D6.03:
Fed4FIRE+ Dissemination and Communication Report and Updated Plan

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Abstract	This deliverable defines and describes the dissemination and communication strategy and set of activities that have been pursued by the Fed4FIRE+ partners in the first 18 months of the project to guarantee broad and effective visibility, promotion and up-take of the project's work and outcomes. It also outlines the activities foreseen for the second period (M19-M36)
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Nature of the deliverable:		**R**
Dissemination Level		
PU	Public, fully open, e.g. web	✔
CL	Classified, information as referred to in Commission Decision 2001/844/EC	
CO	Confidential to FED4FIRE+ project and Commission Services	

* R: Document, report (excluding the periodic and final reports)
DEM: Demonstrator, pilot, prototype, plan designs
DEC: Websites, patents filing, press & media actions, videos, etc.
OTHER: Software, technical diagram, etc.

EXECUTIVE SUMMARY

This deliverable presents the various dissemination and communication activities conducted by the Fed4FIRE+ consortium, as well as the actions taken to raise public awareness in the first 18 months of the project. As the project is providing an improvement of the federation of experimentation facilities built in Fed4FIRE, the dissemination has harvested fruitful results since the beginning of the project. Such activities are led by MARTEL Innovate and have been actively contributed by the entire consortium.

The different communication channels and dissemination tools identified at the beginning of the project were used in order to promote the main news, activities and results of the project:

- ➲ Fed4FIRE+ specifically organized 3 FEC and foresee one in October 2018
- ➲ Fed4FIRE+ has participated in more than 15 relevant external events and presented itself to relevant stakeholders
- ➲ Four scientific publications have been published presenting advances marked by Fed4FIRE+
- ➲ Over 75 demonstrations were conducted
- ➲ The outcomes/results from Fed4FIRE+ during the first period will be used as input towards interactions with "ITU-T SG13 Study Group 13 – Future networks" as well as ITU-T Study Group 20 on IoT and Smart Cities and Communities.

Altogether, Fed4FIRE+ has widely promoted its results and activities to more than 1,000 users (including subscribers to social media channels, mailing lists and website visitors). Additionally, Fed4FIRE+ has engaged 100s of participants in events.

For the second year of the project, the strategic perspective of the Fed4FIRE+ dissemination and communication effort will continue serve the overall success of the Fed4FIRE+ project and maximizing the dissemination and communication impact within the communities of target stakeholders. A specific attention will be paid on Next Generation Internet (NGI) events/workshops and target stakeholders (SMEs, Startups, Researchers) which may/will need test facilities to be able to test their HW/SW design or prototypes. Such effort includes:

- ➲ Continuation of active promotion of project branding and outputs through different channels
- ➲ Extending promotion to NGI events and workshops including a collection of best practices and success stories from SME experimenters
- ➲ Development of online tutorials and training activities
- ➲ Publication of scientific articles and presentation in international peer-reviewed journals and conferences
- ➲ Contribution to Standardisation and interoperability of experimental facilities.
- ➲ Contribution to Exploitation.

TABLE OF CONTENTS

Contents

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

FEC	Fed4FIRE+ Engineering Conference
FIA	Future Internet Assembly
FI-PPP	Future Internet Public Private Partnership
FIRE	Future Internet Research and Experimentation
GENI	Global Environment for Network Innovations
NGI	Next Generation Internet
RTD	Research and Technical (or Technological)
CENI	EU‑China‑FIRE project
FIWARE	Future Internet Core Platform
5GPPP	5G Infrastructure Public Private Partnership

1   INTRODUCTION

D6.3 is the Dissemination and Exploitation Report for period 1.

This document provides in detail the dissemination and exploitation activities performed during Period 1 (January 2017- June 2018), as well as presents a series of actions planned for Period 2 (July 1018 to December 2019). The grounding of such activities was clearly defined and guided by both the Description of Action (DoA) and Deliverable (D) 6.2 – Dissemination an exploitation plan.

The purpose of the current deliverable is therefore two-folded: 1) to report on the Fed4FIRE+ project's dissemination and exploitation activities held from month 1 to month 18, that is an intermediate report covering the Period 1 of the project; and 2) to lay out the plan for Fed4FIRE+'s second period activities related to dissemination and exploitation, ensuring the fulfilment of targets and supporting the successful conclusion of the project.

To further detail the dissemination and communication activities conducted during Period 1 and the plan for Period 2, the remaining part of the document is organised as follows:

- ➲ Section 2 focuses on activities undertaken and followed in Period 1 of the project.
- ➲ Section 3 foresees planned activities in Period 2 of the project.
- ➲ Section 4 briefly summarises the key points of the document and orient towards future tasks.

2 FED4FIRE+ UPDATED DISSEMINATION & PROMOTION STRATEGY

2.1 OBJECTIVES

The main objectives of the dissemination, communication and community building strategy and activities are to:

➲ Reach, stimulate and engage a critical mass of relevant stakeholders. European Industry, represented by large companies and SMEs, and the NGI community, represented by other research projects, are privileged potential users of the experimentation facility.

➲ Generate broad awareness for European industry and H2020 projects about Fed4FIRE+ work and services, attract them to join the federation, use the offered facilities, and encourage the uptake and reuse of the free open-source tools that the project develops. The open engineering conferences around Europe will help in this.

➲ Ensure broad visibility of the project's work and disseminate results to the FIRE+ community and beyond. Fed4FIRE+ aims to contribute to and inform the overall scientific community of its results through publication of articles, and through presentations at conferences and workshops. Particular attention will be paid to fostering dialogue with related R&D efforts also at an international scale, by ensuring liaisons and close coordination with initiatives such as GENI, FIWARE Mundus, CENI, etc.

➲ Contribute to standardisation and interoperability of experimental facilities. By aligning Fed4FIRE+ efforts to relevant standards and open source initiatives, fostering contribution to them as appropriate and relevant to planned exploitation or project's outcomes, will contribute to ensure sustainability and interoperability of the federated experimental infrastructures and technologies Fed4FIRE+ offers.

These objectives remain at the core of the project's communication strategy for the Period 2 (M19-M36).

2.2 REACHING A BROADER AUDIENCE

The diverse target groups Fed4FIRE+ identified at the proposal preparation stage has been reached in Period 1, through several media channels and communication actions:

➲ Existing users of the facilities, who already have experience with the facilities, independently of whether they are academic or industrial users.

➲ NGI projects and other European collaborative projects that require networking facilities to develop their research.

➲ Academic researchers in the areas of information and communications technologies (ICT) and distributed systems.

➲ CTOs of high-tech companies, including small, medium and large industry players.

➲ European policy makers who have a strong impact on the evolution of information technologies, from professional consortium leaders to EC representatives, as well as national research and industry decision makers.

❏ The environment and the society as a whole including citizens and in particular students that could benefit from an Open R&D ecosystem creating opportunities for individuals and/or associations by a more direct access to Future Internet initiatives.

2.3 PRIMARY DISSEMINATION AND PROMOTION CHANNELS

Following the objectives and planned activities as detailed in D6.2, a broad array of dissemination channels is used to effectively reach the targets groups and to maximise awareness of the overall project's work and outcome. The synergy of Fed4FIRE+ dissemination is generated through seamless connected online and offline communication activities. Both online (e.g. website and social media) and offline channels (e.g. events) are constantly used to disseminate Fed4FIRE+ related activities and project actions throughout Europe and beyond.

Here after is reported the table of the dissemination channels used to reach each target group.

Table 1: Dissemination & Promotion Channels per target group

Channel/ Target Group	Next Experimenters	FIRE & NGI and ICT Industry	Innovators & Researchers	Standardization Bodies	General Public
Website	X	X	X	X	**X**
Social networks	X	X	X	X	**X**
Project Newsletter	X	X	X		
FEC Conferences	X	X	X	X	
Third parties events	X	X	X	X	
Scientific Publications	X		X	X	
PR materials (e.g. Flyers)	X	X	X	X	X
General Media					X

In Period 2, Fed4FIRE+ partners will adapt their communication efforts to include the newly available channels in the framework of the NGI initiative through the contacts all project partners have within this community. By publishing more focused calls and specific topical sessions at the FECs also try to attract new players out of the broader NGI community. Increasing presence at major events within the NGI community will also increase the visibility of the Fed4FIRE+ facilities to those new stakeholders.

3   DISSEMINATION ACTIVITIES: M1-M18 (JAN 2017 - JUNE 2018)

Fed4FIRE+ has been involved in several dissemination and communication activities, led by CERTH (Leader of WP6) and supported by Martel. During Period 1, the consortium has ensured a fruitful promotion of the Fed4FIRE+ project and its results, mainly including the following:

1. Creating the project logo and identity (project templates)

2. Revamping the Fed4FIRE website : www.fed4fire.eu

3. Setting up the project websites for each edition of the Fed4FIRE+ Engineering Conferences (FEC): www.fecN.fed4fire.eu

4. Setting up the website presenting the past and forthcoming editions of the FECs: www.fec.fed4fire.eu

5. Contributing to the project Twitter account

6. Developing and distributing the newsletter

7. Organising twice a year Engineering Conferences (FECs)

8. Creating promotional materials including a slide-based presentation, a poster, a leaflet, and a roll-up

9. Publishing/submitting/presenting scientific papers

10. Contributing to Standardisation and interoperability of experimental facilities

It is essential to point out that, Fed4FIRE+ consortium has been dynamic to identify multichannel approaches to maximise the impact of the Dissemination and Communication activities.

3.1   COMMUNICATION CHANNELS AND MARKETING MATERIALS

The Fed4FIRE+ project supports impact creation activities through a number of dissemination channels and marketing materials. Presentation of different channels and materials developed during Period 1 is included in this subsection.

3.1.1   PROJECT'S BRAND IDENTITY

As described in detail in D6.2 the Fed4FIRE+ project inherits the legacy, awareness and identity built by the Fed4FIRE project and the logo has been maintained, with a simple and light adaptation as shown in the following figures. Therefore the updated logo and templates have been released and made available to all partners by M01

Figure 1: FED4FIRE+ logo (extended version)

Figure 2: FED4FIRE+ logo (compact version)

3.2 ONLINE COMMUNICATION

3.2.1 Official web portal

As per the brand identity, Fed4FIRE+ leverages the legacy of its predecessor Fed4FIRE project and this contributed to the following results as detailed in **Figure 3 (Traffic Overview)**, **Figure 4 (Top Visited Pages)** and **Figure 5 (Visit Devices)**. An overview of the project website can be found in Deliverable D6.2 where the layout and concept of the web design are illustrated.
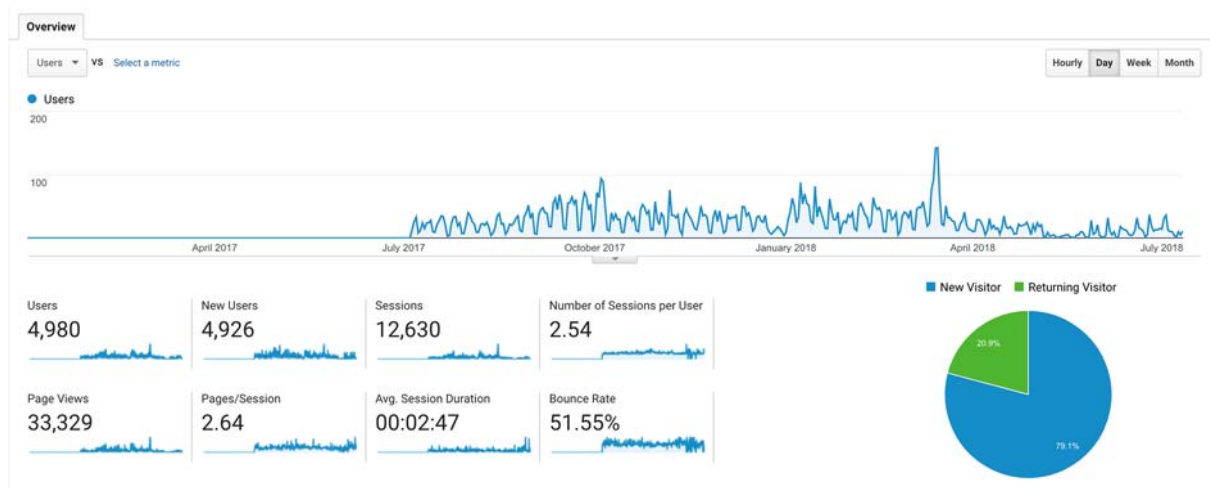
Figure 3: Traffic Overview

In summary, by the time of writing this report (June 2018), the website has had **4,980 unique visitors**, who generated **a total of 33,329 page views**. The average of page view per user is approximately 2,64 (pages). In terms of visit duration, most visitors stayed on the website for a short period of time: for a total of 12,630 sessions, 71%o of visitors stayed for less than 60

seconds, 12% of them stayed for 60–180 seconds, 9% stayed for 3–10 minutes and 8% more than 10 minutes. Regarding specific pages on the website, the most popular one, after the homepage, is the "OpenCall" page, with 1,483 unique visitors and a total of 1,977 views, followed by "Testbeds" page, with 1,067 unique visitors and 1,613 page views.
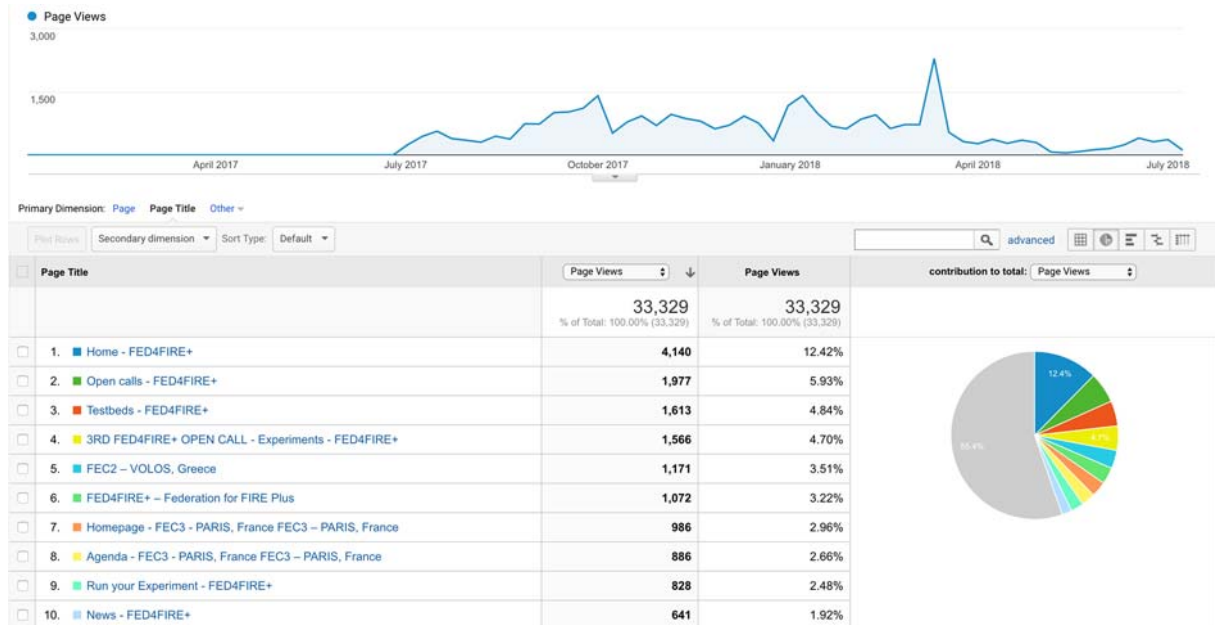
Figure 4: Top Visited Pages

Finally, 83% of our visitors gained access to our website through their desktop (more traditional means), while the rest used mobile devices (15%). Based on these data, it will be beneficial to continue promoting and including contents that are of interest to the stakeholders, while disseminating project results.
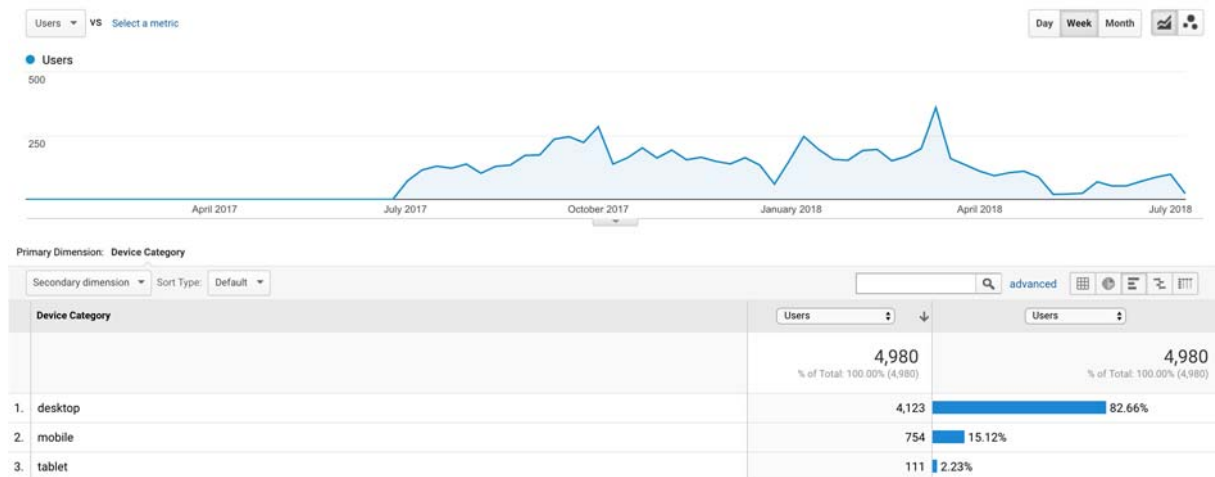
Figure 5: Visit Devices

The following Figure 6 shows the current homepage of the project.

Figure 6: Fed4FIRE+ Homepage

3.2.2 FEC dedicated pages

As described in D6.2 to have a more effective dissemination on the Engineering Conference that are foreseen during the 5 years of the project, dedicated websites have been created.

Each edition of the FEC has specific site inside the fed4fire.eu domain based on this model: **fecN.fed4fire.eu**, with N the edition of the conference.

Figure 7: FEC3 website screenshot

3.2.3   FECs gallery webpage

The gallery of the past and forthcoming editions of FECs is be available at: **www.fec.fed4fire.eu**

Figure 8: FEC website screenshot

3.2.2   Intranet

The Fed4FIRE+ private workspace will play an important role as the main internal repository for the project's Consortium as it provides different tools to facilitate project management as the repository, calendars, discussion area and a dedicated wiki. Its structure is flexible, dynamic and easily adaptable to each step of the project and to partners requirements. As a collaborative on-line tool, all partners can add information, discuss different subjects, create new spaces according to the evolution of the project and follow up on the advancement of the Work Plan and deliverables.
It has been made available by Imec at: https://cloud.ilabt.imec.be/
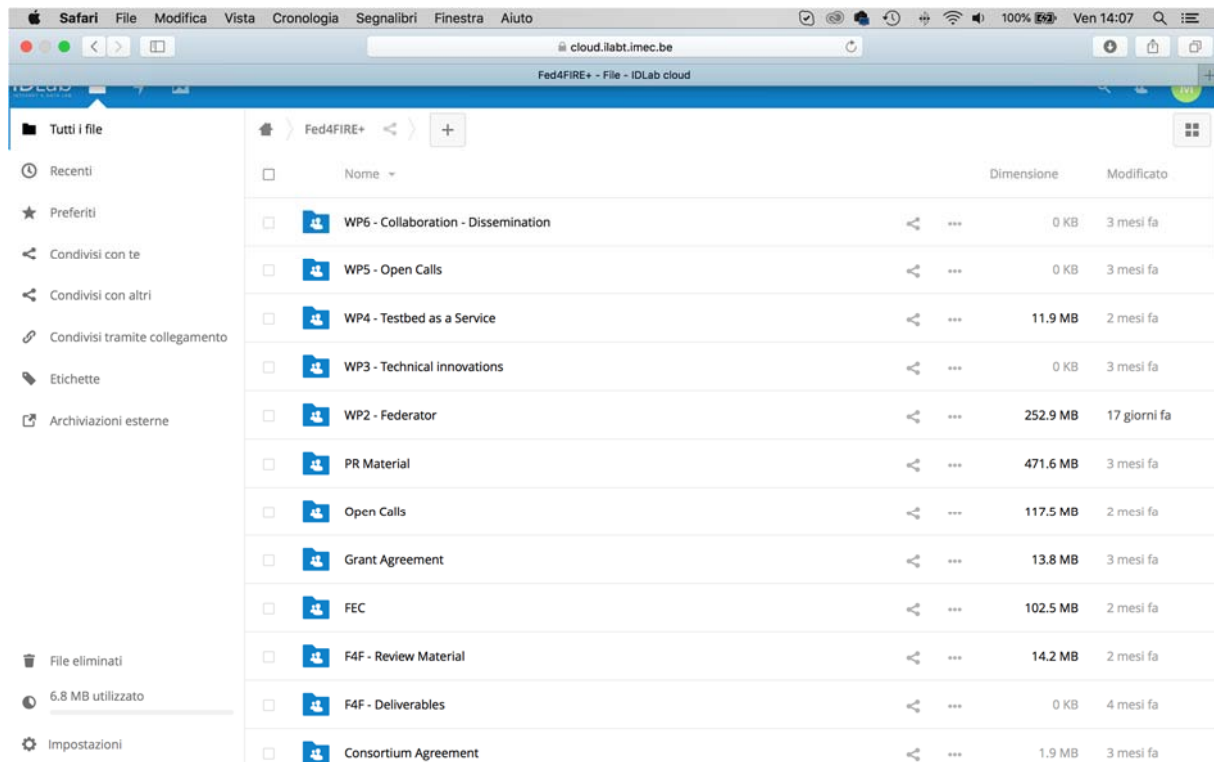
Figure 9: a screenshot of Fed4FIRE+'s intranet

The workspace has proven to be very useful during this first reporting period in maintaining the projects documents and information in a single space accessible to all partners. Since the storage is physically at servers located at imec's premises, it is also easier to maintain.

3.2.3 Newsletter

It was agreed among the consortium to have at least two editions of e-newsletter to be publisher after each FEC describing the results and the topic discussed during the event , the evolution of the project framework and announcing interesting news and promoting initiatives. Three editions of the e-newsletters has been distributed to stakeholders through Fed4FIRE+'s mailing lists as well as made available on the project website.

So far, **204** stakeholders have subscribed to receive Fed4FiRE+'s e-newsletters. In terms of further analysis on the efficiency of the communication:

- The first e-newsletter was sent to 105 subscribers / 46.6% opens / 16.5% clicks
- The second e-newsletter was sent to 169 subscribers / 45.5% opens / 24.2% clicks
- The third e-newsletter was sent to 177 subscribers / 45.7% opens / 12.6% clicks
- The fourth e-newsletter was sent to 205 subscribers / 38.4% opens / 2% clicks

To maximise dissemination impacts, the newsletters have also bene distributed through other mailing lists controlled by individual partners, which keeps it more difficult to track. As an example excerpts of the newsletters are also included in newsletters form imec which is distributed worldwide to several thousand addresses.

1) e-newsletter 1 (July 2017)

The first e-newsletter of Fed4FIRE+, published on July 2017, has announced and introduced the project. The following is the screenshots of the e-newsletter.

Figure 10: A screenshot of Fed4FIRE+ e-newsletter 1

2) e-newsletter 2 (November 2017)

The second e-newsletter of Fed4FIRE+, published on November 2017, containing FEC2 report. The following is the screenshots of the e-newsletter

Figure 11: A screenshot of Fed4FIRE+ e-newsletter 2

3) e-newsletter 3 (February 2018)

The third e-newsletter of Fed4FIRE+, published on February 2018, promoting the FEC3 in Paris. The following is the screenshots of the e-newsletter

FED4FIRE+
14-16 MARCH 2018
COME JOIN US AT FEC3 IN PARIS!

The third **Fed4FIRE+ Engineering Conference (FEC)** will be organised on **14-16 March 2018 in Paris, France.**

Figure 12: A screenshot of Fed4FIRE+ e-newsletter 3

4) e-newsletter 4 (June 2018)

The fourth e-newsletter of Fed4FIRE+, published on June 2018, promoting the Fed4FIRE+ participation at EuCNC 2018 in Ljubljana, Slovenia. The following is the screenshots of the e-newsletter

FED4FIRE+ @ EuCNC 2018
— 18-21 JUNE 2018 —
COME JOIN US AT OUR BOOTH IN LJUBLJANA!

FED4FIRE+
THE LARGEST FEDERATION OF TESTBEDS IN EUROPE

A variety of testbeds for (real life) experimentation and testing exist in Europe. Even a lot of them allow open access, but the problem is that the learning curve for using them is typically too steep. **Fed4FIRE+, as largest federation of testbeds in Europe,** helps in this by having simple tools and a single account to access all those testbeds, allowing to do experiments in the fields of 5G, IoT, cloud, big data and networking and even combining them easily.

At EuCNC the Fed4FIRE+ project will have a demo booth showcasing how simple it is to use the testbeds and to combine multiple testbeds in a larger experiment. This is achieved via three 5G demos.

Figure 13: A screenshot of Fed4FIRE+ e-newsletter 4

3.2.4 Social Media

Social media channels have been widely used to always widen the reach of the audience and to facilitate an interactive dialogue with relevant stakeholders and potential experimenters. Moreover, social media has been chosen to the support to the Open Calls promotion.

As per the D6.2 the social media used are built upon Fed4FIRE ones and are:

➲ The **Twitter Account**, currently has **239 followers** and has generated **1557 tweets**, https://twitter.com/Fed4Fire

➲ The **NGI-EXP Linkedin Group** has **630 members** and it been used to promote Fed4FIRE+ Open Calls and Fed4FIRE+ Engineering Conferences, https://www.linkedin.com/groups/3361373

➲ The **YouTube Channel** (https://www.youtube.com/channel/UCw-qixoqWLJ8qzEEGrRNQUA), currently has the following videos (with **928 views**):

   o   Introduction to Fed4FIRE+ Federation (September, 2017)

   o   Presentation of the Open Calls Fed4FIRE (September, 2017)

   o   Presentation of the FED4FIRE+ ENGINEERING CONFERENCE [FEC] (September, 2017)

   o   5GinFIRE approach and potential Fed4FIRE+ collaboration (October 2017)

   o   The interviews to the experimenters run during the FEC1 Conference in Ghent (March 2017)

   o   The interviews to the experimenters run during the FEC2 Conference in Volos (October 2017)

   o   Fed4FIRE+ video presentation at EuCNC 2018 in Ljubljana, Slovenja. (June 2018).

COMING SOON:

o Interview to Georgios Tselentis about Fed4FIRE+ project in the FIRE ecosystem

o Interview to Ivan Seskar about future testbed initiatives in the US

o Interview to the experimenters run during the FEC3 Conference in Paris (March 2018)

3.2.5 Online education, tutorial and training materials

Fed4FIRE+ provides and offers online tutorials and training materials to facilitate uptake of the project outcomes to the target stakeholders, in particular small and medium businesses and new constituencies for new types of innovation-driven experimentation. Fed4FIRE+ reuses a number of tools and facilities developed within the Fed4FIRE project, builds upon any relevant outcome of the FIRE FORGE project and coordinates with any training activities planned at programme-level as relevant.

NITOS Testbed Tutorial

NITOS is heavily used for education in undergrad and graduate level. NITOS has created a full set of labs for several networking classes that are based on hands on experiments that run real time on NITOS. More details can be found at: https://nitlab.inf.uth.gr/NITlab/education

eWINE Iris Testbed Video Tutorial

This tutorial guides experimenters through the process of executing a GNU radio OFDM experiment on the Iris testbed at Trinity College Dublin using the Fed4FIRE+ JFed experimenter toolkit. YouTube: https://youtu.be/ER_inWEip14)

3.3 VIDEO

To widen the reach of the Open Calls for each of the representatives of the experimenters showcasing a demo at the conference a video has been shot. The interviews have been produced as speeches presenting the results obtained by using Fed4FIRE+ testbeds and the business impact for their companies. The intention is that these videos are on one side an extra promotion for the experimenter, but also a tutorial-type of presentation for newly interested partners and experimenters to showcase the potential of Fed4FIRE+.

Table 2: Video Interviews' from Fed4FIRE

Company	Project Name	Project Title	Person Interviewed
InnoRoute GmbH	TUNeR	Tuning User-Driven Network Reprovisioning	Andreas Foglar
SkilledApp s.r.l.s	Skilled	Skilled	Giovanni Trotta
Almatex	FI-DSPP	Future Internet data stream processing platform	Paweł Świątek
Aeorum España S.L.	LTEUAV	Performance analysis of adaptative algorithms for UAV data transfers over LTE	Sergio Boatella
ORION INNOVATIONS PRIVATE COMPANY	MENTA	MENTA: Bandwidth Management Experimentation through DPI Application	Nena Davri
ITTI sp. z o.o.	QBIX	Quality booster for QoE and context-aware adaptive service	Adam Flizikowski
OneSource, Consultoria Informática Lda.	SODNS	Scalable OnDemand DNS	Bruno Sousa
ALLBESMART LDA	WiFi-C	Experimental assessment of WiFi	Jorge Ribeiro
AOIFE SOLUTIONS S.L	AW-Pilot_Test	AOIFES Pilot for "Access and Connectivity" experiments in the framework of Wi-Fi network	Victor Berrocal-Plaza
CYBERNETIC TECHNOLOGIES NETICTECH SA	medLTE	LTE performance of a mobile application for remote collaboration of medical professionals	Piotr Szymaniac
WPWEB	QUIES4FIRE	QUIES4FIRE	Alessandro Falcone
Duvall bvba	HMP	Hybrid Meeting Platform	Steve Bosmans.

Table 3: Video Interviews' from OC1

Company	Project Name	Project Title	Person Interviewed
Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)	LASH-5G	Latency-aware and self-adaptive service chaining in reliable 5G/SDN/NFV infratructures	Barbara Martini
Aerial Insights S.L.	Aerial Insights	performance evaluation of cost aware agressive scheduling approeaches for multi datacenter computing	Fernando Navarro
National and Kapodistrian University of Athens	CLC	Cross Layer Control (CLC) based on SDN and SDR towards 5G heterogeneous networks	Sokratis Barmpounakis
MaLe Labs sp. z o.o.	DDLP	Distributed Deep Learning Platform	Pawel Świątek
OneSource, Consultoria Informática Lda.	EMPATIA_XXL	Large Scale Empatia Evaluation	Luis Cordeiro
EIGHT BELLS LTD	Go-Quick	Joint experimentation of modern internet application protocols with SDN	Ioannis Giannoulakis
Fundación Centro de Tecnología de Interacción Visual y Comunicaciones Vicomtech	MEC4FAIRFEST	Mobile Edge Computing for Fair Media Streaming Manifest	Seán Gaines
CASTOOLA d.o.o.	MOCAP	Measuring performance of cloud-based platform for interactive TV services delivery	Uroš Žižek
atSistemas S.L	POI	PaaS deployment on multi-IaaS	Lorena Bourg Arceo
medVC.eu sp. z o.o.	UbiMed4K	Transmission optimization and performance evaluation of a realtime ultrahigh definition medical collaboration platform	Piotr Pawałowski

Table 4: Video Interviews' from OC2

Company	Project Name	Project Title	Person Interviewed
FERON TECHNOLOGIES P.C.	FIVE	Experimenting in Fed4FIre+ with VEhicle Communication Systems	Antonis GOTSIS
TELESIS d.o.o.	FARMSENS	Integration of Sensory Information into the Farm Management Platform	Daniel Copot / Uroš Žižek
Tara Hill National Park Teo	CLONE	CLOudlet information centric Networking Experiments	Diarmuid Ó Coileáin
CYBERNETIC TECHNOLOGIES NETICTECH SA	RobotView	Wireless Robotic Surveillance Platform	Wojciech Józefowicz
WINGS ICT Solutions Ltd.	COMFORT-APP	Computation Offloading for IoT-enabled Applications	Kostas Trichias
NEMERGENT Solutions S.L.	Perceval	PERformance EVALuation of Critical Communications	Lamiae Akif
ComSensus, komunikacije in senzorika, d.o.o.	D2D4P	Direct Device-to-Device Communications for Proximity Services	Miha Smolnikar

3.4 PROMOTIONAL MATERIALS

The following material has been produced so far:

- A project flyer presenting the project. It has been printed in 700 copies and already distributed at several events like MWC, EuCNC2018.
- A flyer promoting the 2nd FEC in Volos. It has been printed in 100 copies and distributed at EuCNC2017, NGI Forum 17,
- A flyer promoting the 4th FEC. It has been printed in 250 copies and already distributed at Bilbao IoT Week 2018, EuCNC 2018, Futur.es in Paris, NGI Forum 18 (in September).
- A couple of roll-ups have been designed and used on the occasion of each FEC Conference.
- A Poster template has been designed and used by experimenters for the Demo exhibitions

3.5 WORKSHOPS & CONFERENCES

As presented in the dissemination plan Fed4FIRE+ will focus on two types of events to provide major visibility to the project's outcomes:

- **Engagement Events**: Dedicated and active participation in conferences and workshops co-located with major events as a means to engage new Future Internet players and maximize the participation to the Open Calls.
- **Engineering Conferences:** these events serve as a forum at which experiments will showcase their results and provide feedback to Fed4FIRE+ and will serve as a basis to strengthen the community through which experimenters and facility providers interact and exchange information and experiences. These FECs events are organized every 6 months.
- **Summer schools**: Based on the success initiated inFed4FIRE project targeting the involvement of students, researchers, SMEs and other companies the of Summer Schools are part of the Engineering Conferences.

3.5.1 Engagement Events

Table 5: Engagement events

Event Name	Date, Place	Type of Audience	Approx size of audience	Leading Partner
First SoftFIRE Hackathon in Berlin	Berlin, 4 May	Researchers, Policy Makers, Industry	100	Fraunhofer
TNC17 Networking Conference	Linz, 29 May – 2 June	Researchers, Policy Makers, Industry	100	IMEC
EuCNC 2017	Oulu, 12-15 June	Researchers, Policy Makers, Industry	300	IMEC
5G Summit Dresden	Dresden, 19 September	Industry, Researcher	500	IMEC
World Mobile Congress 2018	Barcelona, 12-14 September 2018	Researchers, Policy Makers, Industry	2500	Martel
EuCNC 2018	Ljubljana 18-21 June	Researchers, Policy Makers, Industry	400	IMEC
The EU/US Future Networks Workshop	Brussels, 26-28 June 2017	Academics, Industry	35	SU
Global Experimentation for Future Internet (GEFI) conference	Rio de Janeiro (Brazil), 26-27 October 2017	Academics	150	SU
JAIST World Conference	Ishikawa (Japan) 27-28 February 2018	Academics	150	SU
INFOCOM 2018	Honolulu (USA) 15-19 April 2018	Academics	150	SU
OrganiCity event	Santander (E), 2 June 2017	Researchers, Policy Makers, Industry	50	UC
OrganiCity event	Santander (E), 21 June 2017	Researchers, Policy Makers, Industry	50	UC
INDIS 2017	12 November 2017	Network engineers and researchers	100	UvA
GEFI 17 meeting	Rio de Janeiro, Brazil 25-26 October, 2017	Academics, Industry	30	inria

3.5.2 Engineering Conferences (FEC)

The "FECs" engineering conferences are a series of technical events organised by Fed4FIRE+ with the aim to strengthen the interaction among the different stakeholders involved. Three edition of Engineering Conferences has been organised.

Event Name	Date, Place	Type of Audience	Topic	Approx size of audience	Leading Partner
1st FEC	March 2017, Ghent (BE)	Experimenters, facilities providers, Fed4FIRE+ partners	Next Generation Internet	80	IMEC
2nd FEC	October 2017, Volos (GR)	Experimenters, facilities providers, Fed4FIRE+ partners	Fed4FIRE+ Testbeds tutorials	100	IMEC
3rd FEC	March 2018, Paris (F)	Experimenters, facilities providers, Fed4FIRE+ partners	SDN	120	IMEC

For each FEC a dedicated web site has been created and where are available all the details about the event such as sessions, speakers, agenda, etc. Finally, the website fec.fed4fire.eu links to all past and upcoming FECs.

3.6 PRESENTATIONS AND TALKS

The table below presents the third-party events that Fed4FIRE+ took part with a presentation, a paper and/or a demo.

Table 6: Third-party events

Event Name	Date, Place	Type of Audience	Website	Presentation	Leading Partner	Focus and link to Fed4Fire+
IEEE DYSPAN 2017	Baltimore, USA 6-9 Mar, 2017	Industry, Academia	http://dyspan2017.ieee-dyspan.org	Demo (Paper)	TCD	As part of the 2017 DySPAN Spectrum Challenge with the demo paper "Context-Aware Cognitive Radio Using Hidden Markov Models" by Paisana et al, the TCD team promoted the Iris testbed by showcasing the kind of advanced research and experimentation possible with equipment accessible via the Fed4FIRE+ jFed framework. More details at: http://dyspan2017.ieee-dyspan.org/program/spectrum-challenge-program
INFOCOM 2017	Atlanta, GA, USA 1-4 May, 2017	Industry, Academia	http://infocom2017.ieee-infocom.org	Demo (Paper)	TCD	As part of the 2017 INFOCOM Demo session with the demo paper "HyDRA: A Hypervisor for Software Defined Radios to Enable Radio Virtualization in Mobile Networks" by Kist et al, the TCD team showcased the open source HyDRA radio slicing SDR advanced experimentation software and promoted user experimentation with equipment accessible at the TCD Iris testbed via the Fed4FIRE+ jFed framework. More details at: http://infocom2017.ieee-infocom.org/program/demos-posters https://luizdasilva.files.wordpress.com/2011/02/kist-demoinfocom17.pdf
EuCNC 2017	Oulu, Finland 12-15 Jun, 2017	Industry, Academia	http://www.eucnc.eu/	Demo	TCD	TCD team presented a paper as part of the EU-Brazil FUTEBOL project entitled "Experiments Overview of the EU-Brazil FUTEBOL Project", where they promoted Fed4FIRE+ framework to support advanced experiment in wireless and fibre testbeds in the EU and Brazil.More details at: https://www.eucnc.eu/2017/www.eucnc.eu/index9306.html?q=node/147
NetFutures 2017	Brussels, Belgium 28-29 Jun, 2017	Industry, Academia	http://netfuturesconference.eu	Presentation	TCD	Prof. Luiz Da Silva attended NetFutures 2017 and gave the presentation "The power of locality: from cloud to fog", in the session "Mobile connectivity: how will the edge look like in 2027?", where he promoted the Iris testbed and the Fed4FIRE+ project. More details at: https://netfuturesconference.eu/mobile-connectivity-how-will-the-edge-look-like-in-2027

5GINFIRE plenary meeting	Nice, France 15-16 May, 2018	Industry, Academia	www.5ginfire.eu	Presentation	TCD	Dr Diarmuid Collins presented the Iris testbed, the Fed4FIRE+ framework, and discussed possible Iris Testbed / Fed4FIRE+ integration strategies with the 5GINFIRE project.
Wertschöpfung durch Linked (Open) Data in Unternehmensprozessen - Value creation through linked (open) data in business processes	Munich, Germany March 2018	Industry, Academia	DGfK PFGK18	Presentation	Fraunhofer	Focus of this presentation was on Linked (Open) Data and it's value for business processes. Background was the potential value of open data in general and challenges that arise (data vs knowledge, data quality, silos, ...). These challenges are addressed in F4F+ Task 3.5 and Linked (Open) Data will be used in WP4 to find services that are offered by federation members.
IoT Architectures for Interoperability	Berlin, Germany June 2017	Industry, Academia	IoT Tech Expo	Presentation	Fraunhofer	Focus of this presentation was on the complexity of interoperability within the Industrial IoT (IIoT) context. Background was the different technologies that are required to combine in the Industry 4.0 context. To offer support/consulting in this context is one of the objectives of the WP4 Testbed as a Service developments.
Gehören alle Daten in die Cloud? Der Weg zurück zu verteilten Systemen - Do all data belong in the cloud? The way back to distributed systems.	Berlin, Germany May 2017	Industry, Academia	SIBB Forum Digital Platforms & Technologies	Presentation	Fraunhofer	Focus of this presentation was on the future paradigm shift from centralised clouds to distributed clouds. Background was the need to process data locally for privacy and performance reasons. To offer support/consulting in this context is one of the objectives of the WP4 Testbed as a Service developments.
2nd IEEE 5G Testbed Workshop in conjunction with IEEE VTC Spring Conference	Porto, Portugal 3 June, 2018,	Industry, Academia	https://5g.ieee.org/testbeds/workshop-vtc-spring-2018-porto	Presentation	IMEC	The paper presented is entitled: "5G experimentation on imec's testbeds and federated testbeds in Fed4Fire". This presentation was part of the workshop "2nd IEEE 5G Testbed Workshop in conjunction with IEEE VTC Spring Conference" and described the different testbeds within Fed4FIRE+ which can be used for experiments in the area of testbeds. This presentation was made in preparation of the Open Call 4 which was aimed at a.o. 5G experimentation. This presentation directly and completely describes work and facilities available within Fed4FIRE+.
EuCNC 2018	Ljubljana, Slovenia 18-21 Jun, 2018	Industry, Academia	http://www.eucnc.eu/	Booth	IMEC	EuCNC was showcase how simple it is to use the Fed4FIRE+ testbeds and to combine multiple testbeds in a larger experiment. Three different demos: 5G network end-to-end cellular virtualized infrastructure provisioning, How to use Femtocells, EPC, NFV, USRPs on the Fed4FIRE testbeds, LASH 5G experiment based on Fed4FIRE+ testbeds

GEFI 17 meeting - Global Experimentation for Future Internet	Rio de Janeiro, Brazil 25-26 October, 2017	Industry, Academia	http://indico.rnp.br/conferenceDisplay.py?confId=243	Presentation	inria	The GEFI meeting goal is to encourage collaborative research across international boundaries, in a set of topics that are interesting to researchers in each of our countries
Workshop on Design, Deployment and Testing of Internet of Things Technologies (DDT-IoT)	Montenegro, 8 June 2018	Industry, Academia	http://www.balkancom.info/2018/workshop.html	Booth/ presentation	IMEC	The presentation is entitled: "Automated IoT interop testing using federated testbeds and the F-interop framework" This presentation was demonstrating how the use of testbeds with IoT devices can help in automated interop and conformance testing. For the testbeds, Fed4FIRE tools and testbed resources are used. This presentation also helped in advertising the Open Call 4 of Fed4FIRE+ which focused on IoT.

3.7 OPEN CALLS

Fed4FIRE+ provides funding for third parties through the cascade funding by means of the Open Calls, mechanism. The following table presents the proposals that has been received for each Open Call.

<p align="center">Table 7: Number of proposals that has been received for each Open Call</p>

Call	Title	Deadline	Status	Proposal received
F4Fp-01	**1st Fed4FIRE+ Competitive Call – Innovative Experiments** Category "Small experiments (S)" & "Large Experiments (L)"	15th Feb 2017	Closed	13 L 30 S
F4Fp-02	**2nd Fed4FIRE+ Competitive Call – Innovative Experiments** Category "SME Cascaded Experiments"	**Stage 1** 18th Sept 2017 **Stage 2** 15th Dec 2017	Closed	11 XS 9 M
F4Fp-03	**3rd Fed4FIRE+ Competitive Call – Innovative Experiments** Category "Medium (M) & "Large Experiments"	15th Jan 2018	Closed	10 L 24 M

The Fed4FIRE+ Open Calls are broadly advertised through:

- Publication of the Open Call to Fed4FIRE+ website;
- Publication of the Open call to all relevant NGI web sites and project web sites, to the "Future Internet" communication list (5,000+ contacts), including reminders
- Dissemination through Fed4FIRE+ social channels, partners and community social channels;
- Dissemination through NGI, Future Internet mailing list;
- Flyer are distributed online and offline;
- A dissemination kit (visual/copy/link) is distributed to major community websites to further increase visibility

More details about the Open Calls themselves is presented in Deliverable D5.1

3.7.1 Publications made by open calls participants

Participants to Fed4FIRE+ open call could have the possibility to present papers on the results obtained by using Fed4FIRE+ testbeds and the publications will be made available on the project channels.

There are at least two publications that acknowledge the activity done by using Fed4FIRE+ testbeds in the project LASH 5G.

- On Experimenting 5G: Testbed Set-up for SDN Orchestration across Network Cloud and IoT domains, CNIT- Italy

- Network Orchestrator for QoS-enabled Service Function Chaining in reliable NFV/SDN infrastructure, CNIT -Italy

3.8 SYNERGIES WITH RELATED PROJECTS AND INITIATIVES

he main goal of this activity is to ensure broad outreach and impact of the project's activities, including fostering worldwide collaboration with related initiatives and stakeholders from countries such as USA, Brazil, South Korea, Japan, China and Australia, by exploiting existing cooperation synergies and establishing new ones as relevant.

Fed4FIRE+ liaise with the following international initiatives and support the dissemination and communication efforts and reach the widest audience possible. In particular,

- ➲ **FP7 FIRE and H2020 projects**
  - **OpenLab:** delivers control and experimental plane middleware to facilitate the use of testbeds.
  - **CREW**: has established an open federated test platform, which facilitates experimentally-driven research on advanced spectrum sensing, cognitive radio and cognitive networking strategies.
  - **WiSHFUL**: develops software for controlling radio and network aspects of heterogeneous devices ranging from sensors to software defined radios.
  - **IoT Lab**: is researching the potential of crowdsourcing and crowd sensing for ICT research and experimentations**.**
  - **F-Interop**: develops a set of online testing tools, including interoperability, conformance and performance testing tools for the Internet of Things
  - **ANASTACIA**: Solution enabling trust and security by-design for Cyber Physical Systems (CPS) based on IoT and Cloud architectures
  - **SynchroniCity**: Large scale pilot for smart cities
  - **5G!Pagoda**: Federating Japanese and European 5G Testbeds to Explore Relevant Standards and Align Views on 5G Mobile Network Infrastructure
  - **FORGE** is an FP7 FIRE CSA which focuses on bringing together the spheres of FIRE and eLearning, especially focusing on technologies related to Open Educational Resources, MOOCs and eBooks.
  - **RAWFIE** (Road-, Air-, and Water- based Future Internet Experimentation) is an Horizon H2020 programme under the Future Internet Research Experimentation (FIRE+) initiative that aims at providing research facilities for Internet of Things (IoT) devices.
  - **eWiNE** run as a "Collaborative project for experimentally-driven research on top of existing experimental infrastructures including necessary extensions, adaptations or reconfigurations that serve the experiments
  - **ORCA** offers experimentation facilities to promote wireless innovation in several market segments, including manufacturing, automotive industry, healthcare, ambient assisted living, public events, home automation, and utilities
  - **FLAME** main target is to provide a significant leap forward for media delivery supporting personalized, interactive, mobile and localized (PIML) workflows by means on-street 5G testbeds with Open Calls for experimenters,
  - **FUTEBOL** the EU-BR envisages the creation of a federated control framework to integrate testbeds from Europe and Brazil for network researchers form academia/industry with unprecedented features.

- **5GINFIRE** aims to build and operate an Open, and Extensible 5G NFV-based Reference ecosystem of Experimental Facilities that not only integrates existing FIRE facilities with new vertical-specific ones but also lays down the foundations for instantiating fully softwarised architectures of vertical industries
- **FIESTA** works towards providing a blueprint experimental infrastructure, tools, techniques, processes and best practices enabling IoT testbed/platforms operators to interconnect their facilities in an interoperable way. Related to T3.5 and WP4
- **F-Interop** among the objectives of F-Interop, the consortium works on the integration and extension of several European testbed federations with a shared "Testbed as a Service" interconnecting three European testbeds federations (Fed4FIRE, OneLab, IoT Lab), bringing together over 32 testbeds and 4755 nodes. It will develop a new architecture model enabling easier access
- **HUB4NGI** aims at transforming the current NGI initiative into an increasingly dynamic, collaborative and participatory Innovation Ecosystem capable of effectively supporting and coordinating activities across the whole NGI landscape and provide a collaborative platform, including content, tools and processes, to turn all Internet Researcher and Innovators into NGI promoters.
- **ENVRIPLUS and SWITCH (H2020**) focused on time critical applications and data science for environmental infrastructures
  SARNET and DL4LD projects (NWO funding) focused on the development of digital market places and autonomous networks.
- **RoN (SURFnet)** focused on programmable networks

FIRE STUDY was a study of the Inventory of European and National Experimentation Facilities and Roadmap of the future needs for advanced networking experimentation. It finished in the end of July 2017 and after it the Fed4FIRE+ has maintained the NGI-EXP Twitter and LinkedIn social media channels.

- **ESFRI** project submission (under review): SILECS aims at building a European scale research infrastructure, gathering experimental needs for resources ranging from wireless and IoT devices, to cloud and datacenter resources

➲ **Global Collaboration Initiatives**
  - **GENI**, a first collaboration is between GENI and FIRE, on which FED4FIRE+ will build further. A first collaboration initiative is between GENI and the Fed4FIRE project on the network interconnection. Another link between GENI and FIRE is via the Fed4FIRE project through the organisation of GENI/FIRE collaboration workshops. These are brainstorm workshops, upon invitation only, between key researchers from GENI and FIRE to discuss the vision and strategies on test facilities and experimentation, and to boost collaboration between GENI and FIRE.
  - Specifically, there is a formal request from US GENI for federation as follows:
    - o **Control plane federation**
      - ▪ Allow US GENI users to use Fed4FIRE federation testbeds▪Practically: add GENI clearinghouse root cert as a trusted cert
      - ▪ Same policies as for EU users (https://www.fed4fire.eu/terms/)
      - ▪ (in practice: Fed4FIRE users are already allowed on GENI)
    - o **Data plane federation**
      - ▪ Initiate negotiation Geant – Internet2

- It is currently possible to set this up with GENI accounts, but Internet2 does not yet allow Fed4FIRE accounts
  - **PAWR:** Fed4FIRE+ initialized an interface with PAWR in the US.
    - **NSF Platforms for Advanced Wireless Research (PAWR)**. It isan important initiative in USA for developing city-scale wireless testbeds o100M in 5 years
    - Close collaboration with the industry
    - 4 awards to be announced
    - They are about to announce the first two awards
    - Our intention is:
      - To enable an interface with them
      - To work closely with them in terms of federation and interoperability
- **FIBRE project** aimed to design, deploy and validate a testbed facility that supports the joint experimentation of European and Brazilian researchers.
- **CENI:** The EU-China-FIRE project facilitated coordination and support to EU-China cooperation on Future Internet Experimental Research (FIRE) and IPv6.
- **SmartFIRE** project between EU and South-Korea has built an EU/South-Korean community and compatible and interconnected testbeds.
- **Felix** project between EU and Japan has built an advanced interconnected SDN EU/Japan testbed and community.

➲ **EC Initiatives**
- **5G PPP:** the 5G Infrastructure Public Private Partnership. Interaction between the Fed4FIRE+ and the 5G PPP players is essential to ensure synergies to be exploited beyond individual programme border to foster federation of facilities developed in the 5G PPP context via the Fed4FIRE+ infrastructure.
- **FI-PPP/FIWARE / FIWARE** LAB federation offers a federated testing environment which currently comprises 18 nodes and as such can cope with large trial deployments and can serve the various needs of a broad set of FI users and experimenters. This initiative is very much related to the work that will be done within Fed4FIRE+ and will therefore be closely coordinated with the planned project's activities with the equivalent of the Fed4FIRE+ project in the FI-PPP context.
- **AIOTI/IoT:** The involvement of several Fed4FIRE+ partners within the AIOTI and IoT Forum will ensure to liaise to relevant events and activities that will help promoting further the Fed4FIRE+ results reaching a broad audience. Coordination on a cross programme perspective for orchestrated contributions to standardisation with the AIOTI will be fostered as an important channel to ensure global impact creation.
- **Next Generation Internet - NGI:** The aim of the Next Generation Internet initiative is to put Europe at the heart of Internet developments by shaping its main principles and key technology building blocks (e.g. blockchain and distributed ledger technologies in particular). As the proposed NGI building blocks include infrastructures, convergence of networks elements, and large-scale pilots, the Fed4FIRE+ will be in a key position to support NGI infrastructure development. Special *Smart Connectivity in NGI* and *Smart Connectivity in the context of NGI* have already been organised at the EUCNC 2018.

3.9 CONTRIBUTION TO OPEN SOURCE INITIATIVES AND STANDARDS

The project will contribute actively to standardisation with two main focuses:

➲ Testbed federation and interoperability;

➲ Data portability, in line with the General Data Protection Regulation.

The project will relay (through P06 MI) the relevant results to the corresponding SDOs, namely:

➲ The European Telecommunication Standards Institute (ETSI).

➲ The International Telecommunication Union (ITU), with a focus on the Study Groups 20 and 11. MI is Rapporteur on Research and Emerging Technologies for the Internet of Things and for Smart Cities at the ITU (SG20) and will lead the standardisation effort within the ITU.

➲ Institute of Electrical and Electronics Engineers (IEEE), where MI is Vice‑Chair of the IEEE

➲ Subcommittee on the Internet of Things.

➲ International Standardization Organization (ISO), with a focus on personal data protection related standards, such as ISO 29100, ISO 29101, ISO 15408.

CBTM (Cloud-Based Testbed Manager)

The CBTM (Cloud-Based Testbed Manager) developed by TCD researchers to control the IRIS testbed and SDR (Software Defined Radio) resources and support FED4FIRE federation, has been licensed under AGPLv3 and released in 2018. Source code, and documentation is available at the public repository: https://gitlab.com/futebol/cbtm-tcd

Currently, CBTM supports the allocation and management virtualized resources in four testbeds in the FUTEBOL H2020 EU project: Iris at Trinity College Dublin; Université Fédérale de Minas Gerais, Brésil (UFMG); Federal University of Rio Grande do Sul, Brésil (UFRGS); and VTT Technical Research Centre of Finland Ltd.

VDI/VDE-GMA. (2018)

"I4.0-Sprache: Vokabular, Nachrichtenstruktur und semantische Interaktionsprotokolle."

3.10 JOURNALS AND CONFERENCE PUBLICATIONS

The table below presents the publications for the first eighteen months of the project.

Table 8: List of relevant journals for scientific dissemination

Publication	Topic covered	Submission to	Lead partner	Link to document	Focus and link to Fed4Fire+
The CityLab Testbed - Large-scale Multi-technology Wireless Experimentation in a City Environment: Neural Network-based Interference Prediction in a Smart City	Testbeds		IMEC	https://fed4fire.eu/wp-content/uploads/sites/10/2018/08/1.1570426615.pdf	The work in this publication resulted directly from the integration of CityLab in Fed4FIRE+. By building on top of the Fed4FIRE technologies such as jFED, we were able to gather the data used in this paper to obtain the neural network research outcomes. Moreover, the results of this paper were presented during a demo, which we reproduced at FEC4, and which got a best demo award at CNERT 2018.
Integrating research testbeds into social coding platforms	Testbeds		IJS	https://fed4fire.eu/wp-content/uploads/sites/10/2018/07/ijs-1570436164.pdf	This paper proposes to leverage the high adoption of social coding platforms among software developers to increase the adoption and utilization of research testbeds, arguing that the learning curve of using testbed-specific tools and technologies typically causes an initial drop in performance and often scares the potential experimenters away. The approach introduced in the paper makes the social coding platforms that software developers are used and comfortable to work with to serve as a common gateway to testbeds, thus decreasing the initial effort needed to start using the testbeds. As a proof-of-concept, the implementation of the proposed approach is showcased on the upgraded LOG-a-TEC testbed and can be made available to experimenters through the fed4FIRE federation of testbeds.
Towards Trustworthy Testbeds thanks to Throughout Testing	Testbeds	EPPAR - 4th International Workshop on Reproducibility in Parallel Computing (with	INRIA	https://fed4fire.eu/wp-content/uploads/sites/10/2018/08/3.reppar17-testing-testbeds.pdf	This paper is strongly related to WP3.2, whose focus is on reproducibility (of experiments). In order for experiments to be reproducible, it is crucial that the testbed behaves correctly (as advertised in its documentation, for example). The paper describes a framework (applied to the context of the Grid'5000, but little is specific to Grid'5000) in order to verify a large number of aspects of the testbed

		IPDPS'2017), Jun 2017, Orlando, US			
Testbeds Support for Reproducible Research	Testbeds	ACM SIGCOMM 2017 Reproducibity Workshop, Aug 2017, Los Angeles, US	INRIA	https://fed4fire.eu/wp-content/uploads/sites/10/2018/08/4.sigreprod.pdf	This paper is strongly related to WP3.2, whose focus is on reproducibility (of experiments). This paper surveys the state of reproducibility-related features in several testbeds in order to identify gaps and limitations, leading to possible future improvements.
Using Semantic Web Technologies to Query and Manage Information within Federated Cyber-Infrastructures	Ontologies		Fraunh ofer	https://fed4fire.eu/wp-content/uploads/sites/10/2018/08/5.2017.mdpi_.obda_.pdf	This journal paper summarises the work that has been achieved in the ontology task in Fed4FIRE and provides a starting point for the extensions for Task 3.5 in Fed4FIRE+
COINS: ContinuOus IntegratioN in wirelesS technology development			IJS	https://fed4fire.eu/wp-content/uploads/sites/10/2018/08/6.1804.01814v2.pdf	The paper proposes a framework that can be used by wireless technology developers to enable the use of continuous integration practices in their testbed infrastructure. As a proof-of-concept, the paper describes a reference implementation of the framework for controlled testing of multi-technology 5G Machine Type Communication networks in the LOG-a-TEC testbed, where it has also been validated. The framework implementation upgrades the wireless experimentation testbed with new software and hardware functionalities and provides, through the Fed4FIRE federation of testbeds, a set of new functionalities to experimenters and developers.
CLONE: An NDN Architecture for Content Distribution at Remote Tourist Sites - a TCP/IP and NDN Comparison	TCP/IP and NDN Comparison		TCD	https://fed4fire.eu/wp-content/uploads/sites/10/2018/09/7.clone-acm-icn-2018-thnp-cameraready.pdf	This demo aims to explore the Quality-of-Experience (QoE) of end-users under both network architectures over the 2G, LTE and Wi-Fi technologies.
An Experimental Assessment of Channel Selection in Cognitive Radio Networks	instrumental contribution of the Fed4FIRE+ infrastructure in providing access to the Iris testbed	IFIP International Conference on Artificial Intelligence Applications and	TCD	https://link.springer.com/chapter/10.1007/978-3-319-92016-0_8	The paper presents the use of knowledge-based capabilities through a specific lab experiment at the Iris testbed Trinity College Dublin, which focused on the channel selection functionality for cognitive radio networks (CRN). The jFed Fed4FIRE+ framework supported all user interactions and result collection, facilitating the implementation of four different classifiers (including decision tree, neural network, naive Bayes and Support Vector Machine), which allowed estimating the number of interfering sources existing in a given frequency channel. Without the Fed4FIRE+ toolset, equipment and support

		Innovations Springer, Cham.			available at the Iris testbed, the experimenters would not have been able to perform this advanced experiment.
Towards Container Orchestration in Fog Computing Infrastructures		IEEE International Workshop on Fog Computing and Networking	Fraunhofer	https://ieeexplore.ieee.org/document/8029944/	Focus of this paper is about the orchestration of virtualized functionalities in particular in the manufacturing context. This relates to the work planned in T3.5 (description of resources for orchestration) and WP4 (supporting companies to digitize their manufacturing processes).
Sprache für I4.0-Komponenten in Automation -Language for I4.0 components in automation	-	Baden-Baden, Germany: VDI	Fraunhofer	https://www.researchgate.net/publication/319140466	Focus of this paper is about the formal description of an interaction language to allow machines to understand each other in the manufacturing context. This relates to the work planned in T3.5 (formal description of resources).
OpenIoTFog: Eine anbieterunabhängige Verwaltungsschale für Industrie-4.0-Komponenten. - OpenIoTFog: A vendor-independent asset administration shell for industrial 4.0 components.)	Open IoT fog	In S. Schäfer (Ed.), „Tagung Berliner und Brandenburger Industrie 4.0" Safety und Security – Mit Sicherheit gut vernetzt. Berlin, Germany: Beuth-Verlag.	Fraunhofer	https://books.google.de/books?id=Trg4DwAAQBAJ&lpg=PA252&ots=2wQNTzq0gb&dq=OpenIoTFog%3A%20Eine%20anbieterunabh%C3%A4ngige%20Verwaltungsschale%20f%C3%BCr%20Industrie-4.0-Komponenten&pg=PA252#v=onepage&q=OpenIoTFog:%20Eine%20anbieterunabh%C3%A4ngige%20Verwaltungsschale%20f%C3%BCr%20Industrie-4.0-Komponenten&f=false	Focus of this paper is about the implementation of a so-called Industry 4.0 component to be used in the manufacturing context. This relates to the work in WP4 (supporting companies to digitize their manufacturing processes).
Semantic Interoperability for Asset Communication within Smart Factories.		IEEE International Conference on Emerging Technologies and Factory Automation (ETFA). Limassol, Cyprus	Fraunhofer	https://ieeexplore.ieee.org/document/8247689/	Focus of this paper is about the formal description of a language to allow machines to understand each other in the manufacturing context. This relates to the work planned in T3.5 (formal description of resources).

Semantic Communication between Components for Smart Factories based on oneM2M.		IEEE International Conference on Emerging Technologies And Factory Automation (ETFA). Limassol, Cyprus	Fraunhofer	https://ieeexplore.ieee.org/document/8247690/	Focus of this paper is about the usage of a formal language within oneM2M to allow machines to understand each other in the manufacturing context. This relates to the work planned in T3.5 (formal description of resources).
A Service Orchestration Architecture for Fog-enabled Infrastructures.		IEEE 2nd International Conference on Fog and Mobile Edge Computing (FMEC). Valencia	Fraunhofer	https://ieeexplore.ieee.org/document/7946419/	Focus of this paper is about the orchestration of virtualized functionalities in particular in the manufacturing context. This relates to the work planned in T3.5 (description of resources for orchestration) and WP4 (supporting companies to digitize their manufacturing processes).
Application of the Fog computing paradigm to Smart Factories and cyber-physical systems	Fog computing	Transactions on Emerging Telecommunications Technologies, e3184	Fraunhofer	https://www.semanticscholar.org/paper/Application-of-the-Fog-computing-paradigm-to-Smart-Brito-Hoque/7387e10da284d401edf6dc1acfc03a2d30875d6a	Focus of this paper is about the orchestration of virtualized functionalities in particular in the manufacturing context. This relates to the work planned in T3.5 (description of resources for orchestration) and WP4 (supporting companies to digitize their manufacturing processes).
Integrating research testbeds into social coding platforms	Testbeds	IJS	EUCNC		The paper focus on the social coding platform approach to be used as a common gateway to various testbeds since it is something many developers are comfortable with and thus the initial effort needed to start using the testbed is decreased and the probability that experimenters continue to use a testbed is higher.

3.11 EXPLOITATION

3.11.1 Consortium-wide exploitation

As defined in the project proposal, the exploitation is strictly related to the results and outputs of the project. For all the duration of the project, the exploitation will be carried out in close relation with the dissemination activities both at Consortium level and individually from each partner. Thanks to their combined expertise each partner delivers the project aims, and seek opportunities to disseminate their contributions.

At consortium level a set of KPI has been identified and are continuously monitored and described in the Paragraph 5.1 Quantitative Indicators.

3.11.2 Individual partner exploitation

Beside the overall Fed4FIRE+ vision and mission as a project, each one of the consortium partners has its own, distinct exploitation perspective. Hence, partner-specific exploitation report is seen crucial in ensuring that potential benefits for each project partner and for the whole consortium will be maximized.

1 IMEC

There are two important routes towards exploitation of the results. imec is an independent research institute that is working closely with industry. The knowledge and IPR gained in Fed4FIRE+ will be exploited in future projects with industry, where industry will directly benefit from imec's knowledge but industry may also take over some of the IPR for further commercialization. imec is also exploiting its knowledge by establishing spin-off companies. In Fed4FIRE+, the research group IDLab (Internet Technology and Data Science Lab) is involved. IDLab is a core research group of imec and its research activities are embedded in Ghent University and University of Antwerp.

The embedding in 2 Flemish universities, allows a very efficient exploitation of knowledge by embedding this in the more advanced master courses in engineering and related high-quality PhD programs.

2 UPMC/ Sorbonne University

As a public university, our priority is to promote open access.

UPMC (Sorbonne Université – SU from 01/01/2018) leverages the work done in Fed4FIRE+ in relation with the several testbeds managed and federated by UPMC, and with the European and national projects and initiatives in which UPMC participates. UPMC also contributes to share the results to the research community.

UPMC organised and hosted FEC3 in Paris on 14-16 March 2018 with a mix of plenary and parallel sessions, consisting of talks, tutorials, technical discussions and a demo night session with experiments set up and ran on the federated testbeds. Attendees were Internet Researchers and Innovators, Testbed providers, SMEs and Start-ups. A delegation of UPMC's team also

attended the previous two editions of the FEC, organised in Ghent and Volos. UPMC also shared the results and did networking with the research community in the following events (main ones):

- The EU/US Future Networks Workshop, Brussels (Belgium), 26-28 June 2017.
- The Global Experimentation for Future Internet (GEFI) conference, Rio de Janeiro (Brazil), 26-27 October 2017.
- The JAIST World Conference, Ishikawa (Japan), 27-28 February 2018.

3 Fraunhofer

Incorporation of work related to WP4 and Task 3.5 into own toolkit OpenIoTFog (https://openiotfog.org).

4 TUB

To exploit T3.5, TUB want to use the ontologies used in this project in the industrial IoT area and to combine them with natural language processing.

While to exploit WP4, TUB plans to write a paper about the matchmaking system. Among other things, about query processing, since the customer should be able to formulate normal sentences to get suitable results.

5 CERTH

At CERTH, where significant part of the experimentation will occur, graduate students will take a hands-on experience. The knowledge and experience acquired by students will provide them with better job opportunities and will be the driving force for distilling know-how to industry. Furthermore, establishment of fundamental knowledge and understanding on advanced and novel techniques of wireless networking will be achieved. Researchers, junior faculty and students will be educated through research conducted along the lines of the project in the form of theses, fellowships or research internships in industrial or other academic partners. The project results will be used in shaping the curricula of graduate and undergraduate studies of partner education institutes, by introducing new courses related to network applications, and by adding state-of-the-art cutting-edge material on already existing courses. CERTH is actively in disseminating project results in terms of publications and standardization work and in providing expertise to the research community. The cooperation with industrial partners will be exploited to give more concreteness to their academic research and to acquire practical experience, especially through the development of the testbeds within other user communities.

6 Mandat

Mandat International is managing and hosting the main servers for the IoT Lab testbeds federation. IoT Lab owns several testbeds dedicated to the Internet of Things (IoT) across Europe. Originally, IoT Lab was a European research project with the goal to research the potential of crowdsourcing to extend IoT testbed infrastructure for multidisciplinary experiments involving the end-users. Mandat International has planned to integrate the IoT Lab platform and testbeds to the Fed4FIRE+ testbeds. Mandat International is reusing or will reuse the results of the Fed4FIRE+ project to improve its own testbeds based on the tools developed by Fed4FIRE+.

7 Eurescom

Eurescom, having the mandate to advance technology for the benefit of the telecommunications industry, informed and discuss the current project outcomes with its shareholders and members who all have a business interest in the telecommunication market. As a follow-up activity in the area of experimental research, Eurescom is participating in several projects aiming at establishment of 5G facilities enabling the future experimentation in the area. Also, Eurescom is commercializing its knowledge by selling consulting services on building and deploying large scale testbeds and is active in preparation of the 3rd 5G PPP phase, focused on corresponding trials and experiments.

8 Martel

Martel will continue the planned engagement and marketing activities in Fed4FIRE+ through leveraging a number of related innovation projects and promotional frameworks Martel is involved in**.** These continuous actions will give the opportunity to reach more broad audience and ensure effective establishment and sustainable growth of the future business development of Fed4FIRE+. Moreover, Martel actively contributes to liaisons and communication towards related communities where is actively engaged in. This includes: 5G PPP /Networld2020, Future Internet Experimentation Research and Next Generation Internet

9 Atos

ATOS SE (Societas Europaea) is a leader in digital services with pro forma annual revenue of circa € 12 billion and circa 100,000 employees in 72 countries. Group provides Consulting & Systems Integration services, Managed Services & BPO, Cloud operations, Big Data & Cyber-security solutions, as well as transactional services through Worldline, the European leader in the payments and transactional services industry. ATOS works in different business sectors: Defense, Financial Services, Health, Manufacturing, Media, Utilities, Public sector, Retail, Telecommunications, and Transportation.

Within ATOS Research & Innovation (ARI), node of R&D at ATOS in Spain, there is technology transfer and business development team that works on transition from research results to ATOS global portfolio and service lines. One of these lines is related to Business and Platform Solutions (B&PS) where CloudSocket results will be transferred, while the other one is within the portfolio of ATOS BPS (Business Process Services) and especially BPaaS (Business Process as a service) which is one of the offerings currently provided in partnership with other companies (e.g. https://ATOS.net/content/dam/global/documents/we-do/ATOS-BPaaS-factsheet.pdf). When it comes to BPS, in ATOS we make difference between BPO (Business Process Outsourcing) and BPS (Business Process Services) since in BPS we consider the whole mix of people, processes and technology, and what the business needs to achieve to deliver digital transformation strategy, combining customer experience, technology ecosystem, analytical insight, innovative business models etc. In this direction Fed4FIRE+ results and in particular yourBPM will be introduced as a part of technological solution for a specific customer segments. In a matter of fact, FIWARE4Industry catalogue has included a lightweight version of yourBPM (named COMPEL) as one of the enablers for generic manufacturing platform. Finally, ATOS also owns Canopy brand for cloud related services, which can also be used for the exploitation of Fed4FIRE+ results.

The largest number of customers in business process service portfolio comes from financial sector, public sector and utilities. However, there are also processes that are common to any

organisation and can be provided in BPaaS mode, for example, a number of processes are offered on top of Oracle ERP in BPaaS mode, namely Source to Pay (integrating and automating Vendor Master Data, Invoice Processing, AP Payments and Query Resolution), Order to Cash (integrating and automating Customer Payment, Collections, Reporting and Customer Maintenance) or process known as Record to Report (Master Data Management, General Accounting and Cash Management). Our plan is also to contact other potential clients (e.g. Chambers of Commerce) and explore possibilities of joint exploitation with the other Fed4FIRE+ partners.

The exploitable assets of ATOS include yourBPM and SLA manager. Exploitation path for these components are:

1.   Technology maturation and transfer within ATOS Research & Innovation portfolio

2.   Contribution to product and service portfolio related to cloud related business of ATOS, including offering under Canopy brand.

3.   Contribution to new paradigms around Business Process Services, including technological environment such as BPaaS or consulting projects around Digital Transformation.

10 NTUA

Exploitable knowledge from Research Activities

During the first cycle, NETMODE team developed the reputation service of FED4FIRE+ and tested in NITOS and NETMODE testbeds. More specifically, a new reputation system is developed, which leverages Quality of Service (QoS) and Quality of Experience (QoE) metrics to compute the testbed's reputation score the experimenter's credibility. This hybrid reputation system facilitates FED4FIRE+ users to select the appropriate testbeds and resources for their experiments.

NTUA has gained considerable knowledge and expertise from the design and implementation of the access control component and NTUA's exploitation strategy is to enhance the developed reputation service in order to be applicable in future projects. An explicit design objective is to ensure that the reputation service can support a wide variety of metrics, so it is flexible to be applied to an equally wide variety of testbeds and resources. It is our intention to use this knowledge and the implementation in future project proposals.

11 Inria

As a testbed provider, Inria's main interest in the project results is in attracting users in a way that generates revenue for its testbeds. Therefore, the results of WP4 are of particular Itnerest to Inria. It is also very interested in the work done to allow federation with minimal adaptations to the native APIs of its testbeds. Adoption of the authentication proxy to service as developed in T3.4 is therefore of particular interest.

The second exploitation path for Inria is related to all the work done in the project to help testbed users perform experiments with a scientifically solid methodology, using tools and services that contribute to making experiments reproducible, and experiment result available.

12 It Innovation

IT Innovation will develop its expertise in two major areas through participation in Fed4FIRE+. Firstly, it will enhance its expertise in risk assessment associated with data management through development of a data management plan and related tools or patterns to help experimenters assess the impact of sharing data with the Fed4FIRE+ platform. Secondly, IT Innovation will build on its experience in federation sustainability and governance management by developing further its contributions to these areas in Fed4FIRE.

Synergy with HUB4NGI – proposed patterns for open calls, which are being tested in Fed4FIRE+. It is planned that Fed4FIRE+ will evaluate innovation support proposed in HUB4NGI.

13 Geant Limited

GEANT has not spent any PM in Fed4FIREPlus during this reporting period. The participation of GEANT in the project is limited to attending events, when invited, in order to provide advice on networking plans and issues.

15 I2cat

i2CAT aims to support heterogeneous Future Internet experiments through its test-bed and services offered, as well as in the federated infrastructures in Fed4FIRE+. Feedback provided by the experimenters during the usage of the infrastructure or in the Engineering Conferences can be used to adapt equipment and frameworks to their needs. Consequently, an eventual extension of the infrastructure also benefits from external usage and feedback for further stress testing and fine-tuning of computing or SDN equipment. i2CAT leverages on the experimentation and internal feedback within Fed4FIRE+ to adequate the capabilities, offered via infrastructures and services, to that of the users' needs.

16 Psnc

PSNC continues its mission to provide research infrastructures to scientific communities, industry and SMEs in Poland. Fed4FIRE+ is a flagship project offering beyond state of the art facilities for testing and validating innovative solutions in close to real conditions. PSNC plans to continue the service offering through Fed4FIRE+ and invite third party partners to make use of network and compute facilities offered for experiments. Wherever possible, PSNC will update components of the facility offered to Fed4FIRE+, in order to maintain high quality of the infrastructure offered to experimenters.

17 Universidad de Cantabria

All the enhancements introduced in SmartSantander testbed during Fed4FIRE+ will ease the interactions with the different stakeholders, whether it be industrial partners, scientific community, smart city managers or research projects. Lower the access barriers to an infrastructure such as SmartSantander will empower knowledge transfer towards local, national and international industrial partners, and at the same time will speed up their experiments in the smart city field.

All the extensions and enhancements included deployed during Fed4FIRE+ on SmartSantander testbed will also be used and promoted in future EU Projects. In addition, the work carried out

in Fed4FIRE+ will also be used to support local academic teaching and research in the fields of testbed federation and smart cities.

Finally, University of Cantabria pursue increasing the scientific production of the institution with novel scientific papers, posters and conferences as result of the works carried out in the project.

18 Universidad de Malaga

UMA is making public its testbed in the scientific and industrial community in several ways. UMA has participated in all the Fed4Fire+ Engineering Conferences to advice potential users on the features of the testbed. During the first FEC in Ghent UMA presents the tutorial ""Hands-on tutorial on the PerformLTE testbed about LTE experimentation". The features and visibility of the testbed have been increased thanks to the participation of UMA in further projects like TRIANGLE, Q4HEALTH, EuWireles and 5Genesis. In particular, as far as UMA testbed is being extended with resources from TRIANGLE Project, the papers, webs and other dissemination material in TRIANGLE are a powerful method to reach potential open callers in the context of Fed4FIRE+.

19 University of Amsterdam

The OpenLab infrastructure that UvA makes available in the Fed4FIRE+ project is continuously evolving to support novel Future Internet experimentation. The interest in this type of infrastructure is significant as well as within the Netherlands, thanks to many national projects, as well as in the European context thorough the participation in data driven H2020 projects.

Future efforts for exploitation of the testbed will lie primarily in the area of secure data sharing, with the infrastructure providing programmable devices that are easily embedded in scientific and industrial usecases.

20 Institut Jozef Stefan

Evolution of the LOG-a-TEC (http://log-a-tec.eu/) testbed to version 3 enables to perform trials with several technologies: LoRa, Sigfox, IEEE 802.15.4a, TVWS, clean slate non-IEEE 802.15.4, IEEE 802.15.4. The technology is (can be) used for advanced spectrum sensing, localization, LoS/nLoS classification, link quality classification and prediction, in MTC type heterogeneous networks. Exploitation of results is foreseen as follows: (i) research results will be published in top international journals and conferences (IEEE, ACM), such as GLOBECOM, INFOCOM, and. (ii) developed soft- and hardware will be used in teaching (laboratory).

JSI's facilities and developed components in other EU projects are open for the public. This will benefit the public at large, specifically small companies and enterprises in need of experimentation capabilities and developed components, which will be simplify the buildup of their products**.**

21 Trinity College Dublin

The FED4FIRE+ objectives are well aligned with the research vision at TCD, where significant focus is given to resource sharing and slicing, network and radio virtualization, task automation, experiment reproducibility, orchestration, and control in future networks. Our work in FED4FIRE+ advances this research vision by helping our users validate new theories and technologies across

real experiment environments, supported by easy to use tools such as jFed Experimenter, high testbed availability, and continuous equipment and technology upgrade and improvement. Additionally, FED4FIRE+ contributes to the development of relationships with existing and with new research partners, both in academia and in industry, supported by the open call process and the project openness philosophy, which is having a direct impact on the research activities at TCD. The results of these cooperative research efforts, together with the dissemination material produced in FED4FIRE+, will contribute to TCD's excellent reputation as a world class research institution. Furthermore, FED4FIRE+ contributes to TCD's experience in EC funded projects, building on the expertise gained in consortia such as 5GINFIRE, CREW, WiSHFUL, FORGE, eWINE, ORCA, FUTEBOL, and Fed4FIRE. Finally, TCD leads the CONNECT Centre on Future Networks, a research centre co-funded by the Science Foundation Ireland and by industry. The FED4FIRE+ framework enables these partners to easily explore the exploitation potential of intellectual property developed across 5G networks.

Supporting Open Call Partners

The FED4FIRE+ infrastructure is instrumental in supporting the following open call partners from industry and academia experiment on the Iris testbed at Trinity College Dublin over the last 18 months.

- ⟳ WiSHFUL
  - o TRAINER: Towards aRtificAl Intelligence-based NEtwoRk optimisation
    Submitted by: Universitat Politecnica de Catalunya
  - o LSARadar: Experimental validation of a fully automated LSA system in the 3.5GHz radar band with spectrum sensing
    Submitted by: Red Technologies, France.
  - o WISE: WIshful Srslte Extension
    Submitted by: Software Radio Systems Ltd., Ireland

- ⟳ ORCA
  - o **FINS** – Federating Interface for Network Slicing
    Submitted by: FBK CREATE-NET (Italy)
  - o FastFlow5G:Instantaneous end-to-end flow latency optimization in a cellular 4G/5G based network
    Submitted by: Universidade de Vigo (Spain)
  - o ACROSS: Autonomic CRoss layer prOtocol stack for SDR Systems
    Submitted by: ICCS – Institute of Communications and Computer Systems (Greece)
  - o CLUE: Coexistence of LTE-Unlicensed & Wi-Fi
    Submitted by: EIGHT BELLS LTD (Cyprus)
    E2EWebRTC: Proof of Concept of an 5G End to End Computationally Intelligent WebRTC service leveraging ORCA's combined SDR/SDN approach
    Submitted by: Modio Computing (Greece)

- ⟳ Futebol
  - o AAHCCaVI: Adaptation Aware Hybrid Client-Cache; a smart pre-fetching scheme for DASH for Regular Videos and Immersive Contents
    Submitted by University of Missouri-Kansas City, USA
  - o Testing Adaptive Scaling for Evolved Packet Core in the FUTEBOL Research Infrastructure
    Submitted by Universidad del Cauca, Colombia

⟳ Fed4FIRE+

    o   CLONE: CLOudlet information centric Networking Experiments
            Submitted by: Tara Hill National Park Teo, Ireland

22 Nordunet A/s

No activities in the reporting period.

4 PLAN OF ACTIVITIES: M19-M36 (JULY 2018 – DECEMBER 2019)

4.1 ENGAGEMENT ACTIVITIES

Besides the channels listed below through which the community addressed by Fed4FIRE+ will be further engaged in its activities and Open Calls, we intend to increase the effort on this engagement by using in a more extensive way the material which has been collected from the experiments in the Open Calls.

Each experiment is required, at the end of its duration, the produce a technical report as well as a poster, presentation and demo at the occasion of the next FEC event. At that occasion most of the experiments are also interviewed. Up to this moment these testimonials and publication material available from the successful experiments have not been used extensively to promote the Open Calls and Fed4FIRE+ facilities and the project as a whole.

The list of interviewed experiments is provided in section 3.3 of this deliverable. And an example of a poster presentation by the PiAS experiment is given below as illustration.
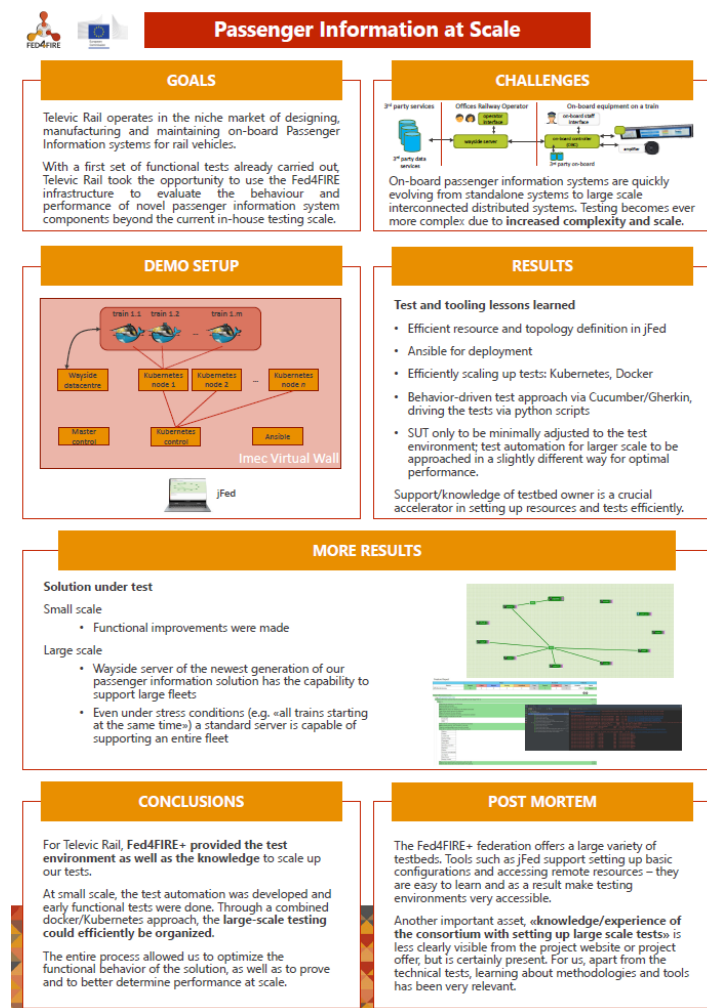

Figure 14: Poster presentation by the PiAS experiment

It is the clear intention for the upcoming period to increase this effort and specifically use this material in the different channels available to the project: website, newsletters, Twitter channel, participation at events, exhibition booths,…

4.2 WORKSHOPS & CONFERENCES

Participation in workshops and conferences is envisaged and will focus on three main activity streams to effectively promote the project's outcomes:

➲ **Engagement Events:** dedicated and active participation in conferences and workshops co-located with major events as a means to engage new Future Internet players, SMEs/Startups, and FIRE infrastructures providers into theFed4FIRE+ federated platform, such as NGI Forum, Net Futures, etc.

Table 9: Engagement Events

Event Name	Date, Place	Type of Audience	Website	Leading Partner
ICT Wien	Wien, Austria, December 2018	Industry, Startups, SMEs, Academia	https://ec.europa.eu/digital-single-market/events/cf/ict2018/programme.cfm?id=408	IMEC
EuCNC 2019	Valencia, España June 2019	Industry, SMEs, Academia	https://www.eucnc.eu	IMEC
NGI Forum	September 2019	Industry, Startups, SMEs, Academia, Policy makers	https://ngiforum.eu	IMEC MARTEL
Supercomputing18 conference	Dallas, USA November 2018	Industry, Academia	https://sc18.supercomputing.org	PSNC
Sigcomm 2018	Budapest, Hungary August 2018	Industry, Academia	http://conferences.sigcomm.org/sigcomm/2018/	SU
INFOCOM2019	Paris, France April 2019	Industry, Academia	http://infocom2019.ieee-infocom.org	SU
INDIS2018	Dallas, USA November 2018	Industry, Academia	https://scinet.supercomputing.org/	UoA

➲ **Engineering Conferences:** these events serve as a forum at which experiments will showcase their results and provide feedback to Fed4FIRE+. It will serve as a basis to strengthen the community through which experimenters and facility providers interact and exchange information and experience.

Table 10: Fed4FIRE+ Engineering Conferences

Event Name	Date, Place	Type of Audience	Approx size of audience	Leading Partner
4th FEC	October 2018 Brugge, Belgium	Experimenters, facilities providers, Fed4FIRE+ partners	130	IMEC
5th FEC	March/April 2019 TBD	Experimenters, facilities providers, Fed4FIRE+ partners	140	IMEC
6th FEC	October 2019 TBD	Experimenters, facilities providers, Fed4FIRE+ partners	150	IMEC

➲ **Summer Schools**: will be carried out through tutorials to set up and run experiments which will take place in the Engineering Conferences**.**

4.2 PRESENTATIONS OR TALKS

The table below presents an initial list of third party events planned by Fed4FIRE+ to run during M19- M36 (July 2018- December 2019) of the project.

Table 11: List of relevant conferences and events for scientific dissemination

Event Name	Place, Date	Type of Audience	Website	Presentation	Leading Partner
EUCNC 2018	Ljubiana, Slovenia 18-21 June 2018	Industry, Academia	https://www.eucnc.eu	Conference Paper	IJS

4.3 OPEN CALLS

Fed4FIRE+ provides funding for third parties through the cascade funding by means of the Open Calls, mechanism. The following Open Calls are either already published or are planned.

Table 12: List of the Open Calls

Call	Title	Deadline	Status
F4Fp-04-M	**4th Fed4FIRE+ Competitive Call – Innovative Experiments** Category "Medium Experiments" with focus on IoT & 5G	18 Sept 2018	**OPEN**
F4Fp-05-M	**5th Fed4FIRE+ Competitive Call – Innovative Experiments** Category "Medium Experiments"	Feb 2019	PLANNED
F4Fp-05-L	**5th Fed4FIRE+ Competitive Call – Innovative Experiments** Category "Large Experiments"	Feb 2019	PLANNED
F4Fp-06-M	**6th Fed4FIRE+ Competitive Call – Innovative Experiments** Category "Medium Experiments"	Sept 2019	PLANNED
SME	Fast response	Continuous with 2-weekly cut-off dates	PLANNED

4.5 SYNERGIES WITH RELATED PROJECTS AND INITIATIVES

When the Fed4FIRE+ project started it was one of the last FIRE – Future Internet Research and Experimentation projects starting under the ICT-13-2016 call. The FIRE initiative has been an important initiative financed by the European Commission to promote and support experimentally-driven research to develop the Internet of the future. Beside the Fed4FIRE+ project there are several other FIRE projects still on-going thus extending and bringing FIRE concepts, methods and technologies in several related R&D fields such as 5G, IoT, Smart Cities, etc.

Although the FIRE initiative as such has finished (projects still ongoing), experimentation-driven research and innovation continues to play a prominent role to build new initiatives such as the Next Generation Internet - NGI. Specifically, to investigate and experimentally validate highly innovative and revolutionary ideas for next generation internet, networking and service paradigms - at a lower cost and in a more rapid way - is central to the overall ambition of the NGI initiative. In this respect, a number of FIRE efforts are needed to push forward to continue serving growing NGI community of future Internet researchers, developers and innovators all across Europe.

Via Next Generation Internet initiative and its Research and Innovation Actions (RIAs) target stakeholders, namely SME's and Startups, Fed4FIRE+ will get access to an "extended" stakeholder base. This is because just started RIA projects in the NGI may not be able to offer any test platforms for SMEs/Startups. In this contest, the Fed4FIRE+ project has an opportunity to offer testbeds for innovative SMEs/Startups which would be able to submit their proposals for the NGI Open Calls (cascaded funding) with testing included.

In practice Fed4FIRE+ will attend the Next Generation Internet organized events and workshops beside already planned "conventional" events/workshops to promote in priority order:

1) Best practices and success stories from SME experimenters, and
2) Federated testbeds and services.

The first dissemination step has already been taken on the NGI.eu website where the link to the Fed4FIRE+ continuous Open Call is made visible (figure 14).

To further maximize the cooperation with NGI and their target stakeholders Fed4FIRE+ will use the NGI Map where Fed4FIRE+ partners offering testbeds will be visible. The NGI Online Map offers an infographic type of view of the NGI community across all Members States and Associated Countries. Mapping of relevant NGI and related initiatives, organisations, companies, including testbed owners, will foster cooperation, increase their visibility, and create business opportunities among all key players[1].

Figure 15 The Fed4FIRE+ Open Call web-link on the NGI.eu website

Fed4FIRE+ will continue the liaison with the international initiatives as indicated in section 3.8 and support the dissemination and communication efforts and reach the widest audience possible on:

➲ **FP7 FIRE and H2020 projects**
➲ **Global Collaboration Initiatives**
➲ **EC Initiatives, especially the NGI**

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[1] https://map.ngi.eu/

4.6 CONTRIBUTION TO OPEN SOURCE INITIATIVES AND STANDARDS

With respect to contributions to standards and open source initiatives, the project, during this first reporting period, has mainly been working on identifying topics on testbed federation and interoperability. The standardisation landscape calls for fostering interoperability between the different layers of the IoT domain incorporated within Smart Cities systems. As such this need for interoperability maybe extrapolated to upcoming interconnected testbeds which could in the future serve as the foundation for the expanding smart and sustainable urban realm. In this context, initial work has been focused mainly on identifying potential interactions with "ITU-T SG13 Study Group 13 – Future networks" due to its focus on IMT-2020, cloud computing and trusted network infrastructure is leading the global standardisation work on next-generation networks. Meanwhile, contributions to the standardisation work performed by ITU-T Study Group 20 on IoT and Smart Cities and Communities have been planned.

With respect to data portability, in line with the General Data Protection Regulation (GDPR), the initial set of efforts towards ensuring the adaptation of Fed4FIRE+ testbeds to GDPR, a network of data protection officers (DPO) from all the testbeds was introduced. As part of their monthly meeting with the project DPO (MI), this network has enabled a harmonised approach to GDPR compliance through technical processes aimed to facilitate policy agreement by the end-user while respecting the needs and contextual elements of the testbeds. As part of the expected contributions to the standardisation landscape, future meetings of the network will be focused on identifying potential issues that could be resolved by enhancing data portability among testbeds, as well as defining the most relevant means (including standards, protocols and processes) to implement this right. Once this takes place, the project will seek to provide inputs or feedback to relevant standard bodies and data protection authorities, as necessary to contribute to the definition of standards which meet GDPR requirements.

Within the ITU-T Study Group 20 on IoT and Smart Cities and Communities, there is an ongoing work item on Open API in smart cities. This draft Recommendation is being developed under Question 6/20 on Security, privacy, trust and identification for IoT and SC&C highlights the concept and potential of developing a secured open and interoperable API in the context of IoT deployment testbeds and open data management in smart cities. In the context of this draft Recommendation, it will be beneficial to include core inputs from Fed4Fire,which helps highlight real-life and successful interoperable API schemes and architectural frameworks from a leading European-level project for dissemination through an international standard at the International Telecommunication Union.

5 IMPACT ASSESSMENT

5.1 QUANTITATIVE INDICATORS

Table 13: Communication KPIs

Measure	Indicators	Target Number	Measured in Jun 2018
Brochure	Cumulative number of brochures (also updated) distributed	>3,500 (700 per year)	1050 in total (general, FECs)
Project Website	Number of unique visitors to the website (average per year)	>1,000	4,980
Social Networks	Number of followers in social media	>100	239
Newsletter	Number of subscribers (by the end of the project)	> 500	204
Publications	# of relevant publications to conferences and journals*	5 per year	>5
Engineering Conferences	Number of events**	2 per year	3

* All publications are based on experiments and necessarily may not be included in this figure. That is why >5 is indicated for known publications.
** Three FECs during the reporting period.

The following table summarises the KPIs and the achievement reached so far by June 2018 (M18).

Table 14: Dissemination and Communication KPIs

Measurable output	KPI	Target Number /year	Measured in Jun 2018
# of experiments / year	# of experiments registered with Fed4FIRE+*	15	37
	# of industry-driven experiments/year*	10	32
# of testbeds/ year	# of testbeds added to federation*	3	7
Heterogeneity of testbeds (cumulative)	Total cumulative number of application domains covered by the federation**	6	>10
Number of publications / year	# of relevant publications to conferences and journals, per year***	5	>5
Participation in major events	# of major events and conferences with Fed4FIRE+ attendance, presentations and/or booths****	4	>15

* Experiments/testbeds through the Open Calls during the reporting period.
** Based on application areas covered by experiments from Open Calls: e.g. agriculture, medical, learning, data centers, media, automotive, robotics, etc.
*** All publications are based on experiments and necessarily may not be included in this figure. That is why >5 is indicated for known publications.
**** All partners attended events may not be included in this figure. That is why >15 is indicated for known events participated.

5.2 PLANNED DELIVERABLES

The table 15 here below lists the Fed4FIRE+ Communication & Dissemination deliverables:

Table 15: WP6 Deliverables

Del. No.	Deliverable name	WP No.	Lead part.	Diss. Level	Del. date	Status
D6.04	Fed4FIRE+ Dissemination and Communication Report and Updated Plan	WP6	Martel	PU	M36	planned

6 CONCLUSIONS AND NEXT STEPS

This document presents the Fed4FIRE+ dissemination and promotion activities and plan and describes a number of key activities that the project's partners are focusing on, in order to guarantee broad visibility of the project's work and results in the FIRE+ domain and beyond and to engage target stakeholders and produce a relevant and durable impact.

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