination actions, a significant number of events have been prepared and targeted in Year 1 which will take place in Year 2.

The participation to some of these events will offer the opportunity for 5GCity consortium to showcase demos, test 5G equipment, and provide UHD video shooting opportunities for city use cases tests. Other events will give the opportunity to report at European level project's results and achievements which will be consolidated in the next months.

The list of events which has been considered and planned for 2018 is presented in Table 8.

#	Data & Location	Event	Planned attendees
1	06-08 June 2018 Valencia, Spain	IEEE Broadband Multimedia Systems and Broadcasting (BMSB)	I2CAT and VOSYS will present 5GCity papers
2	14-15 June 2018, Lucca - Italy	15 th European Digital Forum	Comune di Lucca, Comunicare Digitale, RAI, Nextworks 5GCity will meet Media Industry, B2B, European stakeholders, CEO/CTO profiles
3	13-15 June, Tokyo, Japan	Interop-18	VOSYS will present demos
4	18-21 June, 2018, Ljubljana Slovenia	EuCNC 2018	5GCity will present 3 demos at the project booth: <ul style="list-style-type: none"> • Neutral Hosting • Guest Optimization in 5GCity (Unikraft) • 5GCity far-Edge Orchestrator & VIM (fog05) 5GCity will also participate and organise workshops within EUCNC (5 out of 8 workshops in the program) <ul style="list-style-type: none"> • WS1: Vertical Industries & Services for 5G (VIS5G) • WS3 Multi-provider, multi-vendor, multi-player orchestration: from distributed cloud to edge and fog environments in 5G • WS4 2nd Workshop on business models and techno-economic analysis for 5G networks • WS6 5th International Workshop on programmable networks: Demystifying software networks for Vertical Industries • WS8: Next generation network systems security
5	13 - 17 September, 2018, Amsterdam	IBC 2018	RAI will attend
6	4-6 Dec 2018 Vienna, Austria	ICT 2018: Imagine Digital - Connect Europe	ALL partners 5GCity applied for a booth with demos

Table 8 – 5GCity planned participation to upcoming events

For the communication part is expected a substantial implementation of video production and partners' interviews during events participation. Special video shooting will be made during the execution of the city use cases pilot experiments, the phases of infrastructures deployments and tests.

Since April 2018, great support and collaboration has been received from all 5GCity technical partners for the Technical Blog published in the 5GCity Website. The blog will elaborate relevant materials on important topics related with the project, to keep consortium members and 5G community informed at all time. It is expected that one article per month will be produced.

Clearly, the progress, the demos, the new results from the project will allow a new and important communication to the community, the industry, the main 5G stakeholders, also with greater initiatives on promotion and communication activities, which will enhance even more 5GCity project outcomes.

To achieve the best possible results, the most important planned actions will be:

1. Identification of key industry and stakeholder's events for dissemination of UC results and exploitation;
2. Industry and market analysis and evaluation for exploitation and industrial opportunities;
3. Organization of a 5GCity Summit co-located at Smart City Expo World Congress in Barcelona, to offer a cross-sectional view of the various applications and utilities. The new role of cities will be helped by the 5G and the project has a specific purpose in this sense;
4. Keep spreading and enhancing project results via press releases, social media and the project's website;
5. Demonstration during the 15th European Digital Forum of pilot use case empowered by edge computing capabilities that will be deployed in the municipality of Lucca, looking to deliver in 2019 a great result in terms of demo & service;
6. Demonstration during the Summer Festival 2018 in Lucca, video pilot of 4K/UHD contents based on users' experience NGX;
7. Supporting and stimulating activities related with knowledge outreach and standardization. Smart city;
8. Permanently stimulating discussion, meetings, high-level events involvement, and important cooperation between the various sectors of the 5G, including not only industry, universities, telco, broadcasters, media companies, and all stakeholders; but also those "third parties" that could help to make the European proposal stronger. This is the case, for example, of the cultural and tourism industries, which can represent two important reinforcement for the success of 5G proposals;
9. Supporting the 5G Observatory; so that the outcomes of European contribution is appreciated worldwide; producing important partnerships and collaborations results, at all levels.

3. Standardization and Open Source Project Activities

Following the strategy described in deliverable D6.2 “Standardization and Exploitation Plan”, the standards related activities of the project during Year 1 have been mostly focused on consolidating engagement with the identified SDOs in the four main areas (edge computing, 5G, cloud/orchestration and media), and setting the ground for 5GCity contributions in the next period.

A summary of the contributions and activities executed by the project during Year 1 is presented in Table 9.

Area	Activity/Contribution	Partners involved	Status
Edge Computing and Smart Cities	Created an Eclipse IoT project around the DDS standard and contributed an implementation of the DDS standard	ADLINK	Ongoing The project is live and available at https://projects.eclipse.org/projects/iot.cyclonedds
	Started fog05 as Eclipse IoT project, to provide an infrastructure for Fog Computing and MEC	ADLINK	Ongoing The project is live and available at http://projects.eclipse.org/proposals/eclipse-fog05
	Reference implementation of the Open Fog Consortium Reference Architecture (OFCRA) that can be used by test-beds	ADLINK	Ongoing, follow up of the OpenFog Reference Architecture design issued in Feb 2017
5G-RAN	Analysis of 3GPP 5G RAN design specification	ACCELERAN	Contributions planned for next period
	Analysed ONF specification	ACCELERAN	Contributions planned for next period
	Contributions to Small Cell Forum Release documentation	ACCELERAN	Contributions planned for next period related to 5GCity Small Cell solutions
Cloud and Orchestration	Analysis of ETSI NFV IFA and SOL specifications	NXW, i2CAT, UW	Ongoing, continued alignment of 5GCity interface to ETSI NFV consolidated specifications
	Analysis of ETSI MEC specifications	NXW, i2CAT, UW, ADLINK, VYOSIS	Ongoing, continued alignment of 5GCity design to MEC in NFV scenarios
Media & Broadcasting	Followed activities of AMWA, EBU, Society of Motion Pictures Engineers, Digital Video Broadcasting and ITU	RAI, BTVE	Contributions planned for next period related to 5GCity use cases
Other Open Source Communities	Bootstrapped Unikraft as Xen Project under the Linux Foundation	NEC	The project is live and available at https://www.xenproject.org/developers/teams/unikraft.html

Table 9 – Summary of contributions to standards in Year 1

Details are provided in the following subsections.

3.1. Edge Computing and Smart Cities

The number of consortium and standardisation groups that have sparked initiatives around IoT keeps growing. Some of these consortia, such as the IIC and the Open Fog, have played an instrumental role in raising awareness around some of the key problems posed by IoT in its most general conception and specifically in Industrial IoT. These consortia have been busy over the past two/three years on creating Reference Architectures (RA). These reference architectures provide a reference of how one may decompose

and architect IoT systems, but do not mandate standards nor provide reference implementations that can allow companies to experiment with some of the new concepts such as Fog Computing and MEC.

As a result, and as found out in the IoT Developers Survey 2018, the main focus of the IoT community has been constantly moving toward open source initiatives. As shown in Figure 19, this survey found out that the two most relevant IoT Consortium are the Eclipse IoT and the Apache Foundation.

These findings are aligned with our observations and experience as long-standing members of the majority of the IoT initiatives and in a way validates the strategy we are executing in the context of 5G described below.

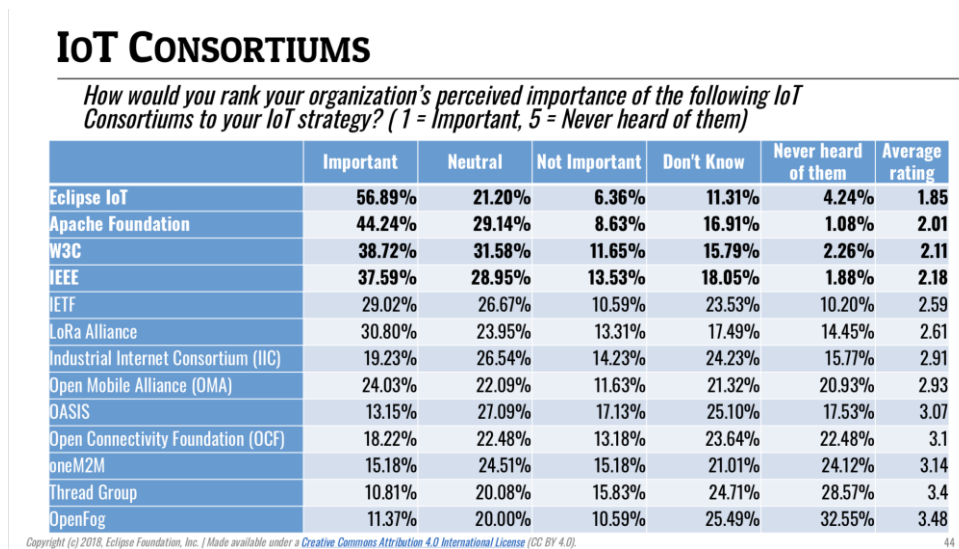


Figure 19 – IoT Developers Survey 2018 (available at <http://bit.ly/2sinK6Q>)

3.1.1. 5GCity contribution to Eclipse IoT Consortium

In the context of the 5GCity project we are working with the Eclipse IoT Consortium to establish an ecosystem of technologies as well as a reference platform for MEC and Fog Computing. Below the list of activities that we have performed from the beginning of the project to date.

3.1.1.1. Eclipse Cyclone DDS Project

The OMG Data Distribution Service (DDS – <https://www.omg.org/spec/DDS>) is one of the connectivity standards identified by IIC and the OpenFog Consortium as addressing the key requirements of IIoT. As reported in the table shown in Figure 20 – extracted from the IIC Connectivity Framework (<http://bit.ly/2lW2t9Q>) – DDS is perhaps of the connectivity standards that addresses the most requirements of IIoT applications. Yet, in spite of its applicability, DDS remains a standard which there is limited Open Source availability and arguably very little open source community. Its application remains confined to those environments that are sufficiently challenging not to be able to get-by without using it – such as smart cities. As a matter of fact, DDS is in use in various smart cities and is also the standard called for by the Smart Nation Project in Singapore (see <https://www.smartnation.sg>).

To foster the adoption of DDS and help creating an ecosystem of technologies that can facilitate the development of IIoT applications, in the context of the 5GCity project we have created an Eclipse IoT project around the DDS standard and contributed an implementation of the DDS standard. The project is now live and available at <https://projects.eclipse.org/projects/iot.cyclonedds>. This project will be used to grow the DDS community as well as engage a more community and user driven standard evolution. Through this project we have zeroed the barrier of adoption and made it possible for this technology to be leveraged in IoT projects as well as verticalized to specific IIoT application domains.

	Core Standard Criterion	DDS	Web Services	OPC UA	oneM2M
1	Provide syntactic interoperability #	✓	Need XML or JSON	✓	✓
2	Open standard with strong independent, international governance #	✓	✓	✓	✓
3	Horizontal and neutral in its applicability across industries#	✓	✓	✓	✓
4	Stable and deployed across multiple vertical industries#	Software Integration & Autonomy	✓	Manufacturing	Smart City Pilots*
5	Have standards-defined Core Gateways to all other core connectivity standards#	Web Services, OPC UA*, oneM2M*	DDS, OPC UA, oneM2M	Web Services, DDS*, oneM2M*	Web Services, OPC UA*, DDS*
6	Meet the connectivity framework functional requirements	✓	✗	Pub-Sub in development	✓
7	Meet non-functional requirements of performance, scalability, reliability, resilience	✓	✗	Real-time in development	Reports not yet documented or public
8	Meet security and safety requirements	✓	✓	✓	✓
9	Not require any single component from any single vendor	✓	✓	✓	✓
10	Have readily-available SDKs both commercial and open source	✓	✓	✓	✓

green = Gating Criteria

* = work in progress, ✓ = supported, ✗ = not supported

Figure 20 – IIoT Connectivity Core Standards (source <http://bit.ly/2IW2t90>)

3.1.1.2. Eclipse fogØ5 Project

Early Internet of Things (IoT) applications have adopted cloud-centric architectures where information collected from things is processed in a cloud infrastructure and decisions are pushed back from the cloud to things. While this architectural paradigm is suitable for a subset of Consumer IoT (CIoT), it quickly shows its limitation in the context of Industrial IoT (IIoT). Fog Computing and MEC have emerged as an architectural approach to deal with the limitations exposed by cloud-centric architectures in the context of IIoT applications. Yet, to date, the large majority of Open Source initiatives are centred around the device-to-cloud paradigm.

To accelerate the adoption of MEC and Fog Computing we have started an Eclipse IoT project, namely fogØ5, that provides an infrastructure for Fog Computing and MEC. This project is available at <http://projects.eclipse.org/proposals/eclipse-fog05>.

3.1.1.3. 5GCity contribution to Open Fog Consortium

ADLINK played an active role in the definition of the vision paper and the reference architecture which was published in February 2017 and is available at <https://www.openfogconsortium.org/ra>. Our current effort is related to establishing a reference implementation of the Open Fog Consortium Reference Architecture (OFCRA) that can be used by test-beds as well as in order to explore new aspects of fog computing.

Additionally, in light of the recent collaboration established between the Open Fog Consortium and ETSI we are trying to establish a reference platform that is compatible with both the OFCRA as well as the ETSI reference architecture.

3.1.1.4. Working Group Testbeds & specific 5GCity activities/results

Along with focusing our efforts in creating an open source ecosystem for Fog and MEC related technologies within the Eclipse IoT foundation, we have been actively working with the Open Fog to set the Eclipse IoT as the “Fog Computing” Open Source foundation and fogØ5 the reference implementation to be made available for Open Fog Consortium test-beds.

3.2. 5G-RAN

In Year 1, ACCELERAN has continued its participation to the Small Cell Forum being awarded the SCF Award “Outstanding Innovation in Small Cell Architecture or Technology” for their “Carrier and mission critical grade architecture agnostic RAN/vRAN solutions”. This achievement is related to R&D activities in scope with 5GCity, which will also stimulate subsequent contributions to SCF Release documentation packages focused on Small Cells.

Partners have followed the activities of 3GPP and Open Networking Foundation (ONF), planning more active contributions in next period.

3.3. Cloud and Orchestration

The main activities of the period in this area have been carried out by partners working on the 5GCity orchestration and NFVI functions (NXW, i2CAT, UW, VYOSYS, ADLINK) who have analysed the latest standard releases by ETSI NFV on NS and VNF package descriptions and by MEC (for co-existence of MEC in NFV) in order to align 5GCity design of SDK and edge/core virtualization infrastructure to the latest international recommendations by ETSI.

NXW has been contributing to Specialist Task Forces set up by ETSI to work on gap analysis between OpenStack APIs and NFV interfaces, and on MEC Testing Framework. This activity has configured as a mix of standardization and exploitation tasks.

More active contributions to these SDOs are planned for the next period.

3.4. Media and Broadcasting

In the period, the media vertical partners of 5GCity (RAI, Barcelona TV) have continued following the activities of AMWA, EBU, Society of Motion Pictures Engineers, Digital Video Broadcasting and ITU. More active contributions are planned once the use cases will be tested on the various city trials.

3.5. Collaboration with Open Source Communities

Considered that most of the attention and impact is now actually made by Open Source Foundations, we plan to leverage our initiatives with the Eclipse IoT Foundation to create a centre of gravity around fog and MEC technologies. Additionally, as the Eclipse Foundation will soon have a standardisation group working in the spirit of the JCP, we plan to focus the standardisation in the context of Eclipse Open Source standards. The time paper-standard has come, to help advance IoT and IIoT we need vendor neutral, open and interoperable solutions that work along with an open and transparent specification body.

The Unikraft project, leaded by NEC, has been bootstrapped as Xen Project under the Linux Foundation (<https://www.xenproject.org/developers/teams/unikraft.html>). No release has been published yet, but code and a public wiki have been setup to ease engagement with the community of developers and adopters.

Moreover, various 5GCity partners (NXW, UW, i2CAT) have followed and contributed to ETSI OSM technical discussions, testing and supporting on operations of OSM Release three.

4. Exploitation Activities

After planning the exploitation directions at project and individual partner level (D6.2), the consortium has started working during Year 1 on the identification of key stakeholders to and external communities with whom to establish networking connections for pursuing the 5GCity technologies and results.

In particular, the consortium has oriented its participation to Barcelona Smart City Expo 2017, MWC 2018, IoTHINGS2018-Milan and EUCNC 2018 to maximise the visibility of 5GCity in the industry and research communities working in areas covered by our use cases, in order to establish useful contacts with relevant players in the field of Smart City, 5G, IoT development.

In addition to this consortium wide exploitation activity, each partner has executed preliminary individual exploitation actions as reported in the following sections.

4.1. i2CAT

Fundació i2CAT is a non-profit technology centre that promotes R&D and Innovation activities in the field of Information and Communication Technologies and the Future Internet. The strategic objectives of i2CAT are: (i) to integrate research, development and innovation; (ii) to foster co-creation using the Quadruple Helix model; (iii) to develop activities within hybrid international and regional framework; and (iv) to create networking and multimedia infrastructures and advanced experimental platforms.

Two research areas, namely Software Networks (SN) and Mobile Wireless Internet (MWI) are actively involved in 5GCity project. As stated in D6.2, i2CAT plans its exploitation strategy along four lines, including i) In-house SDN/NFV tool enhancement, ii) Wireless network virtualization, iii) Leverage for future projects, and iv) Knowledge and technology transfer.

i2CAT is already progressing with the four lines of effort for its exploitation strategy. With regards to SDN/NFV tool enhancement, i2CAT is focused on improving its expertise on the Open Source MANO (OSM) orchestrator which is also supported by ETSI. To achieve this, SN team members are closely following the development activities of OSM by attending OSM F2F meetings. Furthermore, SN team is also looking in to the fog05 edge orchestrator for possible integration with OSM in order to support end-to-end service orchestration in city edge infrastructures. The team is also working on using the above orchestrations tools with OpenStack (Cloud management) and ODL (SDN controller). All in all, these activities are enriching the in-house expertise of the SN with regards to SDN/NFV tools.

The MWI team is working on the enhancement of the wireless network virtualization components. In particular there have been improvements of the wireless scheduler agent running in the Wi-Fi nodes. It forms a basic component for the slicing of the RAN and evaluations have been carried out for new designs of the scheduler to align with SoA wireless driver developments. Similarly, the work on the global scheduler (in the SDN controller) has been initiated. Further, MWI team members have dedicated efforts on integrating the i2CAT RAN virtualization components running in the wireless nodes with elements from other partners, such as VOSYSwitch and the fog05 edge orchestrator. A common NETCONF management and control interface is being defined that integrates both Small Cell and Wi-Fi node control and management plane, allowing for i2CAT's SDN controller to configure both types of devices.

i2CAT considered various 5GCity platform components to serve as basis for a wide-scale enhanced 5G KPIs validation platform for a proposal (5GTRIAL) targeting ICT-17 call. In addition, plans are under discussion to leverage on 5GCity platforms for future projects under the umbrella of 5GBarcelona.

i2CAT has already identified 5GCity platform as an asset for the organization as it is very aligned with the requirements and goals of 5GBarcelona initiative which is led by i2CAT. As mentioned earlier, the plan is to

further enhance 5GCity platform, for example, to include validation mechanisms for particular technological KPIs, for 5GBarcelona.

i2CAT plans to keep progressing along the abovementioned four lines of exploitation. For SDN/NFV tool expertise, the plan is to complete development and integration of new modules with OSM and fog05 and possibly contribute these developments back to OSM and fog05 communities. The main targeted OSM enhancements are related to i) the ability to orchestrate Virtual Networks within the context of 5G end-to-end network slicing of multi-access networks, ii) the support of a broader palette of infrastructure management technologies, iii) a more efficient coordination with Multi-access edge computing orchestrators, and iv) more efficient resource placement algorithms.

Regarding the work on wireless virtualization, the evaluation for the most suitable scheduling method to apply the RAN slicing will be finalized and based on the outcomes, the current solution will be enhanced to suit the best the needs of 5GCity. In parallel, the work on the SDN controller will continue to implement the global scheduler component. Based on the outcomes of the ongoing work for the integration and compatibility tests with other partner's, if possible, the i2CAT Wi-Fi nodes will be enhanced with these technologies to improve their performance and to offer additional virtualization capacities at the far edge. The NETCONF model for the RAN elements will be polished and it will be translated to the client/server agents in the Wi-Fi nodes and the SDN controller.

4.2. NEC

Apart from public demonstration initiatives related to Unikraft just reported in Section 2, NEC has not executed specific exploitation activities in Year 1.

4.3. VOSYS

The VOSYS activity in 5GCity aims at building a vertical VIM-NFVI product solution which enables trusted computing and mixed criticality features in 5G networks, thus widening the possible deployments and applications of 5G networks also to city mixed-critical environments like roads/vehicles, hospitals, industries, etc. At the same time, VOSYS will leverage on skills and expertise acquired during the project to provide related design and development services.

The market targets for the exploitation of the VOSYS VIM-NFVI product are the city infrastructures, NFV, automotive, smart edge and Industry IoT (IIoT) market segments. In the first project year, VOSYS started the development of a new vertical VIM-NFVI product which combines open source software, safety critical and trusted computing features of VOSYSmonitor and the networking performance of VOSYSwitch.

These activities resulted in the following outcomes:

- Open source contributions (KVM hypervisor patches merged, speech at the OpenIoT summit),
- VIM solutions benchmark (OpenStack and OpenVIM performance and features comparison),
- software design (EdgeVIM, i.e., virtualized Trusted Platform Module and Trusted Pools for Arm servers on OpenStack),
- software development (OpenFlow enablement for VOSYSwitch and execution of multiple security payloads on VOSYSmonitor).

In the next year, VOSYS plans to continue the development of its VIM-NFVI product solution working into the direction of Trusted Computing extensions for OpenStack and vTPM enhancements with VOSYSmonitor. This work will lead to a new demonstrator, which will be used to start exploitation and dissemination

4.4. ADLINK

ADLINK activity in the 5GCity project aims at advancing the state of the art in Fog and MEC platforms as well as establishing an Open Source ecosystem for edge-related technologies. We think that for IIoT to happen we need open, interoperable and vendor neutral technology stacks that were designed ground up to address the needs characteristic of IIoT. The availability of this open technology ecosystem is essential to the adoption and growth of edge computing and IIoT in general. As a vendor of Edge Technologies, we will leverage these open platforms in our hardware as well as in vertical solutions.

Our activities in the contexts of 5GCity are resulting in the following contributions:

- Development of fogØ5, a MEC and Fog computing platform
- Creation of an Open Source ecosystem for MEC and Fog Computing in the context of the Eclipse IoT
- Cross contamination of 5GCity technologies as part of the OpenFog Consortium Test Beds.

4.5. Cellnex ReteVision

Cellnex Telecom is the main neutral infrastructure provider in Europe. It is mainly focussed in Spain but has commercial capillarity in all countries in Europe. It has been involved in R&D projects and has knowledge in all new wireless technologies such as IoT, 5G. Cellnex has already demonstrated its expertise in mobile infrastructures and DAS and Small Cells business with real commercial deployment as the Wanda Metropolitan stadium.

5G technology is going to establish a new communications paradigm that may open the traditional communication market to edge or data companies or not traditional mobile operators.

The 5GCity project is helping Cellnex to improve their business lines and technology expertise focusing on this new challenge in communications that 5G technology will become. The main objective is to obtain a complete platform fully operative to be capable of providing Neutral Host services. The traditional market position where mobile operators participated as alone service providers is going to change with this approach. Many other actors will come up and the chain value will be upgraded with use cases. Cellnex will act in a key role but not alone. Manufacturers, infrastructure, platform and service providers, all will have a role in the value chain. It is important to understand this new market proposition in which all participate.

Once the project will finish the aim is to design a pre-commercial trial where to start deploying the platform while integrating with our real systems, network etc. This project is important to start this pre-commercial trial without investing an important amount and starting from a technological advantage compared to the competitors.

The opportunity brought from the participation in the 5GCity project will allow:

- Cellnex to enhance their business line with a real product for neutral host. A platform to manage Virtualization of 5G resources.
- Cellnex to improve the scenarios or use cases knowledge.
- Cellnex to find new actors and partners for these businesses.

4.6. University of Bristol / Bristol Is Open

The University of Bristol as a worldwide leading research and educational institute aims to contribute positively to the development of new and relevant technologies for the society. High performance network (HPN) group as a member of the University of Bristol is leading the research and development in more than 11 European projects and 7 UK funded projects focused in cutting-edge technologies for computing and networking. 5GCity is one of the most important projects to accomplish the HPN group mission for the society.

HPN group is currently researching next generation optical transmission, new optical data center solutions and architectures, software defined networks (SDN), network function virtualization (NFV), cloud and edge computing, mobile edge computing (MEC), 5G technologies, Internet-of-things (IoT), and Smart City ICT solutions. All of them relevant for the objectives of the new technologies to be researched and developed in 5GCity project.

Regarding innovation and future, the University of Bristol recently defined a strategical partnership with TM Forum, an industry association leading digital business transformations. This partnership will help the University to develop its institute of Digital Futures with industry-endorsed technical specifications using TM Forum's Open Digital Architecture by facilitating the connection with large number of industry verticals of the digital ecosystem, aligned to the 5GCity project and neutral host model. In fact, TM Forum's emerging Open Digital Labs programme will both contribute-to and benefit-from the partnership with the University of Bristol.

The University of Bristol recently demonstrated the world's first comprehensive urban 5G showcase as part of the UK Government's 5G Testbeds & Trials Programme. It is now working with the West of England Combined Authority to install 5G mobile technology at the Roman Baths in Bath, Bristol's MShed museum and science centre, We the Curious. The University is building a new Temple Quarter Enterprise Campus focused on digital innovation, which will house the Institute of Digital Futures, where TM Forum's assets will be deployed. The Institute of Digital Futures will be a state-of-the art research facility for internationally-leading research teams together with industrial and civic partners, unlocking an array of unprecedented applications of disruptive digital technologies.

One important action and contribution is the participation ETSI initiatives i.e., MEC, OSM-MANO.

4.7. Nextworks

Nextworks' main focus in 5GCity is related to the open source NFV management and orchestration stacks in relation to the area of (i) virtual infrastructure monitoring, (ii) mixed edge-core orchestration over a neutral host scenario, (iii) standard compliant 5G service and applications catalogue (NS, VNF), especially in relation to media handling and manipulation. Furthermore, Nextworks is interested in aspects of VNF monitoring, routing and security when applied in live trials as planned in 5GCity.

Starting from these strategic objectives that orientate Nextworks participation in the project, the SME has been able to start capitalizing on the new knowledge matured during the 5GCity design activities and exploit the increased know-how in three main areas:

- Standardization (ETSI NFV and ETSI MEC)
- Participation to National 5G trials
- Creation of new partnerships for joint participation to tenders on NFV service roll-out and operations

In particular, between 2017 and 2018 Nextworks team has been capable to achieve 4 services contracts with ETSI to participate in Specialist Task Forces formed by ETSI to cover specific topics of the NFV and MEC workprogramme:

- In Apr-Oct 2017, Nextworks have worked as leader of ETSI Specialist Task Force 530 Identification of Gaps between ETSI NFV requirements and Open Stack APIs
- From May-2018, Nextworks has started contributing to the ETSI Specialist Task Force 551 MEC Testing Framework as member of the Expert Team
- Nextworks researchers have supported the ETSI CITI team in the organization, execution and reporting of the 2nd ETSI NFV Plugtests in Sophia-Antipolis (FR) in the period Oct-2017 / Jan-2018

-
- Nextworks is supporting the ETSI CITI team in the organization, execution and reporting of the 3rd ETSI NFV Plugtests in Sophia-Antipolis (FR) in the period Mar-2017 / Jun-2018

Related to 5GCity core research activities, Nextworks has managed also to join the 5G experimentation in Prato (IT), in a live trail project led by OpEn Fiber and Wind Tre. The 4-years trial project on 5G technologies is developing a number of innovative use cases to be experimented in the territory of Prato, Tuscany (IT). The new 5G City of Prato will test innovative services for eHealth, Industry 4.0, Smart Culture and Smart Mobility with large positive impacts expected on the economic and social tissue of the area. In this trial initiative, Nextworks' know-how and expertise on SDN/NFV for 5G Networks are being reused to design the enabling NFV infrastructure. Moreover, Nextworks is offering a Technical Project Management service to OpEn Fiber, thus supporting the work of the Project Management Office of one of the prime contractors of the initiative. Additional contacts for knowledge services to be offered to verticals involved in the experimentation are also ongoing.

In parallel, the company has continued establishing partnerships with leading system integrators to participate in tenders for specialized consultancy services on virtualized infrastructures and NFV operations, issued by leading network operators around Europe.

The planned 5GCity development activities on orchestration and SDK are expected to further open exploitation opportunities for Nextworks in Year 2, allowing to better approach the 5G Vertical industries with tools and solutions for network automation.

4.8. LUCCA

The City of Lucca, as a mid-sized city, is mainly interested in 5GCity due to the possibility to exploit 5G communication in the area of city surveillance, especially in relation to possible threats and crimes.

LUCCA has been able to start incorporating the results of the project together with the experience on managing 5G infrastructures, in preparation for the design of more effective services the city of Lucca is planning to deliver to citizens to increase the environment monitoring, quality of life and security.

The overall knowledge consolidated across project activities of Year 1 has been capitalized by Lucca with higher understanding about the do and don'ts related to:

- Designing better architecture to supply video-surveillance service;
- UHD video distribution together with CODI.
- Set up optimization of 5G networks in city environments, especially for aspects related to environmental electromagnetic pollution and optimization of the radio network devices to be integrated into an existing environment with constrains related to preservation of the local architectural heritage.

LUCCA plans for the next period can be summarized as follows:

- Continuous consolidation of knowledge generated by 5GCity technical topics
- Exploitation of 5GCity project outcomes useful for video surveillance and 5G network set up optimization, as above described.

4.9. Italtel

Italtel's history is closely connected to the telecommunications innovation. Among the first companies in the world to develop VoIP (Voice over IP), today it is positioned on the most advanced communication segments.

Its offer includes proprietary products, engineering and network consultancy services. In the last few years, Italtel has decided to focus strongly on new themes, widening its interests towards novel innovative topics. IoT and eHealth services, Smart cities and Industry 4.0 solutions are currently driving its R&D activities. From the technological point of view, SDN and NFV are expected to redesign the Italtel product portfolio following two important lines of development:

- virtualisation and cloudification, providing scalability, flexibility and the other cloud principles;
- improvement of the programmability of the network, statically and dynamically, to reach a better QoS and QoE, optimize operational activities (configurations of new devices or nodes) and runtime activities (guarantee specified Service Level Agreement).

In this context, to address the huge capacity demands of new applications anywhere - seamlessly and securely, Italtel is putting a very strong attention to the 5G specifications and developments, as a perfect unifying framework for present and future applications. 5G is perceived as a possibility to improve current operation and business position in existing markets, and to create new markets in which to secure a strong leadership position.

Italtel will benefit from the innovation carried out by 5GCity project, exploiting it for the improvement of its product line, especially related to Cloud and Edge Cloud applications, enabling also a possible expansion towards Smart City market. Indeed, the neutral host model proposed by 5GCity will allow a possible extension of the existing types of applications running on the Smart Cities infrastructures to 5G related applications.

In fact, the 5GCity platform provide the capacity to run applications, compliant with the NFV and SDN paradigm, coming from Service Providers and Mobile Operators, on a Smart City infrastructure.

This opens two new market scenarios:

- the first one could extend the commercial proposal for Smart Cities (for example related to traditional services, i.e. Energy, Environment, Mobility) to other services such as waste collection
- optimization and structural monitoring of public buildings and infrastructure leveraging the 5G network connectivity;
- the second one could open access to new Services Providers for running their services on the 5GCity Platform.

Main activities executed in Year 1 related to the exploitation of the 5GCity findings are:

- Analysis of Cloud and Edge Cloud applications portfolio in order to evaluate the possibility to extend market proposal for the new business model (neutral host) envisaged by 5GCity platform.
- Evaluation of possible new services that can be delivered on the Smart Cities infrastructure, leveraging the 5G network connectivity (i.e. Video Analytics, Immersive Video Services in crowded events, augmented reality).

The plans for the next period are based on reinforcing and enhancing its catalogue of solutions, leveraging on the wide network of partners and selected vendors Italtel owns, which offer commercial or technological collaboration in the ICT. Moreover, Italtel has recently launched an Open Innovation program, which will see it collaborate with start-ups and new businesses to leverage emerging technologies and develop market-ready products for applications for Smart Cities, Industry 4.0 and IoT.

4.10. Barcelona – IMI

Within 5GCity, IMI will create the city infrastructure with capabilities to support next generation 5G technology as support to Urban Lab projects. Barcelona Urban Lab was created as a specific line of action to foster use of the city as an urban laboratory. Through this project, the city is made available to companies with innovative projects to test their services for the future in a real environment. Thus, it will provide a tool to facilitate the use of public spaces in the city of Barcelona to carry out tests and pilot programs on products and services with an urban impact, which are in the pre-market stage and in line with the Barcelona City Council's aims, priorities and lines of action. 5GCity's outcomes will be evaluated by IMI to meet the Barcelona City Council's real needs. IMI will learn and to create new products or services that can bring improvements to Barcelona's residents. Eventually, the solutions presented are expected to impact directly on the functioning of the city or on the services provided by the City Council itself, benefiting residents by providing: Better products, better solutions, and better municipal services. On the other hand, the urban planning department will gather all the lessons learnt and best practices to deploy and scale up the future 5G infrastructure in the city in a sustainable way. We will evaluate MEC architectures, hierarchy and physical position (pole, cabinet, macroblock technical rooms and City Data Centers) and simultaneously possibilities to place interconnection points between Neutral Operator and rest of Operators in Barcelona market (macroblock technical rooms and City Data Centers). Furthermore, 5GCity will be an entrance to other H2020 projects where Barcelona is participating and require architectures and solutions similar to the ones provided by 5GCity.

During Year 1, IMI has been focused in the planning of the infrastructure deployment in the area of influence, the San Martí superblock area. The design has been agreed with the different actors involved and according to the current city plans for the area. In particular, IMI has been focused in:

- Evaluation of the current infrastructure status through a walkout evaluation.
- Definition of the link between IMI and i2cat.
- Location of potential 5G lampposts.
- Location of potential street cabinets and technical rooms.
- Evaluation of potential contractors.
- Initiation of procurement processes
- Study to incorporate 5GCITY infrastructure design constrains detected in Barcelona Macroblock Architecture procedures.

Activities for next period will be focused in the implementation of the infrastructure activities not finalised in Year 1. Once the Barcelona infrastructure will be in place, IMI will participate in the city use cases deployment and follow up during the whole period.

4.11. Barcelona TV

Apart from public initiatives in Smart City Expo Barcelona 2017 and MWC 2018, IMI has not executed specific exploitation activities in Year 1.

4.12. MOG

MOG Technologies is a technology provider, developing solutions (hardware and software) to enable different types of media workflows. Despite its strong presence in the broadcasting area (SONY, ADOBE, AVID, Al-Jazeera, Disney, HBO, Apple, BBC, RTVE and FOX are among its clients), in more than 40 countries, using

cloud computing and state of the art telecommunications technologies like 5G for the professional media sector is relatively new for MOG. In the broadcasting sector, MOG will use the developments from 5GCity to target broadcasters and media production companies (e.g. newspapers) and similar organizations. Event organizers, like municipalities or cultural/sports associations are also another important target marketing group for the company as they can use the application to cover events lease the equipment (cameras, cables, etc.) from MOG and use the virtual newsroom application to deliver a high quality personalized edited video to a large number of users. It's important to note that MOG's strategic alliance with Level 3 Communications, a major global cloud provider, will facilitate MOG's market penetration, in this specific segment, and the creation of new business opportunities.

Therefore, the company intends to develop a novel marketing strategy for this new area, which includes participation as an exhibitor in the most relevant trade fairs like IBC, NAB and WEB Summit and a strong web presence. Main competitors in the broadcasting industry are AVID, which has a strong presence in professional editing, or Anvato that has a technology capable of live streaming events and cloud production. However, the market still does not offer a solution capable off seamless editing on the fly through a multiplayer interface several broadcast high quality feeds; and, this solution coming out of 5GCity could be further combined with those of AVID or ANVATO, having a multiplier effect.

MOG is mainly a product-oriented company, thus the developments of 5GCity will be incorporated in existing products (ingest line) as innovative new features or be used to increase the company portfolio and then sold/licensed. MOG will also be able to provide and sell training and consultancy services to the set of clients described above that need to increase the visibility of a brand or increase their actual sources of revenues.

During the first year of the project, MOG has been busy defining the requirements, technical specifications and architecture of the crowd-streaming ecosystem for live events capture. During this time, a special emphasis was placed in mapping the cities' infrastructures (Barcelona, Bristol) with the use case requirements, in order to prepare the city-wide live pilots. Therefore, the outcomes of these actions are mainly documents, which can't be easily directly exploited, given its nature.

However, there are some key exploitation activities that should be highlighted

- New internal business area and commercialization plan: The developments of 5G City led to the creation of a new business area inside MOG Technologies, focused on the development of "New Media" solutions. This new area will deal with commercial licencing of technologies based on OTT (Over The Top Television), Digital Advertising, Mobile Media App development, Content Management and distribution systems, VR/AR technology and new interactive paradoxes. In this area will use the knowledge gathered in 5G City to identify possible exploitable assets from the project and define upscaling and commercialization timelines for them
- Training of highly skilled personnel: During the first project year, one MSc thesis was completed, focused on mobile crowd-streaming scenarios. At the same time internal trainings had took place to make the project results available to the entire company.
- Market Analysis: MOG has been analysing the media and entertainment market to check the business potential of the use case. The results have been promising. Livestreaming is becoming more and more a part of our daily lives. A study from Koepeldirect¹, indicates that 64% of smartphone users watched at least one live online video during last year. The same study, shows that 41% of the viewers' preferences for live videos goes to the coverage of breaking news, while other interests include events (e.g. sports, or festivals) or videos made by family and friends. In parallel, crowd-

¹ <https://www.koepeldirect.com/drtvblog/rise-of-livestreaming-marketing-trends-tips/>

streaming platforms such as Twitch² are able to engage 9.7 million daily users who spend an average of 106 minutes/day watching live videos and include more than 2 unique million streams/month. According to Livestream³, the global events industry, where crowd-streaming is gaining more and more momentum, is expected to generate 18 billion dollars of annual revenue by 2018. The ease of application of crowd-streaming techniques to news, events and social interaction demonstrate clear the potential market value of the technology

During the second year, MOG intends to continue the activities of the first year and with the development of the technology necessary to implement the video production ecosystem based on crowd streaming. These developments will certainly lead to the identification of new exploitable assets that need to be evaluated in order to define the best exploitation paths. Nevertheless, the following actions are foreseen:

- Identification of key stakeholders and target groups for exploiting the UC results.
- Continue the work regarding market surveillance and analysis
- Further research, namely by fostering the creation of related MSc and PhD thesis and the design of new R&D projects
- Analyse and study potential IPR measures that can be applied to 5GCity results
- Scale up of the TRL for MOG's components, namely by deploying and testing the media services in a live pilot environment
- Further development of the commercialization plan, namely by defining a draft business plan, based on several internal (e.g. company strategy....) and external assumptions (e.g. market evolution).
- Identify possible third parties that can benefit from the project results. An example of this, is MOG's partnership with Level 3 Communications, a worldwide cloud provider. Given that MOG's developments in 5GCity will have a considerable focus on the virtualization of media services, through the usage of cloud computing, it will be important to better align this strategic partnership in order to take these results into account.

4.13. RAI

For RAI, project results will be mainly constituted by the results of the experimental network pilots, in order to gain knowledge about new features offered by 5G technology in the areas of interest of a media company. RAI will exploit project results in two different areas, the final user area to enrich the television experience and in the television production area to use the new network to facilitate the covering of events, exploiting 5G features by providing new services: from audio/video UHD video distribution also as 360° video experience up to the virtual/augmented/mixed reality for immersive services. In particular:

- Knowledge in IP-end-to-end highly distributed broadcast production workflow, cloud/edge-based video and audio encoding, mixed reality for improved TV entertainment
- New TV formats enabled by new features offered by the 5GCity technologies
- Integration of the media company production workflow with new distributed edge network and computing technologies.

In particular RAI is collaborating with other partners of the project for the creation of state-of-the-art television products in order to exploit 5GCity technologies in the area of the television production and in the area of distribution, taking into account UHD content and Immersive experiences in relevant cities.

² <https://twitch.tv>

³ <http://lp.livestream.com/rs/582-GOU-684/images/The%20Ultimate%20Guide%20to%20LS.pdf>

4.14. INCITIES

INCITES Consulting SARL is taking advantage of 5GCity project to enhance its knowledge, future market reports and seminars related to 5G networks that will be deployed in future Cities with specific focus on business cases and commercial opportunities via advanced innovative use cases.

More specifically the involvement at 5GCity will give inCITES the opportunity to:

- Enhance its future market reports and seminars related to 5G networks with specific focus on new business cases and opportunities arising from the model of the Neutral Host.
- Exploit new business models regarding 5G networking and provide a technical competitive edge in the drafting of the regulatory frameworks for the future digital service economy.
- Provide consulting services to operators regarding the future deployment of 5G networks, cost charging mechanisms and sharing schemes using the neutral host model.
- Will be able to perform techno-economic analysis for future investment plans that include various type of technologies and architectures.
- Strengthen INCITES Consulting SARL position as the reference international center of excellence for 5G networking

4.15. WIND3

WIND3 is involved in a Digital Transformation based also in the opportunities coming from 5G capabilities. This is a profound challenge that involves all human capital requiring the development of new skills in every area both in the technological and in the business one to better lead the change coming from the new way to design and deploy networks and services. 5G CITY project is for the company a special “laboratory” to analyse the global aspects coming from the new telco paradigm requested to cooperate and create a new ecosystem. WIND3 is going to explore these elements to better understand how to exploit the 5G CITY results obtained until now: in particular how to address user requirements and architectural solutions analysed in the different tasks of the project in the case of foreseen 5G networks.

The results obtained in the innovative context of the 5G CITY project allow us to define a roadmap to introduce innovating technologies to improve our approach to deal with the 5G opportunities, as the neutral host model, the network slicing, the virtualization.

WIND3 is following this complex and very challenging path; the 5G CITY project offers some elements to better understand the new approach aimed at improving the end user experience when new services are available and the relationship with the company when different business model will arise based on the new possible model.

The 5G CITY exploitation could be useful to study new services using a prototyping approach reducing the initial requested investments because it would be possible to use different solutions coming from different partners and to enrich the experience to integrate different component of the value chain above all in the case of vertical market of Media and improve the industrial results using the new expected tools of the 5G CITY platform.

In the new context, for WIND3 is very important to take into account the 5G specifications and developments to link the present offer to new one with more and more sophisticate applications. 5G is the opportunity to improve the current position in existing markets expanding the new ones to consolidate and improve the WIND3 leadership in the Italian market.

For WIND3 it is very important to exploit the neutral host model proposed by 5GCity to deliver applications running also on the Smart Cities infrastructures and to understand the value for the 5G related applications

compliant with the NFV and SDN paradigm and evaluate how to extend the commercial proposal not only for Smart Cities but also to other innovative services based on media when the 5GCity Platform is available.

During the first year of the 5G CITY project, WIND3 has been involved in the activities correlated to the requirements definition (in particular as far as telecom network is concerned), in the architecture definition and in the preparation of the “ecosystem component” for the Italian pilot. WIND3 participates also to the activities to map the use case requirements with the city’s infrastructure (Lucca) to set up the city pilot.

Besides other important exploitation activities have been started

- A constant link with the internal business area to inform about the developments of 5G City to identify possible exploitable aspects from the project and to start with a Market analysis about these element
- Evaluation of possible new services that can be delivered leveraging the new capabilities of the 5G networks to increase the digital offer of the company.
- New skills preparation

WIND3 plans are to enhance a digital disruption approach taking into account the output of the 5G CITY project; in particular it is important to explore deeper the new 5G ecosystem described in 5G City to evaluate how the emerging technologies and the new business, correlated to the Neutral host model, will offer opportunities for new markets as Smart Cities, IoT, AI.

4.16. Accelleran

Accelleran exploitation strategy is based around the following pillars:

- Evolution and enhancement of the disaggregation of the Small Cell software components and the virtualisation of vRAN Control Plane (L3 Control Plane) in the context of the 5GCity virtualisation
- Enablement of the local breakout of the user plane at the Edge/MEC server in the context of the use cases needing Edge/MEC functionality
- Enhancements of multi-operator neutral-host capabilities using standard 4G 3GPP functionality and upcoming 5G-based slicing technologies
- Integration into 5GCity orchestrating platform
- Use of these enhancements in future projects and the exploitation of Accelleran flexible RAN/vRAN software solutions product proposition and the availability of Small Cell products leveraging on those

Accelleran has already been showing neutral host demos in different events along the lines of the use of Small Cell solutions for Neutral Hosts and private LTE networks (Mobile World Congress Barcelona 2018, CBRS Annual Members Meeting Washington 2018, Small Cell World Summit London 2018) in 3-layer architectures with virtualisation of small cell components running in edge servers.

Accelleran has defined NETCONF model for virtualisation of the Small Cell aligned with i2CAT model for WiFi APs. This model will be used to enable the control and management of the Small Cell from the SDN controller.

These technologies will be delivered and tried in the city pilots in Barcelona, Bristol and Lucca and will be used as pilot trials and showcases for RAN/vRAN products supporting distributed cloud radio platforms to enable neutral host 5G smart city projects. These technologies will feed into the commercialisation of Accelleran Small Cell solutions and products.

4.17. Comunicare Digitale

Comunicare Digitale APS – CoDi, with its twenty years' experience in the organization and promotion of new digital technologies for the media and broadcasting industry, will take advantage of 5GCity project to enhance its knowledge on the 5G networks, study its future markets, and best practices for the promotion of 5G services, new business, and commercial opportunities.

It will analyse and organize the best events participation, organizing conference, workshops, and seminars related to 5G ecosystem.

CoDi will also promote liaison activities between all the cities that will activate 5G services and establish commercial opportunities in Europe and abroad. Networking is a "focus goal" to connect and act in Europe; so CODi will continue to enlarge and strengthen the 5G audience with professionals, companies, associations, stockholders, institutions, public and private entities.

CoDi's involvement in 5GCity project is giving the opportunity to:

- Deeper its future market liaison and networking opportunities in the 5G ecosystem, between operators, companies, research and European institutions. Cooperation between the various subjects embodies the principle of the European Union. A strong collaboration between them is strongly sought; both to open new collaborative projects, to strengthen efforts on research, and to cooperate in a concrete way to be more effective and obtain higher results;
- Creating new promotion and communication opportunities for those business models that will be active in the 5G networking; among the media and entertainment industry. While waiting for the 5G to have important effects on IoT, on the development of Smart Cities, automotive safety, applications on tourism and health, the media represents the first front runner of the development of this new technology, thanks to an "immersive experience", with 4K / UHD and 360°. What it is called the "NGX" (new generation experience) is what CoDi wants to promote and is already talking about with all European industry. In this sense, with its direct involvement in 5GCity project, and for the lucky coincidence of related events going on in Lucca, and for the history of the demos that have made Lucca visible to the main stakeholders, the proposal is carried forward with important results and appreciations from important organizations; such as HD Forum Italia, DPP, Ultra HD Forum;
- Providing consulting services and marketing analysis for future investment plans; for a communication competitive edge in the future digital economy; on new business arising from the video acquisition and production, UHD video distribution, immersive services use cases. Driving the next processes, not only at the level of technology, but also supporting and adjusting future scenarios on the verticals, is also essential to create the conditions for a successful European industry in a highly competitive sector. A sector that today sees large companies as protagonists, predominantly based in the United States. The help that must be given to the important European creative industry also passes through 5G deployment. Throughout the extraordinary European "open-air library"; the important historic and cultural heritage of each country member; the industry that can speak with only one language in the agri-food, environment, and architecture sectors, it is possible to change and have a European edge to support a global market. In this sense, the video, the quality of distribution and the involvement of a wider audience can create great benefits;
- Strengthening Comunicare Digitale APS international position as the promotion, communication, and networking reference for the excellence of 5G European networking. The convinced mission of evangelization has always been the principal activity of CoDi. It was with DVBT, with DVBSH, with 4K/UHD, 8K, 3D, and today with 5G, also for a holistic view of the connection system. The various activities carried out in the first year have had the incipit of including and widening the various sectors of civil society, industry, and institutions.

CoDi has played a circular role in the various activities carried out in the project and in favour of the 5G. Events, workshops, meetings, seminars, communication, information, production were the pillars of the various activities that took place in the main European cities, as evidenced by the important activity carried out and at all levels. An involvement that has been reverberated to create the best conditions of interest and favour towards 5G.

For the first time, an immersive video production will be made at major concerts in Lucca, to verify a series of expected results: quality production, network transport, and mobile devices, immersive involvement of the public, and interaction between them. Is this so true, that have been chosen those events that most involve millennials. An audience attentive to technologies and new languages. Even if, for another project shared with Rai, there will also be a 360° production at Puccini's House Museum, taking advantage of a high-level production; a "European" content well known all over the world; a 'brand' widely recognized as Puccini's operas and famous arias - the whole Metropolitan Opera of New York playbill is composed of European creative plays), a unique content.

The growth of interest in 5G will be stimulated, as well as, the applications made for the market, to create an environment ready to exploit the capabilities and peculiarities at European level. Strong collaborations will always be sought, in the logic of strengthening the proposal and guaranteeing the best possible offering, also for the purposes of industrial, institutional, and civil applications.

An important action in information, dissemination, promotion and visibility of the various activities are fundamental in this first phase of the 5G proposal on the market, also to make visible the efforts made in Europe. 2018 and 2019 will be important precisely in the logic of creating the best possible conditions for a successful 5G experience in Europe

4.18. UbiWhere

Ubiwhere aims at providing 5G technologies and solutions as well as capitalising their appearance with innovative Smart City solutions. Ubiwhere's long-term vision is to provide solutions that merge the main outcomes of both its TELCO (Telecom and Future Internet) and Smart City sectors. As such, most recently, Ubiwhere has partnered with other three major Portuguese SMEs (EFACEC, Metalgalva and PROEF Group) to develop Smartlamppost (<http://smartlamppost.com>): a modular concept of a lamppost with bleeding edge technology, allowing municipalities to future-proof their smart city and Mobile Network Operators to cost-effectively deploy their 5G solution. Aligned with 5GPPP's indicative predictions regarding future 5G network deployments dependency on a five to ten-fold rollout increase of antennas and small cells, Smartlamppost's is betting on the benefits of the novel neutral host approach to tackling such scalability hurdles. Therefore, and aligned with the project's goal of designing and developing a full-fledge cloud and radio platform for 5G-based services deployments, it is the Company's objective to exploit the 5GCity project as much as possible, as to (i) validate Smartlamppost's core business model amongst relevant stakeholders (Infrastructure Owners, Network Operators, Service Providers and Software Developers) (ii) advance its state-of-the-art regarding neutral hosting and network slicing and (iii) design an easy-to-use web platform, for all these different stakeholders, with a clean and effective user experience. Due to this close link between 5GCity's neutral host paradigm and Smartlamppost's as a 5G-enabler, Ubiwhere hopes to leverage key components of 5GCity's platform and include them in its commercial product that is Smartlamppost. Also important is Ubiwhere's recent take on V2X, through Unicle (<http://unicle.io>): It is the Company's goal to exploit the proposed Use Case #6, CCAM, to accelerate its developments and time to market.

During the first year, Ubiwhere has contributed greatly to 5GCity's overall architecture. Specifically, the company has leveraged its acquired experience in other H200 and 5GPPP projects, namely SONATA, SHIELD and Selfnet, contributing to the design of 5GCity's SDK, Dashboard and Monitoring solution. Due to the fact that Ubiwhere has proposed a Use Case which will be deployed in Barcelona, a close partnership between Ubiwhere, i2CAT and IMI have been established as to coordinate the deployment of UC #6 in the chosen

infrastructure and hardware. This first year allowed Ubiwhere to expand its knowledge regarding neutral hosting, while also bootstrapping what would be the core design of the Company's commercial V2X solution that is Unicle. Also, during this period, Ubiwhere has disseminated 5GCity in all its telco-related events such as 2017's Smart City Expo and Visions for Future Communications Summit, in Lisbon, 2017, while also actively contributing to the paper "5G City: A novel 5G-enabled architecture for ultra-high definition and immersive media on city infrastructure", submitted to IEEE Broadband Multimedia Systems and Broadcasting (BMSB).

For the next period, Ubiwhere hopes to continue its work on implementing and developing key components of 5GCity's architecture such as SDK, Dashboard, AAA module and Monitoring solution. Furthermore, the Company will continue to work closely with i2Cat and IMI to make sure its Barcelona deployment will be a successful one. As for dissemination, Ubiwhere will participate in the upcoming EuCNC as one of the 5GPPP representative SMEs to demonstrate 5GCity's Dashboard with the sole purpose of showcasing the innovative neutral host business model and the added value for the multi-actor 5G services value chain. Ubiwhere will also demonstrate the outcomes of 5GCity during the next 2018 Smart City Expo World Congress edition at its own booth.

5. Conclusions

This deliverable has reported on the results of dissemination, communication and standardization activities carried out during the Year 1 of the 5GCity project.

Overall, the consortium has regularly and successfully worked during the period to build a consistent and relevant impact through the preliminary project results. In particular, our action during the Year 1 has tried to maximise the visibility of the city infrastructures we have planned and started delivering in Barcelona, Bristol, Lucca; the 5GCity use cases; the Neutral Host concept; the 5GCity management and orchestration platform for edge/core 5G networks.

Our dissemination and communication targets have been selected from the scientific, industrial and city government communities. We managed to engage with both individual researchers/developers, and with network and cloud operators, vendors and city managers.

The consortium has identified a set of target international conferences and events where to publish the initial project results. We have achieved a good result in terms of published papers (8 out of 9 submissions). Most of these papers are joint works by groups of 5GCity partners. Moreover, the project participation to relevant events has been significant and continuous, with bold participation in Smart City World Expo 2017, MWC 2018 and dense plans for EUCNC 2018.

Five technical workshops have been organised within EUCNC 2018 to further promote our design findings and strengthen the current collaborations with 5G PPP projects and other research initiatives.

The involvement of some 5GCity partners in standardisation activities at ETSI, IIOT, OpenFog and Small Cell Forum has been focused to consolidate and – where missing – establish connections with the relevant Working Groups and technical teams. In the next period, the team will increase activities in this area, leveraging on the availability and maturity of project results. Partners from 5GCity are leading the Unikraft open-source initiative and are expected to work with OpenDaylight / OpenStack / OSM.

5.1. Progress on 5GCity KPIs

Based on the KPIs identified in the 5GCity Description of Action, the progress achieved by the consortium during Year 1 is summarized in the following tables.

KPI Identifier	Description	Status
KPI-O1-1	White paper with the architecture	Planned for next year, once the Neutral Host deployment models will be consolidated for stakeholders/adopters
KPI-O1-2	Publication of the architecture published in at least two scientific/industrial journals	Journal publications planned for next period. Focus in Y1 has been more on IEEE conferences and workshops
KPI-O1-3	At least one contribution to the 5G PPP architecture working group	5GCity representatives are discussing the contents of a new 5G architecture whitepaper to be produced between 2018-2019
KPI-O6-1	At least 20 publications in relevant conferences and journals	8 accepted/published out of 9 submitted
KPI-O6-2	At least 2 contributions to standardization bodies.	Planned for next year
KPI-O6-3	At least 2 white papers	Planned for next year

KPI-O6-4	At least 2 workshops organized.	2 workshops organized at EUCNC2018 + 1 special session on ITALIA5G at IOTHINGS 2018 MILAN Other planned for the next period
KPI-O6-5	At least one pilot demo at MWC.	Preliminary demos by ACCELERAN at MWC2018. Other demos will be organized for MWC2019.

Table 10 – KPI progress as derived from 5GCity objectives

KPI		Description	KPI	Status
Open source contributions		Accepted contributions to open-source communities: (i) KVM community; (ii) QEMU developers' community; (iii) XEN community; (iv) Open Data Plane (ODP) project; (v) OPNFV project; and (v) Contributions to ETSI OSM	At least 3 accepted contributions to different communities during project lifetime	Unikraft project bootstrapped as XEN project fog-05 started as Eclipse project
Pilots and proof of concepts (PoCs)		Applications deployed in three cities: (i) Neutral host pilot (telecom pilot); (ii) Mobile backpack media unit (media pilot); (iii) UHD video distribution (media pilot); (iv) Video acquisition and edge/cloud production (media pilot); (v) Unauthorized waste dumping prevention (smart city pilot)	1 PoC pilot deployed per city; and one common pilot replicated in the three cities	Planned for next period
Contribution to standards		Contributions to OpenFog consortium Contributions to ETSI NFV Other standards will be analysed in WP6 standardization task	At least 2 accepted contributions	ADLINK contributed to OpenFog Reference Architecture
Industry events and ad-hoc meetings		Organization of workshops in national / international events gathering cities, 5G, and edge technologies. Participation in the most relevant world-wide events: (i) Mobile World Congress; (ii) Smart Cities World Congress; (iii) Industrial IoT World Congress; (iv) Fog computing Expo; (v) ITS World Congress; and (vi) TV Markets, European Digital Forum, UltraHD 4K Summit	At least 2 workshops organized, at least participation in 2 industry events per year	3 events executed (14 th EU Digital Forum Lucca, 5G Barcelona events around MWC18, ITALIA 5G within IOTHINGS 2018 - MILAN) 1 event planned (15 th EU Digital Forum Lucca)
Publications	Industry-related	Publications of White papers, magazines, technology roadmaps, and industry-led journals	At least 5	2 newsletters issued Others planned for next year
	Scientific	Publication of scientific results to high-impact journals and leading conferences	At least 15	8 accepted/published out of 9 submitted

	EU events	Presentation of 5GCity results, research and innovation activities, booth and demo set up	At least 1 participation in EU events per year	Yearly participation to EUCNC Planned participation to ICT2018 Wien
Web site, social networks, press releases		Web portal and social media mechanisms will be employed to demonstrate the potential benefits of the solution that will be developed to highlight 5GCity use cases	Public website; 2 newsletters per year;	Website online 2 newsletters published for Y1
Web site, social networks, press releases		Web portal and social media mechanisms will be employed to demonstrate the potential benefits of the solution that will be developed to highlight 5GCity use cases	1 social networking tool utilized	Twitter + LinkedIn + Youtube accounts activated and highly visible

Table 11 – 5GCity objectives dissemination specific objectives

6. Abbreviations and Definitions

6.1. Abbreviations

5G IA	5G Infrastructure Association
DoA	Description of Action
EC	European Commission
IPR	Intellectual Property Rights
MANO	Management and Orchestration
NFV	Networks Function Virtualization
NFVI	Networks Function Virtualization Infrastructure
NS	Network Services
PPP	Public Private partnership
SDO	Standard Developing Organization
VNF	Virtual Network Function
WG	Working group
WP	Work Package


6.2. Definitions



No definition is introduced by this document

Appendix A Relevant 5GPPP Twitter posts related to 5GCity


Title	5G PPP Tweet on 5GCity
Type	Retweet from 5G PPP account of 5GCity tweet participation at MWC 2018
Social	
Tweet date	19 Feb, 2018
Event	MWC 2018
Dates	27 Feb - 1 Mar, 2018
Place	Barcelona, Spain
Link	https://twitter.com/5GPPP
Title	5G PPP Tweet on 5GCity
Type	Retweet from 5G PPP account of 5GCity tweet participation at MWC 2018
Social	<p>5G PPP ha ritwittato</p> <p>Comunicare Digitale @ComunicareDigit 22 feb Comunicare Digitale ha ritwittato 5GCity</p> <p>At @ForumLucca 14-15 June a great opportunity for immersive #VR with @5GCity @digitalsat_it @Cor_Com @5GPPP @5GIEEE @VanillaPlus @Claplaz @marcomele12 @MShuaibSiddiqui</p>
Tweet date	22 Feb, 2018
Title	5G PPP Tweet on 5GCity
Type	Retweet from 5G PPP account of 5GCity tweet participation at MWC 2018
Social	<p>5G PPP ha ritwittato</p>  <p>5GCity5@ GCity 23 feb</p> <p>MWC 2018: Italtel unveils updated 5G video application https://www.rapidtvnews.com/2018022151013/mwc-2018-italtel-unveils-updated-5g-video-application.html#ixzz57vQZHhVm ... @Italtel @Iborle10 @paolo_crosta @NinoAlbanese @sfiguerola @MShuaibSiddiqui @5GPPP @5GPPP5GMEDIA @5GIoRL</p>
Tweet date	23 Feb, 2018
Title	5G PPP Tweet on 5GCity
Type	Retweet from 5G PPP account of 5GCity tweet participation at MWC 2018
Social	<p>5G PPP ha ritwittato</p>

	 <p>5GCity5@ GCity 24 feb</p> <p>Ready for the MWC. Looking to meet @Cinquetacche @Dsimeo @lisadf @thierryfautier @Conessioni @maxpelle @MoniqueCalisti @maria_aguete @viperaviola @GoClearNow @sfiguerola @MShuaibSiddiqui @OPallarols @ruiacosta</p>
Tweet date	24 Feb, 2018
Title	5G PPP Tweet on 5GCity
Type	Retweet from 5G PPP account of 5GCity tweet participation at MWC 2018
Social	<p>5G PPP ha ritwittato</p>  <p>5GCity5@ GCity 25 feb</p> <p>Paris 2024: the 5G pillar of the development of Europe. Read more in https://www.5GCity.eu/news-events/ @JPBienaime1 @ViolaRoberto @GabrielMariya @5GPPP @DSMeu @OPallarols @Eutelsat_SA @EuCNC @NetTechEU</p>
Tweet date	25 Feb, 2018
Title	5G PPP Tweet on 5GCity
Type	Retweet from 5G PPP account of 5GCity tweet participation at MWC 2018
Social	<p>5G PPP ha ritwittato</p>  <p>5GCity5@ GCity 27 feb</p> <p>In risposta a @5GPPP5GMEDIA, @ICT_FLAME e altri 5</p> <p>We share the same pleasure and ambitious achievements see u soon at #MWC @Italtel @5GPPP @i2CAT @DTGTesting @ICT_FLAME @cellnextelecom @MWCcapital @5GBarcelona</p>
Tweet date	27 Feb, 2018
Title	5G PPP Retweets a 5GCity tweet
Type	Retweet from 5G PPP account on 5GCity i2Cat tweet



Social	
Tweet date	28 Feb, 2018
Link	https://twitter.com/5GPPP
Title	5G PPP Retweets a 5GCity tweet
Type	Retweet from 5G PPP account on 5GCity tweet
Social	
Tweet date	21 March, 2018
Link	https://twitter.com/5GPPP
Type	Tweet from 5G PPP account mentioned 5GCity participation at EuCNC2018

Social	
Tweet date	26 March, 2018
Event	EuCNC2018
Dates	18 June 2018
Place	Ljubljana, Slovenia
Link	https://twitter.com/5GPPP
Title	5G PPP Retweets a 5GCity tweet
Type	Retweet from 5G PPP account of 5GCity tweet participation at EuCNC2017
Social	
Tweet date	29 March, 2018
Event	EuCNC2017
Dates	7 Oct 2017
Place	Oulu, Finland
Link	https://twitter.com/5GPPP https://youtu.be/tx_5iyDZPM4
Title	5G PPP Retweets a 5GCity tweet
Type	Retweet from 5G PPP account of 5GCity tweet participation at Digital Economic Conference 2018

Social	
Tweet date	3 April, 2018
Event	Digital Economic Conference
Dates	25 April, 2018
Place	Brussels, Belgium
Link	https://twitter.com/5GPPP
Title	5G PPP Retweets a 5GCity tweet
Type	Retweet from 5G PPP account of 5GCity tweet participation at IoThings Milan 2018 - Retweet
Social	
Tweet date	7 April, 2018
Event	MWC2918
Dates	27 Feb - 1 Mar, 2018
Place	Barcelona, Spain
Link	https://twitter.com/5GPPP https://www.youtube.com/watch?v=vxno4E6d31U&feature=youtu.be
Title	5G PPP Tweet on 5GCity event participation
Type	Tweet from 5G PPP account of 5GCity tweet participation at IoThings Milan 2018 - Retweet

Social	
Tweet date	10 April, 2018
Event	IoThings 2018
Dates	10 – 11 April, 2018
Place	Milan, Italy
Link	https://twitter.com/5GPPP
Title	5G PPP Retweets a 5GCity tweet
Type	Retweet from 5G PPP account of 5GCity tweet participation at IoThings Milan 2018
Social	
Tweet date	10 April, 2018
Event	IoThings 2018
Dates	10 – 11 April, 2018
Place	Milan, Italy
Link	https://twitter.com/5GPPP

Appendix B Relevant 5GPPP LinkedIn posts related to 5GCity



Title	5G PPP Second Wave of Research & Innovation Projects Brochure Take a look at the new 5G PPP brochure, a great description of all Phase-II projects is available for download
Type	LinkedIn 5G PPP Group – post
Posted By	Ana Pastor - EU Projects manager
Date	Dec, 2017
Link	https://5g-ppp.eu/wp-content/uploads/2017/11/5GPPP-brochure-phase2-final-web.pdf
Title	5G was The Megatrend at the MWC2018 MWC 2018 saw the 5G Infrastructure Association (5G-IA) and 5G PPP under the spotlight, with important announcements from the telco industry and policy makers.
Type	LinkedIn 5G PPP Group – post on 5G PPP projects
Social	
Posted By	Margherita Trestini - Apodissi
Date	17 March, 2018
Link	bit.ly/2oPSF9v
Title	Media in 5G by RAI CRITS (Gino Alberico) Really amazing Media presentation made by RAI CRITS (Gino Alberico) during the 5G ITALIA in Milan.
Type	LinkedIn 5G PPP Group – post on 5GCity partner event participation
Social	
Posted By	Andrea Michelozzi
Date	13 April, 2018
Link	https://lnkd.in/e4cyfrr


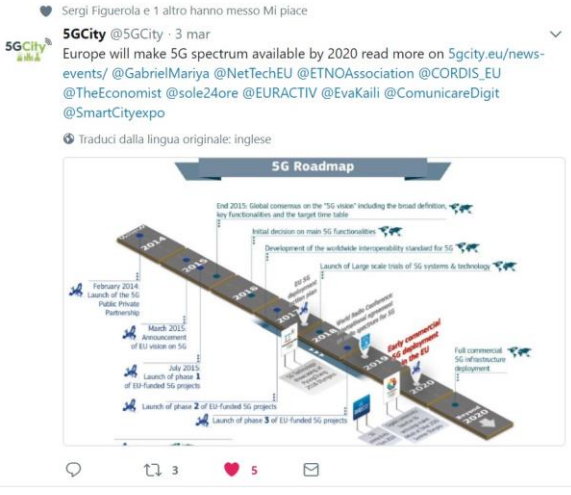
Appendix C Top impacting 5GCity twits



Title	@5GCity – 5G attempts to bring social VR and Immersive experience
Social	<p>Top media Tweet earned 3,452 impressions</p> <p>5G attempts to bring social VR and Immersive experience 5gcity.eu/news-events/ @ComunicareDigit @ICT_FLAME @5GPPP5GMEDIA @EBU_HQ @DVB_Project @Italtel @cellnextelecom @MShuaibSiddiqui @NextworksSrl @WindItalia @Iuvignaroli @28lalo @andresarmasp @thedppltd pic.twitter.com/HksrvzwazE</p>  <p>↻ 7 ❤️ 23</p>
Tweet date	19 Feb 2018
Event	FED 2018, Summer Festival Music and Comics&Games
Place	Lucca, Italy
Link	https://twitter.com/5GCity/status/965616526245195777
Title	@5GPPP5GMedia on 5GCity
Social	<p>5GCity ha messo Mi piace</p> <p> 5G-MEDIA @5GPPP5GMEDIA - 27 feb</p> <p>@5GPPP5GMEDIA is proudly cooperating with a broad network of #5G #media initiatives & partners like @5GCity @ICT_FLAME @ubiwhere @i2CAT @NextworksSrl @Martel_Innovate @interinnov_eu. Glad to see you at #MWC18</p> <p>Traduci dalla lingua originale: inglese</p> 
Tweet date	27 Feb 2018
Event	MWC
Place	Barcelona, Spain
Link	https://twitter.com/5GPPP5GMEDIA/status/968427651185762309



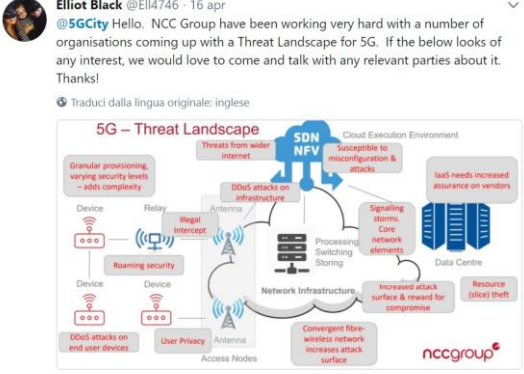
Title	@5GCity – answer to @5GPPP5GMedia
Social	
Tweet date	27 Feb, 2018
Event	MWC 2018
Place	Barcelona
Link	https://twitter.com/5GCity/status/968430080706973696
Title	@5GCity partner – Ubiwhere: MWC booth
Social	
Tweet date	27 Feb 2018
Event	MWC
Place	Barcelona, Spain
Link	https://twitter.com/5GCity/status/968460793237901312
Title	@5GCity partner – i2Cat: 5GCity presentation

Social	
Tweet date	28 Feb 2018
Event	MWC
Place	Barcelona, Spain
Link	https://twitter.com/i2CAT/status/968896278938648582
Title	@5GCity partner – Italtel: Demo on VR and immersive solutions
Social	
Tweet date	28 Feb 2018
Event	MWC
Place	Barcelona, Spain
Link	https://twitter.com/5GCity/status/968810172167671808
Title	@5GCity partner – Cellnex: MWC2018 booth
Social	
Tweet date	1 March 2018

Event	MWC
Place	Barcelona, Spain
Link	https://twitter.com/cellnextelecom/status/969220123713331200
Title	@5GCity partner – CoDi: MWC2018
Social	 <p>Comunicare Digitale @ComunicareDigit - 1 mar Thanks to our enthusiastic team that cover #MWC2018 with 3PPP Passion, Professional and Pathos! @forumlucca @GoClearNow @LorenzoMicheloz @5GCity @bristolisopen @cellnextelecom @accelerant @Italtel @LucaVM_Ferraris @NextworksSrl Traduci dalla lingua originale: inglese</p>
Tweet date	1 March 2018
Event	MWC
Place	Barcelona, Spain
Link	https://twitter.com/ComunicareDigit/status/969328356427747328
Title	@5GCity – 5GCity use cases for Smart Cities at IEEE 5G Summit in Trento with @mariaritaspada and @WindItalia
Social	 <p>5GCity @5GCity Following</p> <p>5G City use cases for Smart Cities at IEEE 5G Summit in Trento with @mariaritaspada and @WindItalia 5gcity.eu/blog/ @5GIEEE @fgranelli @UniTrento @TgrRaiTrentino @SmartCityexpo @NSCexpo @smartcitypress @SmartCity_Tech</p> <p>14:33 - 2 mar 2018</p>
Tweet date	2 March 2018
Event	IEEE 5G Summit
Place	Trento
Link	https://twitter.com/5GCity/status/969566399382290432
Title	@5GCity – 5G Observatory
Social	






	
Tweet date	2 March 2018
Event	MWC
Place	Barcelona, Spain
Link	https://twitter.com/5GCity/status/969596422692667393
Title	@5GCity – 5G Spectrum
Social	
Tweet date	3 March 2018
Link	https://twitter.com/5GCity/status/969903625890926592
Title	@5GCity – @fogoros 500 twitter 5GCity follower


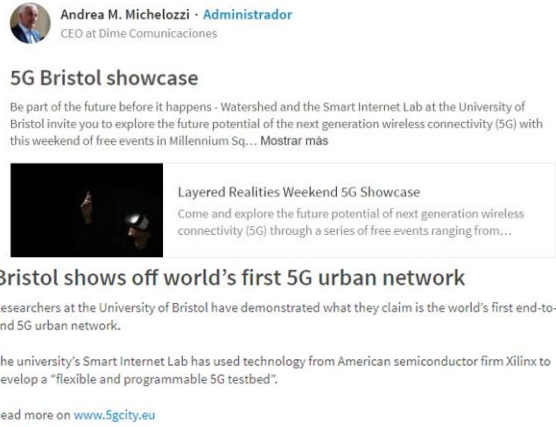
Social	<p>Comunicare Digitale ha messo Mi piace</p> <p>5GCity @5GCity · 9 apr</p> <p>Thanks to @fogoros to be our 500 follower. Great result and thanks to our followers to endorse and support 5G City activities :) @i2CAT @acceleran @cellnextelecom @Dsimeo @MShuaibSiddiqui @IncitesCons @ComunicareDigit @5GPPP @Italtel @bristolisopen @SmartCityexpo @DSMeu</p> <p>Traduci dalla lingua originale: inglese</p>  <p>2 6</p>
Tweet date	9 April 2018
Link	https://twitter.com/5GCity/status/983455672678408192
Title	@5GCity partner – Nextworks: IoTThings
Social	<p>Shuaib Siddiqui e 1 altro hanno messo Mi piace</p> <p>5GCity @5GCity · 10 apr</p> <p>@ginocarozzo by @NextworksSrl about 5G new roles in the industry and cities @ComunicareDigit @comunediLUCCA @i2CAT @MShuaibSiddiqui @p_khodashenas @luvignaroli @acceleran</p>  <p>4 6</p>
Tweet date	10 April 2018
Event	IoTThings
Place	Milan, Italy
Link	https://twitter.com/5GCity/status/983657807072374784
Title	@5GCity partner Wind Tre: IoTThings



Social	 <p>Maria Rita Spada @mariaritaspada · 10 apr @5GCity #Lucca con Mauro Di Bugno #MilanoThings2018</p>
Tweet date	10 April 2018
Event	IoThings
Place	Milan, Italy
Link	https://twitter.com/mariaritaspada/status/983663883884859392
Title	@5GCity – workshop at EUCnC
Social	 <p>5GCity @5GCity · 15 apr @5GCity in collaboration with @VirtuWind , @5g_ex , @SPEED_5G , @5G_MiEdge, and @5g_monarch projects are organizing the "2nd Workshop on business models and techno-economic analysis for 5G networks in @EuCNC June 18, 2018 @sfiguerola @Dsimeo @5GPPP 5gcity.eu/news-events/</p>
Tweet date	15 April 2018
Event	EUCnC
Place	Ljubljana, Slovenia
Link	https://twitter.com/5GCity/status/985566453201063936
Title	@5GCity – NCC group
Social	 <p>Elliot Black @Eli4746 · 16 apr @5GCity Hello. NCC Group have been working very hard with a number of organisations coming up with a Threat Landscape for 5G. If the below looks of any interest, we would love to come and talk with any relevant parties about it. Thanks!</p>
Tweet date	16 April 2018
Link	https://twitter.com/Eli4746/status/985860026110828544
Title	@5GCity partner – CoDi: EDF

Social	
Tweet date	19 April 2018
Event	European Digital Forum
Place	Lucca, Italy
Link	https://twitter.com/ComunicareDigit/status/986955203822915584

Appendix D Top impacting 5GCity posts on LinkedIn

Title	@5GCityGroup – 5GCity participation at BIT Experience 2017																																				
Social	 <p>Shuaib Siddiqui · Group Owner Senior Researcher (Area Manager Software Networks) at i2CAT Foundat...</p> <p>5GCity at Bit EXperience 2017 https://youtu.be/ERMaSFdrhjs</p> <p>Many thanks to Andrea M. Michelozzi and @carlabressan (@Comunicare Digitale) for providing the opportunity to present @5GCity and its media related UCs.</p>  <p>BIT EXPERIENCE 2017 - 5G y la nueva frontera audiovisual y multimedia Shuaib Siddiqui, Director Softwate Network de I2CAT y participante en una destacada mesa redonda en BIT EXPERIENCE 2017, en la qu...</p>																																				
Post date	Dic 2017																																				
Posted By	Shuaib Siddiqui – i2Cat																																				
Link	https://www.linkedin.com/groups/8607896/8607896-6339739386753675265 https://youtu.be/ERMaSFdrhjs																																				
Event	BIT Expereince 2017																																				
Place	Madrid, Spain																																				
Title	@5GCityGroup – European operators step up tests and trials																																				
Social	 <p>Andrea M. Michelozzi · Administrador CEO at Dime Comunicaciones</p> <p>EUROPEAN OPERATORS STEP UP 5G TESTS AND TRIALS</p> <p>Take a look with 3 great presentations made by @EvaKalil Bernard Barani & @NTTDocomoNews@ @i2CAT @cellnextelecom @Italtel @sfguerola @NetTechEU @SGPPP @5GMedia @NextworksSrl</p> <p>www.5gcity.eu</p> <p>5G PPP Phase 2: example demo/trials</p> <table border="1" data-bbox="758 1214 1101 1411"> <thead> <tr> <th>Project</th> <th>Lead Partner</th> <th>Sample Partners</th> <th>Demonstration</th> <th>Location</th> <th>Technology</th> </tr> </thead> <tbody> <tr> <td></td> <td>ERICSSON</td> <td>ORANGE, CHINEA MOBILE, PTA...</td> <td>5G+VR, self-driving, 3D reconstruction for maintenance of cemented vehicles, collaborative real-time operations</td> <td>PRINCE, LYON (FR)</td> <td>4G LTE, 5G</td> </tr> <tr> <td></td> <td>FRU</td> <td>NOVA, BSC, SONY, TSM, etc.</td> <td>Highly Efficient Service, Object Based Broadcast Service</td> <td>MIAMI, FL (US)</td> <td>4G LTE, 5G</td> </tr> <tr> <td></td> <td>PROXIMUS</td> <td>ERICSSON, THALES, HYUNDAI, etc.</td> <td>5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution), 5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)</td> <td>3 hour live trials: - France - Italy</td> <td>4G LTE, 5G</td> </tr> <tr> <td></td> <td>COEAT</td> <td>RESEARCH, TELIA, etc.</td> <td>5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)</td> <td>Frankfurt - Berlin - Hamburg live port</td> <td>4G LTE, 5G</td> </tr> <tr> <td></td> <td>NOVA</td> <td>ERICSSON, THALES, HYUNDAI, etc.</td> <td>5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)</td> <td>MIAMI, FL (US)</td> <td>4G LTE, 5G</td> </tr> </tbody> </table>	Project	Lead Partner	Sample Partners	Demonstration	Location	Technology		ERICSSON	ORANGE, CHINEA MOBILE, PTA...	5G+VR, self-driving, 3D reconstruction for maintenance of cemented vehicles, collaborative real-time operations	PRINCE, LYON (FR)	4G LTE, 5G		FRU	NOVA, BSC, SONY, TSM, etc.	Highly Efficient Service, Object Based Broadcast Service	MIAMI, FL (US)	4G LTE, 5G		PROXIMUS	ERICSSON, THALES, HYUNDAI, etc.	5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution), 5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)	3 hour live trials: - France - Italy	4G LTE, 5G		COEAT	RESEARCH, TELIA, etc.	5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)	Frankfurt - Berlin - Hamburg live port	4G LTE, 5G		NOVA	ERICSSON, THALES, HYUNDAI, etc.	5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)	MIAMI, FL (US)	4G LTE, 5G
Project	Lead Partner	Sample Partners	Demonstration	Location	Technology																																
	ERICSSON	ORANGE, CHINEA MOBILE, PTA...	5G+VR, self-driving, 3D reconstruction for maintenance of cemented vehicles, collaborative real-time operations	PRINCE, LYON (FR)	4G LTE, 5G																																
	FRU	NOVA, BSC, SONY, TSM, etc.	Highly Efficient Service, Object Based Broadcast Service	MIAMI, FL (US)	4G LTE, 5G																																
	PROXIMUS	ERICSSON, THALES, HYUNDAI, etc.	5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution), 5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)	3 hour live trials: - France - Italy	4G LTE, 5G																																
	COEAT	RESEARCH, TELIA, etc.	5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)	Frankfurt - Berlin - Hamburg live port	4G LTE, 5G																																
	NOVA	ERICSSON, THALES, HYUNDAI, etc.	5G+AIOT (e.g. smart, vehicles, etc.), 5G+VR (e.g. construction and electricity distribution)	MIAMI, FL (US)	4G LTE, 5G																																
Post date	15 Feb 2018																																				
Posted By	Andrea Michelozzi - CoDi																																				
Link	https://www.linkedin.com/groups/8607896/8607896-6369497053164380164																																				
Title	@5GCityGroup – IEEE 5G Summit																																				
Social	 <p>Andrea M. Michelozzi · Administrador CEO at Dime Comunicaciones</p> <p>5G City use cases for Smart Cities at IEEE 5G Summit in Trento</p> <p>The 5G Summit will take place in Trento, Italy, on March 6, 2018. It will be the first time the event is organized in Italy.</p> <p>5G CITY will participate with WIND TRE and a speech on 5G CITY use cases in Smart Cities</p>  <p>IEEE 5G Learning Series Event • 5 March 2018 IEEE 5G Summit • 6 March 2018 Trento, Italy</p>																																				
Post date	05 March, 2018																																				

Posted By	Andrea Michelozzi - CoDi
Link	www.linkedin.com/groups/8607896/8607896-6370789564814106627
Event	IEEE 5G Summit
Place	Trento
Title	@5GCityGroup – UNIBRIST
Social	 <p>Andrea M. Michelozzi · Administrador CEO at Dime Comunicaciones</p> <p>Why research and startups can make the UK a 5G leader Bristol excellence on 5G. https://www.5gcity.eu/news-events/</p>
Post date	15 March, 2018
Posted By	Andrea Michelozzi - CoDi
Link	https://www.linkedin.com/groups/8607896/8607896-6370779935384178691
Title	@5GCityGroup – 5G Bristol Showcase
Social	 <p>Andrea M. Michelozzi · Administrador CEO at Dime Comunicaciones</p> <p>5G Bristol showcase Be part of the future before it happens - Watershed and the Smart Internet Lab at the University of Bristol invite you to explore the future potential of the next generation wireless connectivity (5G) with this weekend of free events in Millennium Sq... Mostrar más</p> <p>Layered Realities Weekend 5G Showcase Come and explore the future potential of next generation wireless connectivity (5G) through a series of free events ranging from...</p> <p>Bristol shows off world's first 5G urban network Researchers at the University of Bristol have demonstrated what they claim is the world's first end-to-end 5G urban network. The university's Smart Internet Lab has used technology from American semiconductor firm Xilinx to develop a "flexible and programmable 5G testbed". Read more on www.5gcity.eu</p>
Post date	19 March, 2018
Posted By	Andrea Michelozzi - CoDi
Link	https://www.linkedin.com/groups/8607896/8607896-6378559012996214785 https://www.linkedin.com/groups/8607896/8607896-6381539571158564867
Event	Layered Reality Weekend – 5G Showcase
Place	Bristol

Title	@5GCityGroup – 5GCity developing CCAM
Social	 <p>Andrea M. Michelozzi · Administrador CEO at Dime Comunicaciones</p> <p>5GCity - Developing CCAM and neutral host solutions with Smartlamppost</p> <p>Smartlamppost is an emergent product which aims at solving smart cities' ability to grow and scale efficiently. According to its needs, it leverages urban furniture to elegantly provide (1) telecommunication capabilities, (2) EV-charging stations and... Mostrar más</p> <p>H2020 5G City</p> <p>The 5GCity project is an EU-funded project (Horizon 2020) and part of the 5G-PPP initiative, whose main goal is to enable a 5G Multi-access Edge Computing (MEC) infrastructure. Such technol...</p>
Post date	19 March, 2018
Posted By	Andrea Michelozzi - CoDi
Link	https://www.linkedin.com/groups/8607896
Title	@5GCityGroup – Rai on 5GMedia
Social	 <p>Andrea M. Michelozzi · Administrador CEO at Dime Comunicaciones</p> <p>RAI on 5G MEDIA by Gino Alberico (CRITS Turin)</p> <p>Really amazing Media presentation made by RAI CRITS (Gino Alberico) during the 5G ITALIA in Milan.</p> <p>Congra alberto morello Luca Vignaroli Sergi Figuerola Carla Bressan Shualb Siddiqui Stefania Attanasio Roberta Dellavedova Rui A. Costa Antonino Albanese... Mostrar más</p> <p>ITALIA5G IoT THINGS 2018 APR 11 2018</p> <p>5G, Città e Nuovi servizi Media</p> <p>Rai Gino Alberico R&D Manager Centro Nazionale di Innovazione Tecnologica</p>
Post date	11 April, 2018
Posted By	Andrea Michelozzi - CoDi
Link	https://www.linkedin.com/groups/8607896/8607896-6390229179949993988
Event	IoThings 2018
Place	Milan, Italy

<END OF DOCUMENT>