Grant Agreement No.: 732638
Call: H2020-ICT-2016-2017

Topic: ICT-13-2016
Type of action: RIA

D5.2: Second report on implementation of the Open Calls

Work package	WP 5
Task	5.1, 5.2, 5.3
Due date	31/12/2019
Submission date	31/12/2019
Deliverable lead	Eurescom
Version	1.0
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Co-funded by the Horizon 2020
Framework Programme of the European Union

Abstract	This deliverable summarizes activities of the Fed4FIRE+ projects and its Work Package 5 (WP5) related to implementation of the competitive Open Calls during the period July 2018 – December 2019. In order to implement the planned Open Calls, the Fed4FIRE+ project established all necessary processes for their implementation; call definition, promotion, templates, submission, and evaluation. During the period, the Fed4FIRE+ project organized four competitive Open Calls for innovative experiments mand a continuous Open Call for SMEs.
Keywords	Open Calls, Submission and Evaluation process, 3rd parties interaction

Document Revision History

Version	Date	Description of change	List of contributor(s)
V0.1	18/11/2019	First draft version	Halid Hrasnica (Eurescom)
V0.2	18/12/2019	Update on SME-OC, OC-7, and corresponding conclusions / introduction	Halid Hrasnica (Eurescom)
V1.0	07/01/2020	Final version	Peter Van Daele (imec)

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ACKNOWLEDGMENT

Co-funded by the European Union

Co-funded by the Swiss Confederation

Co-funded by the Horizon 2020
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This deliverable has been written in the context of a Horizon 2020 European research project, which is co-funded by the European Commission and the Swiss State Secretariat for Education, Research and Innovation. The opinions expressed and arguments employed do not engage the supporting parties.

Project co-funded by the European Commission in the H2020 Programme		
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.

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EXECUTIVE SUMMARY

This deliverable summarizes activities of the Fed4FIRE+ projects and its Work Package 5 (WP5) related to implementation of the competitive Open Calls (OCs) during the period July 2018 – December 2019. The overall WP5 goal is to prepare and implement the Open Calls and to establish and follow-up formal agreements and reporting with the successful third parties – accepted after the Open Call evaluations.

Following recommendations from the 1st Periodic Review, the individual reports from the experiments are available but not attached to this document in view of the size of these reports. Actions taken by the testbeds on recommendations / comments made by the experiments are listed in section 5 of this report.

The main purposes of the performed Fed4FIRE+ Open Calls are to enable external experiments using Fed4FIRE+ facilities and gather feedback from experimenters on usage of the Fed4FIRE+ facilities and achieve concrete results from the performed experimentation. The Open Calls are organized for various types of experiments: Extra small, Small, Medium, and Large. In addition, a continuous Open Calls, having submission deadlines every second week, was dedicated to SME experimenters.

In order to implement the planned Open Calls, the Fed4FIRE+ project established all necessary processes for their implementation; call definition, promotion, templates, submission, and evaluation. By applying the Open Call process, the Fed4FIRE+ project organized all together six competitive Open Calls for innovative experiments and the continuous Open Call for SMEs as well as launched the 7th Open Call. The open calls 1-3 has been summarized in the Fred4FIRE+ deliverable D5.1, covering the project period January 2017 – June 2018. In this deliverable, we present results of the open calls 4-6 and the continuous Open Call (status until December 2019) as well as the 7th Open Call definition:

- ➲ 4th OC – 33 proposals received, five accepted, success ratio of 15%
- ➲ 5th OC – Medium experiments: eight proposals received, five accepted (success ratio 62%), Large experiments: four proposals, two accepted (50% success)
- ➲ 6th OC – 25 proposals received, five proposals accepted, success ratio of 20%.
- ➲ 7th OC has been announced – submission deadline on 25 February 2020

Altogether, 70 proposals have been received through the standard 4th, 5th, and 6th Open Calls and 17 of them were accepted. Figure 1 presents number of submitted (left) and accepted (right) proposals from different proposers' categories. Thus, the corresponding average overall acceptance of the proposals in the three Open Calls rate is 24%, where proposers from Industry and SMEs achieved better results than the proposers from Academia and Research institutions.
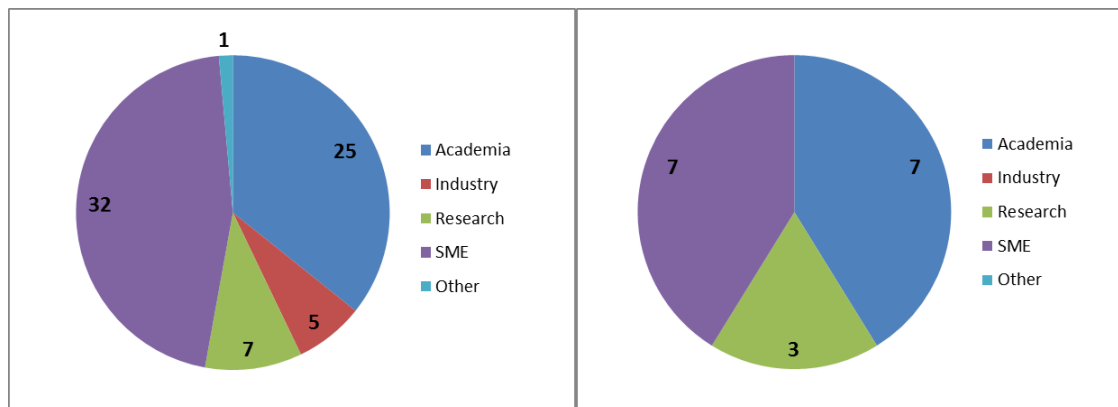

Figure 1: Total number of received (left) / accepted (right) proposals per category – standard OC

Around the start of this reporting period, the project also started with the implementation of the continuous Open call for SMEs. This Continuous Open Call for SMEs has submission cut-off dates every two weeks, with some "blank" periods during holidays. In total 23 cut-off-dates for submission of the proposals to the Continuous Open Call for SMEs (Stage 1) have been offered to the community, resulting with 25 received proposals, whereas 21 of them have been accepted – success ratio of 84% (Figure 2).
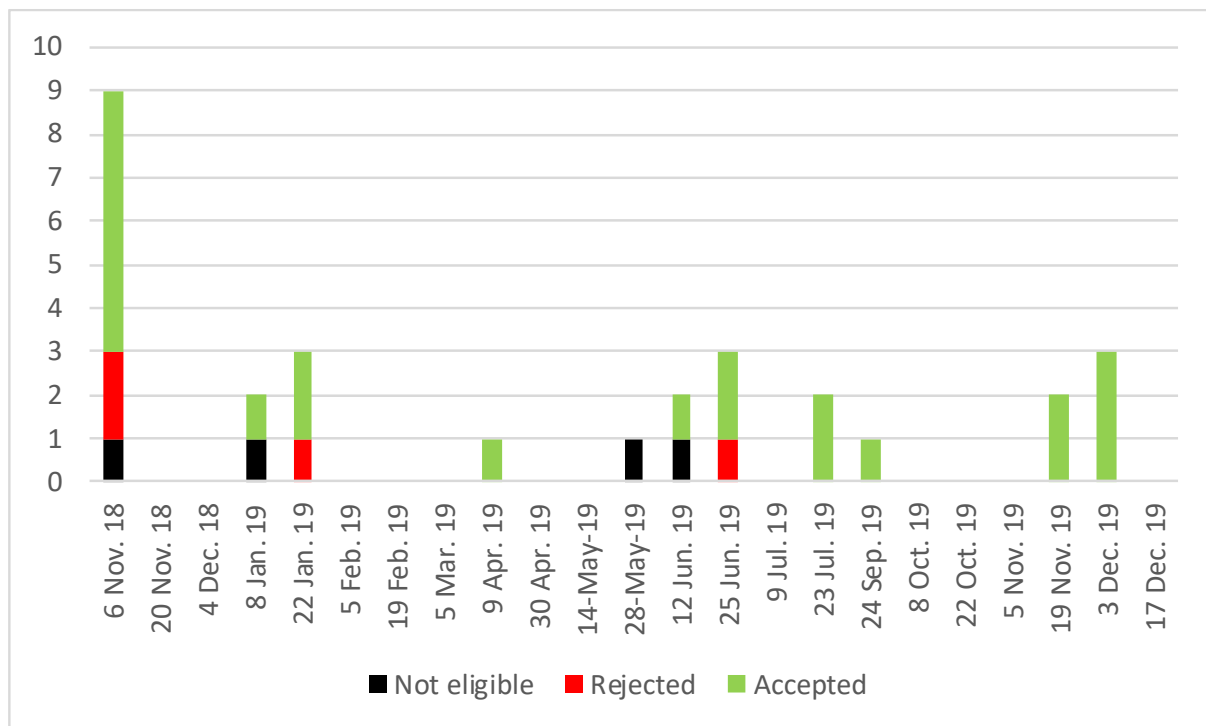

Figure 2: Total number of accepted (green), rejected (red) and non-eligible (black) proposals received on the cut-off dates of the continuous SME Open Call

Experiments which have successfully completed this Stage 1 of the continuous Open Call for SME's are allowed to submit a proposal for a Stage 2 experiment (equal to an M-sized experiment of the standard Open calls), and this submission process runs in parallel with the standard Open Calls. Up to now, 8 Stage 2 proposals have been received and 7 have been accepted.

The geographical spread of the submitted proposals (Figure 3) and of the accepted experimenters (Figure 4) is shown below. From this graph, it is clear that submissions of proposals (and consequently also the accepted experiments) are concentrated in the countries covered by the Fed4FIRE+ project partners, but clearly also new players from new countries are appearing, as was also the case in Fed4FIRE. The current geographical spread of the proposals received is larger than was the case in Fed4FIRE and in the previous PPR1 covering only the first 3 Open Calls.
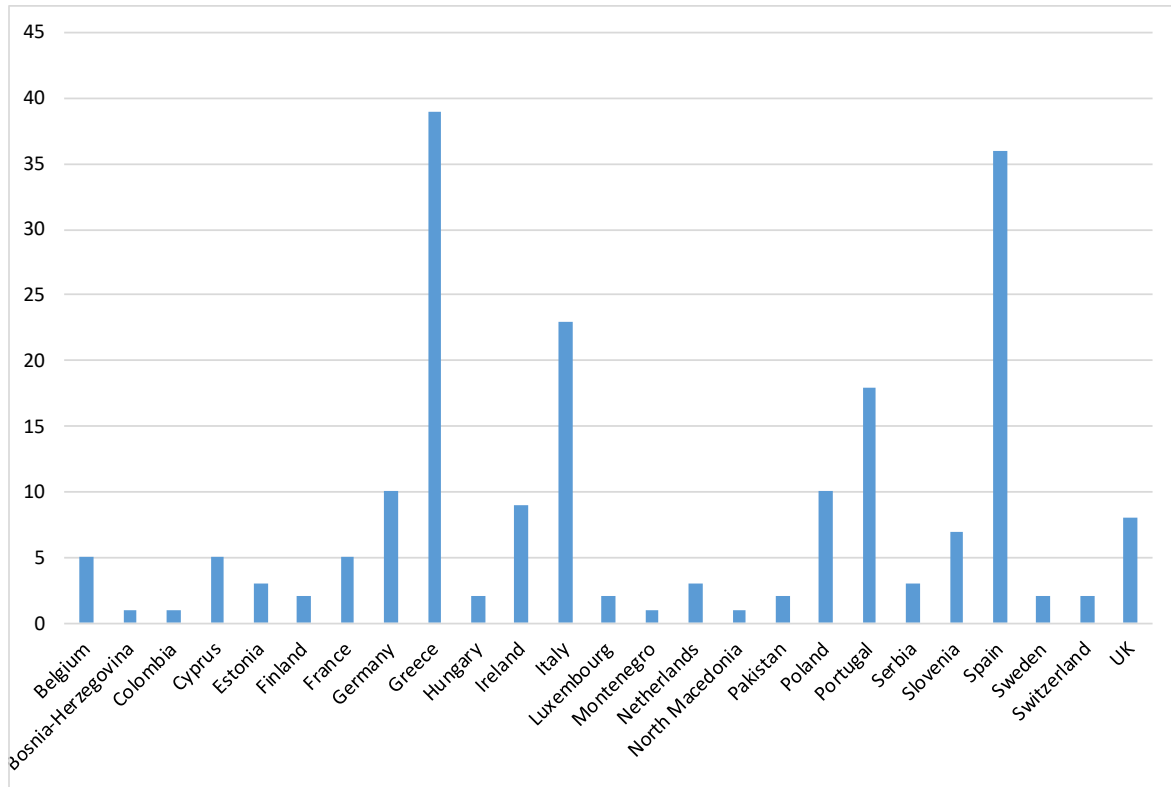
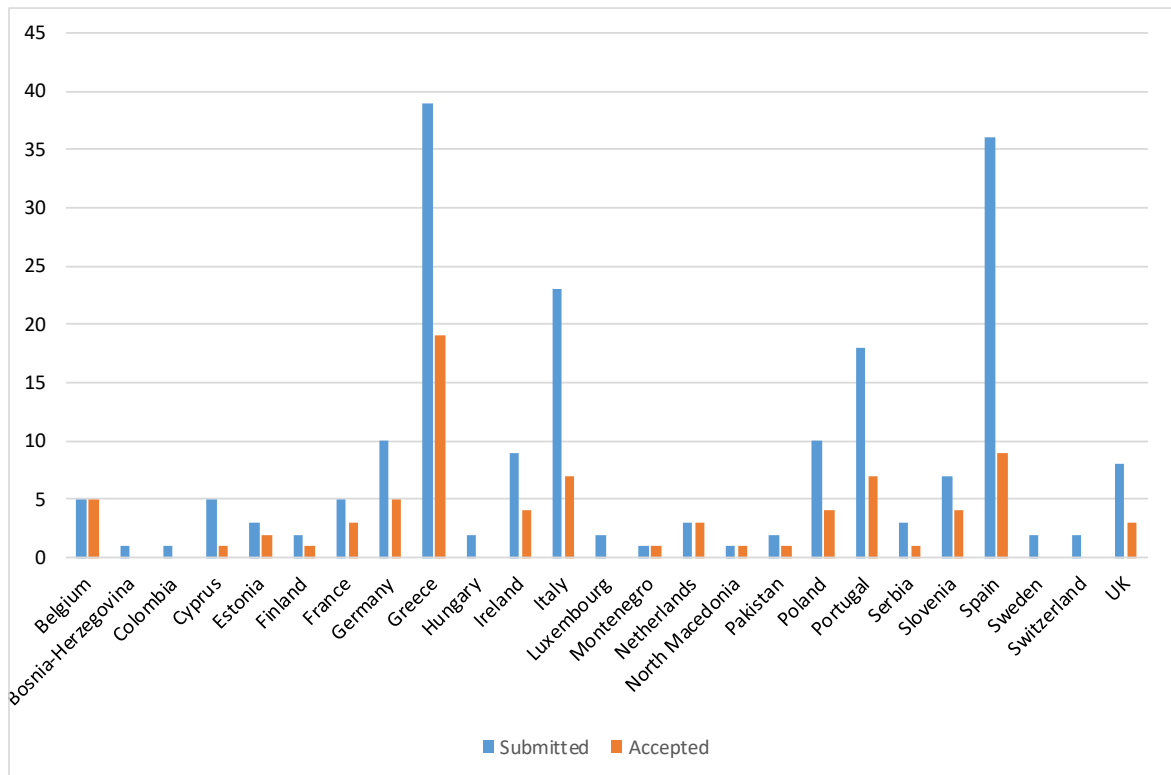*Figure 3: Geographical spreading of proposals submitted to Fed4FIRE+ Open Calls*

Figure 4: Geographical spreading of the accepted Fed4FIRE+ proposals

Open Call 6

■ Previously accepted
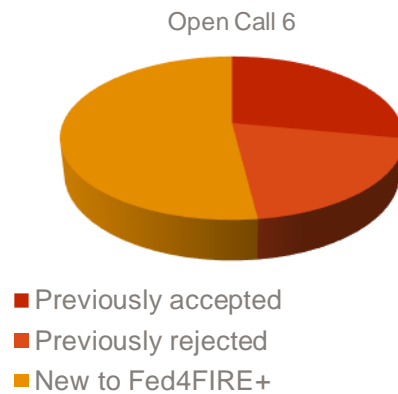■ Previously rejected
■ New to Fed4FIRE+

Figure 5: Distribution between new experimenters and returning experimenters.

If we just look into one specific call (e.g. OC-6), the graph above (Figure 5) shows that about half of the experimenters are new to Fed4FIRE+. This does not imply they are completely new to the H2020 or NGI domain, but gradually the number of parties working with the testbeds is growing and spreading.

Fed4FIRE+ is a federation of testbeds and Figure 6 shows the use of each of the testbeds in the Open Calls. It is clear that after these 6 Open Calls, nearly all testbeds have already been involved in one or more experiments. This is clearly a sign that the Federation as such, also from the point of view of heterogeneity is fulfilling a need.
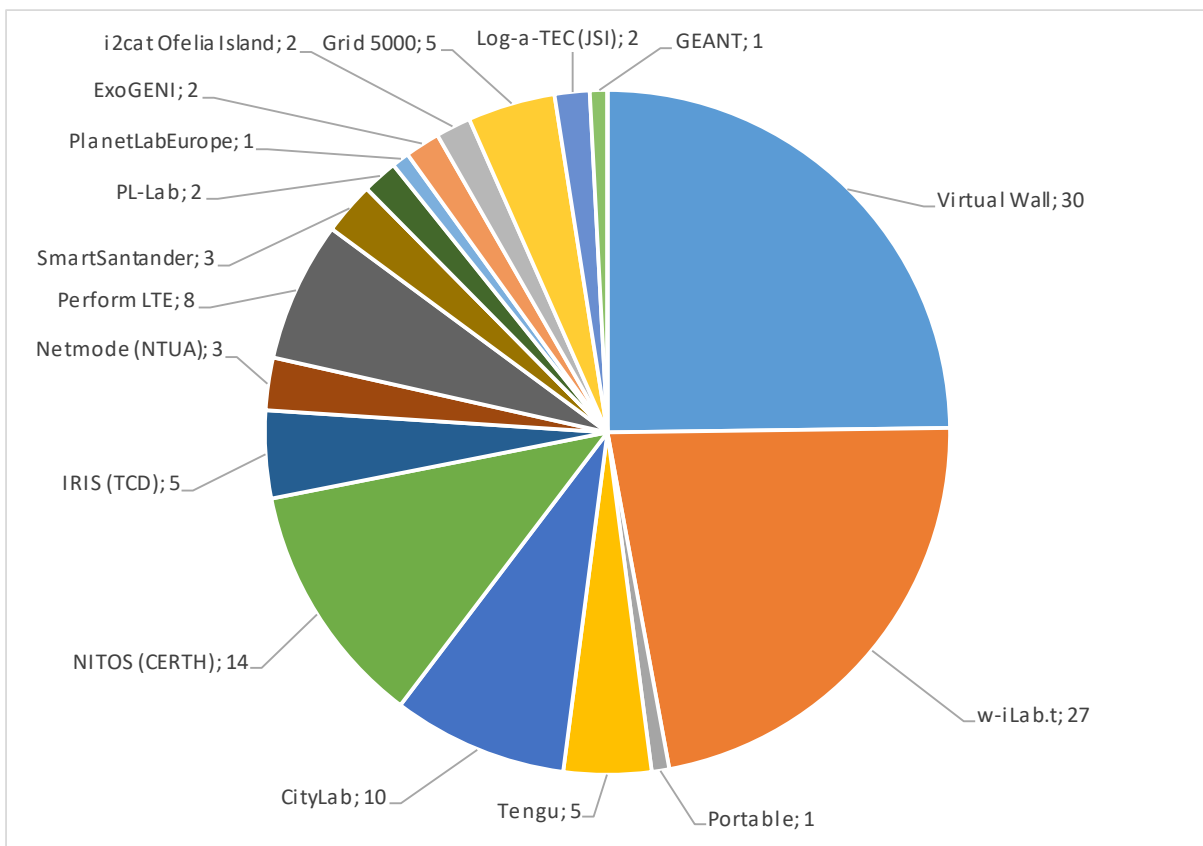

Figure 6: Number of Experiments from Open Calls running or completed on Fed4FIRE+ Testbeds

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1   INTRODUCTION

The previous version of this deliverable, D5.01 was made up of 3 major parts:

- ⮕ Section 1: the process of setting up & running the Open calls
- ⮕ Section 2: the feedback on how the experimenters felt their participation
- ⮕ Section 3: the feedback on how the testbeds felt the impact of the experiments

This 2nd version only covers the update of Section 1 above, as the other information on feedback from experimenters and from testbeds is covered by other deliverables (Deliverable D2.10 End-User Validation) and this information is not duplicated here.

Consequently, this deliverable, like described in the DoW, purely summarizes activities of the Fed4FIRE+ projects and its Work Package 5 (WP5) related to implementation of the competitive Open Calls during the period July 2017 – December 2019.

The main purposes of the competitive Fed4FIRE+ Open Calls are:

- ⮕ To enable external experiments using Fed4FIRE+ facilities.
- ⮕ To gather feedback from experimenters and concrete results.
- ⮕ To include new experimental infrastructures in Fed4FIRE+.

Accordingly, the overall WP5 goal is to prepare and implement the Open Calls and to establish and follow-up formal agreements and reporting with the successful third parties – accepted after the Open Call evaluations.

The Open Calls are organized for various types of experiments. The original scheme as presented in the proposal was tentative and was to be subject to changes during the course of the project following suggestions from the experimenters, the members of the consortium as well as other stakeholders.

2 IMPLEMENTATION OF THE OPEN CALLS

2.1 DEFINITION OF OPEN CALLS

The technical scope of the Open Calls – applying to all Fed4FIRE+ Open Calls – has been defined through collaboration with other Work Packages (WPs) and with the members of the project consortium, in particular WP2 and WP4. This consultation is carried out to identify the most relevant topics for each of the Open Calls. Outcomes of these discussions have been used to define each of the Open Calls in details.

Furthermore, formal requirements and eligibility criteria have been defined for the Open Calls along the following principles:

- ➲ Proposals will only be accepted from a single party eligible for participation in EC H2020-projects.
- ➲ Proposers must originate from parties or organisations that are not already part of the Fed4FIRE+ project consortium.
- ➲ Proposers can submit multiple experiment proposals, but only one experiment per proposer will be selected for funding in per Call.
- ➲ Proposers who have submitted proposals in previous calls of the Fed4FIRE+ - project are allowed to re-submit.
- ➲ Note, for some calls there are specific requirements on possible resubmissions and participation in different stages of the Open Calls, as is presented in Chapter 3.
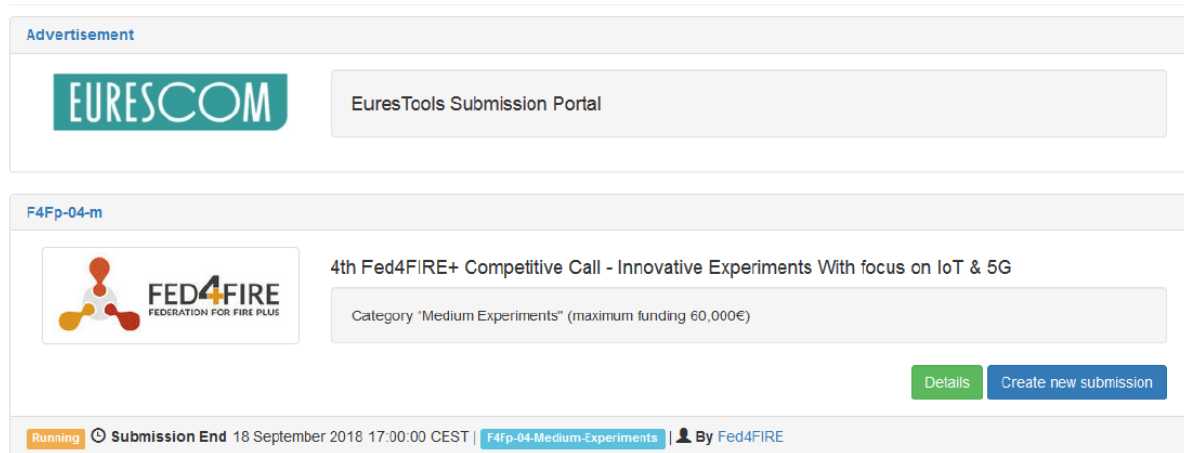
For each of the calls, a full definition of the Open Call has been created and published within the corresponding public Open Call information (e.g. project website). Short versions of the Open Calls definitions are also provided in short versions, as is presented in Sec. 3 for all completed and ongoing Fed4FIRE+ Open Calls within the reporting period.

To support the potential proposers and make the proposal phase as efficient as possible, for both proposers and evaluators, proposal templates have been created for each of the calls, as already reported in the deliverable D5.1, and published on the Open Call web page within the project website.

2.2 SUBMISSION PHASE

In order to receive proposals for the Open Calls, Eurescom established and maintained a submission tool (Figure 7), enabling updates of the submitted proposals until a set deadline, collecting all necessary information from the proposers (proposal title and short names, contact persons, organizations, countries, etc.), and allowing a proper documentation on all relevant proposal and submission processes.

Figure 7 - Fed4FIRE submission portal – now available for the 4th Open Call

Another important activity during the submission phase, starting immediately after an Open Call has been published, is a wide promotion of the Open Calls through various channels. For this purpose, the short definitions of the calls are used to create corresponding promotional messages (e-mail information, web and twitter posts, presentation slides), which are then disseminated in the scope of Fed4FIRE+ WP6 activities (International Collaboration, Outreach & Dissemination).

During the submission phase, it is necessary to ensure permanent support to the proposers and answer questions on the Open Call objectifies, formal requirements, submission issues etc. Furthermore, the proposers have to perform a so-called feasibility check before submitting the proposal to find out if the proposed approach is compatible with the testbeds envisaged, they. This brings them in contact with the Patron and Fed4FIRE+ partners which will support them if the experiment is accepted. Therefore, the support process also involves all Fed4FIRE testbeds, which are able to answer corresponding questions and confirm feasibility of the proposals.

The support for the experimenters is ensured by interaction through the Fed4FIRE+ contact e-mail address (contact@fed4fire.eu) where all relevant project representatives are included as recipients) and by providing and updating FAQ entries on the project website.

2.3   EVALUATIONS

Definitions of the Open Calls also include clear criteria for evaluation and ranking of the proposals in accordance with the specific objectives of the calls. To ensure that the criteria are properly followed up by the independent experts / evaluators, corresponding evaluation forms are defined, as reported in the deliverable D5.1.

To perform the evaluations of the received proposals by independent evaluators, Fed4FIRE+ uses a group of 50 recognized experts in the area of future internet experimentation. For each of the Open Calls, a number of needed experts is selected for evaluations in accordance with the best possible match of their expertise to the scopes of the received proposals. A rule implemented by the project also ensures that as many different experts as possible are involved in the evaluation process along the Fed4FIRE+ Open Calls, avoiding to relay on the same evaluators all the time. Care is also taken to avoid any possible conflict of interest and the project also avoids appointing evaluators for experiments originating from the same country.

After an Open Call deadline, the proposals are evaluated remotely by the independent experts, by using the individual evaluation form mentioned above and in accordance with the following criteria, which have been updated in accordance with recognized needs as follows:

- Industrial and/or scientific innovation & motivation (Threshold 3/5; Weight 2).
- Industrial / scientific relevance (Threshold 3/5; Weight 2).
- Clarity and methodology (Threshold 3/5; Weight 1).
- Use of Fed4FIRE+ facilities and tools (Threshold 3/5; Weight 1).
- Relevance for Fed4FIRE (Threshold 3/5; Weight 2).
- Possible future follow-up experiments (Threshold 3/5; Weight 1).
- Technological expertise and quality (Threshold 3/5; Weight 1).
- Preference is given to proposals originating from new players in the field (Threshold 3/5; Weight 1)
- Preference is given to proposals in the scope of the particular Open Call (No threshold; Weight 1).

Each criterion is scored on a scale from 0 to 5, as follows:

- 0 – The proposal fails to address the criterion under examination or cannot be judged due to missing or incomplete information.
- 1 – Poor. The criterion is addressed in an inadequate manner, or there are serious inherent weaknesses.
- 2 – Fair. While the proposal broadly addresses the criterion, there are significant weaknesses.
- 3 – Good. The proposal addresses the criterion well, although improvements would be necessary.
- 4 – Very good. The proposal addresses the criterion very well, although certain improvements are still possible.
- 5 – Excellent. The proposal successfully addresses all relevant aspects of the criterion in question.

When scores of different experiment proposals are equal, any further prioritization will be based on other appropriate characteristics and/or specific call requirements,

If the scores for proposals set by experts during the remote evaluations are significantly distinguishing among individual evaluations per criteria and/or in total), consensus meetings (video calls) are organized for the affected proposals among the involved experts, to build up a common opinion and adapt the scores accordingly. If in some cases the consensus is not possible to achieve, additional independent experts are involved to make final decisions.

At the ends of the evaluation process, the proposals are ranked in accordance with total scores received and specific call objectives (if any), so that selection of successful proposals is done according to this list and available funding for the Open Calls.

Immediately after end of the evaluations, information about the Open Call outcome, including corresponding evaluation forms with scores and comments from the experts, is sent to the proposers.

2.4   INTERACTION WITH EXPERIMENTERS

Once the final selection of proposals is made, the notification of acceptance is accompanied with an invitation to complete and sign an "Experiment Agreement" between the experimenter and the project coordinator (in this case imec). This agreement (of which a copy was attached as Annex to Deliverable D5.01, and which has not been changed) is a standard document which is also available in the overall call information. The document defines responsibilities, access rights and IP-issues and also includes targeted starting and finalisation dates for the experiment as well as the maximum budget. The agreement refers to the proposal as a technical description of the work to be carried out.

The announcement of the acceptance of the proposals is timed in such a way that the accepted experimenters can attend, before the start of their experiment, one of the Fed4RFIRE+ Engineering Conferences (FECs) to get more acquainted with the testbeds, to learn from other users and to discuss practical and administrative issues.

During the course of the experiment, the project coordinator remains available to respond to any issue raised during the running of the experiment in addition to the support provided by the Patron. The project coordinator regularly checks the status of the experiments with both the experimenters as well as the Patrons.

At the end of the experiment, the 3rd party carrying out the experiment is requested to submit:

- ➲ A report using a template which allows to describe the technical results, but also collects information on the motivation for the experimenter to submit a proposal for an experiment to Fed4FIRE+ as well as feedback on the use of the testbeds and tools. The report also tries to collect feedback on the impact of the experiment and the Fed4FIRE+ - related work on the business and/or product development of the proposer.
- ➲ Based on a first check of the report by the coordinator and the Patron, the experimenter is asked to provide an invoice the project coordinator for 75% of the budget.
- ➲ At the occasion of the Fed4FIRE+_Engineering Conference (FEC) immediately following the end of the experiment, the proposer is requested to present its result and experiment for a formal review as well as to a wide public of peers (consortium partners as well as external participants and other experimenters) during a demo-fair.
- ➲ For this presentation, the experimenter is requested to provide a presentation, a poster and a flyer (using templates) to showcase the results and the impact on its business.
- ➲ After a successful formal review, the proposer is asked to invoice the project coordinator for the remaining 25% of the budget.
- ➲ At the occasion of the FEC, a video-interview is arranged with each of the experimenters to collect feedback and to build a collection of user-stories to be consulted by other interested parties.

3   IMPLEMENTED AND ONGOING OPEN CALLS

Since July 2017, four standard Fed4FIRE+ Open Calls (starting from OC-4, OC 1-3 were reported in the D5.1) and a continuous Open Call for SMEs have been organized, which are described below.

3.1   4TH OPEN CALL

3.1.1   Call definition

The 4th Fed4FIRE+ Open Call - Call identifier: F4Fp-04 targeted Innovative Experiments in categories "Medium Experiments". Submission deadline was on 18 September 2018.

Total available funding for this call was: 300,000€.

Maximum requested funding per experiment was set to 60,000€ (duration of max. 5 months).

The amounts mentioned above include the budget for the Fed4FIRE+ partner(s) acting as Patron for the experiment (max. 5,000€ per experiment/patron).

Formal requirements for participation / eligibility:

- ⮑ Proposals will only be accepted from a single party eligible for participation in the EC H2020-projects.
- ⮑ Proposers can be industry, SME or research/academic organisations.
- ⮑ Can only be selected for funding for one proposal (even if the proposer submitted multiple proposals that are ranked high enough to be selected for funding).

3.1.2   Call objectives

The major objective of this Open Call is to make the federated infrastructure directly available for execution of innovative experiments by experimenters at both industrial (including SMEs) and research organisations. These experiments should be of a duration as defined by the type of the call (Extra Small, Small, Medium or Large) and use one or more Fed4FIRE+ testbeds. Examples of such experiments may include but are not limited to testing of new protocols or algorithms, performance measurements, service experiments. It is required that these experimenters will come from parties or organisations that are not part of the Fed4FIRE+ project consortium.

In view of the targeted timeline and duration of the experiment, it should be clear that these Calls envisage experiments by which existing products or services are tested, implemented or optimized on the Fed4FIRE+ testbeds rather than proposing or developing new ideas from scratch. Examples of such experiments may include but are not limited to testing of new protocols or algorithms, performance measurements, service experiments.

The Fed4FIRE+ project is issuing this series of open and competitive calls for experiments with a degree of industrial and/or scientific innovation, relevance for the Fed4FIRE+ federation and an appropriate scale of complexity. Independent evaluations of the submitted proposals will be performed, in order to select experiments which will be executed within the project. It is required that the experiments are performed by a single organization.

This 4th Open Call targets one specific category for experiments:

➲ "Medium Experiments" with a maximum budget (including the financial support to the Fed4FIRE+ partner(s) acting as a Patron) of € 60 000 and a maximum duration of 5 months.

This 4th Open Call focusses on experiments in the area of IoT (Internet of Things) and 5G. Experiments targeting other areas, applications and/or technologies can also be submitted; however the focus of this call implies that experiments in the area of IoT and 5G will be favored during evaluation.

➲ The focus on IoT covers topics such as (non-exhaustive list): smart devices, smart buildings, smart cities, smart interfaces, sensors and monitoring devices and (wireless) IoT networks and protocols, IoT architectures, security, power consumption, battery life,..
➲ The focus on 5G covers topics such as (non-exhaustive list): networks, MIMO, Multi-Radio Access technologies, end-to-end performance, contextual awareness, intelligent data mining, (distributed) cloud, software-defined networking and network function virtualization. New applications and requirements

Benefits for an experimenter to propose experiments on the Fed4FIRE federation of testbeds:

➲ Possibility to perform experiments that break the boundaries of different testbeds or domains (wireless, 5G, wired, OpenFlow, cloud computing, smart cities, services, etc.).
➲ Easily to access all the required resources with a single account.
➲ Focus on your core task of experimentation, instead of on practical aspects such as learning to work with different tools for each testbed, requesting accounts on each testbed separately, etc.
➲ An extra benefit which is offered in this call is the dedicated support from specific Fed4FIRE members. Each proposer, preparing a proposal is required to seek a supporting Fed4FIRE consortium partner or partners (the "Patron") that will be in charge of dedicated (advanced) support of the experiment.

3.1.3 Call outcome

In this open call, 33 proposals have been received. After evaluation of the received proposals by independent experts, five experiment proposals have been accepted – success rate of 15%.

The Figure 8 below presents number of submissions received from different types of organizations as well as number of proposals accepted per type of organizations; Academia 12 proposals submitted – two accepted (17% success rate), Industry one submission, Research institutions three submissions, and SME 17 submissions – three accepted (18% success rate).
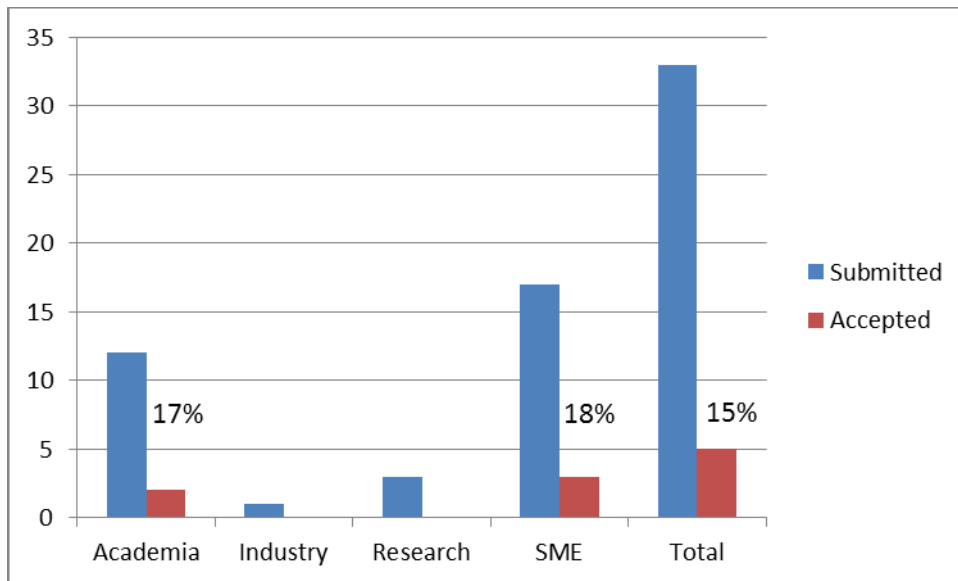
Figure 8: Outcome of the 4ᵗʰ Open Call per type of organizations

Number of submitted and accepted experiments per country of origin of the proposing organizations is presented in the Figure 9 below.
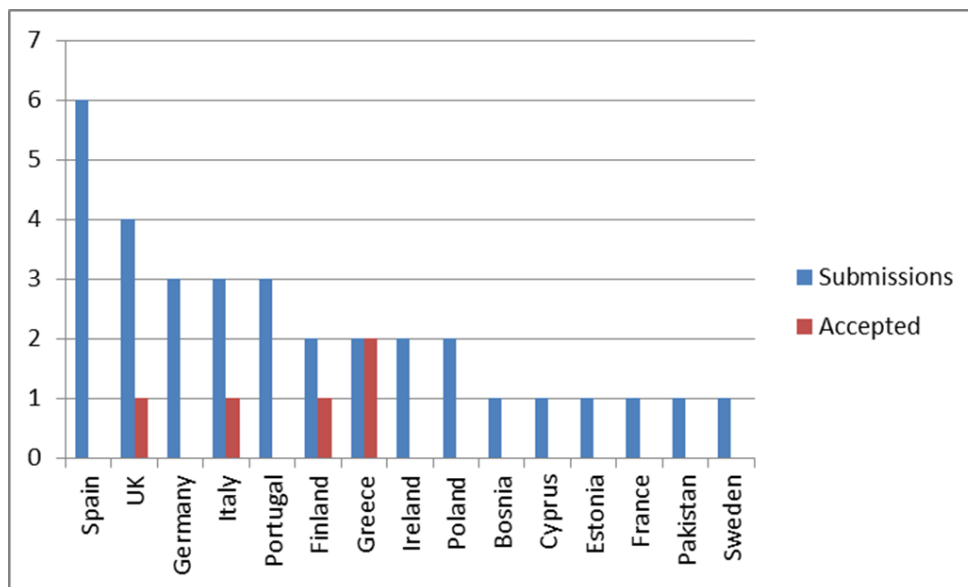

Figure 9: Outcome of the 4ᵗʰ Open Call per country of origin

3.2   5TH OPEN CALL

3.2.1 Call definition and objectives

The 5th Open Call - Call identifier: F4Fp-05 – was organized for Innovative Experiments in categories "Medium" and "Large" with the submission deadline on 26 March 2019.

Total available funding for the 5th Open Call:

- ➲ Medium: 300,000€ (maximum experiment duration of five months).
- ➲ Large: 200,000€ (maximum experiment duration of 10 months).

Maximum requested funding per experiment:

- ➲ Medium: 60,000€.
- ➲ Large: 100,000€.

The above mentioned amounts include the budget for the Fed4FIRE+ partner(s) acting as Patron for the experiment (max. 5,000€ per experiment/patron).

Formal requirements for participation / eligibility remained the same as for the 4th Open Call.

The general call objectives and benefits for the experimenters remained the same as in the 4th Open Call. Particular focus of the 5th Open Call was on networks and advanced wired networking.

3.2.2 Call outcome

The Figure 10 below presents number of submissions received from different types of organizations as well as number of proposals accepted per type of organizations for both size of the experiments. A total of 12 submissions have been received; eight for medium and four for large experiments, whereas seven proposals have been accepted; five medium and two large experiments.
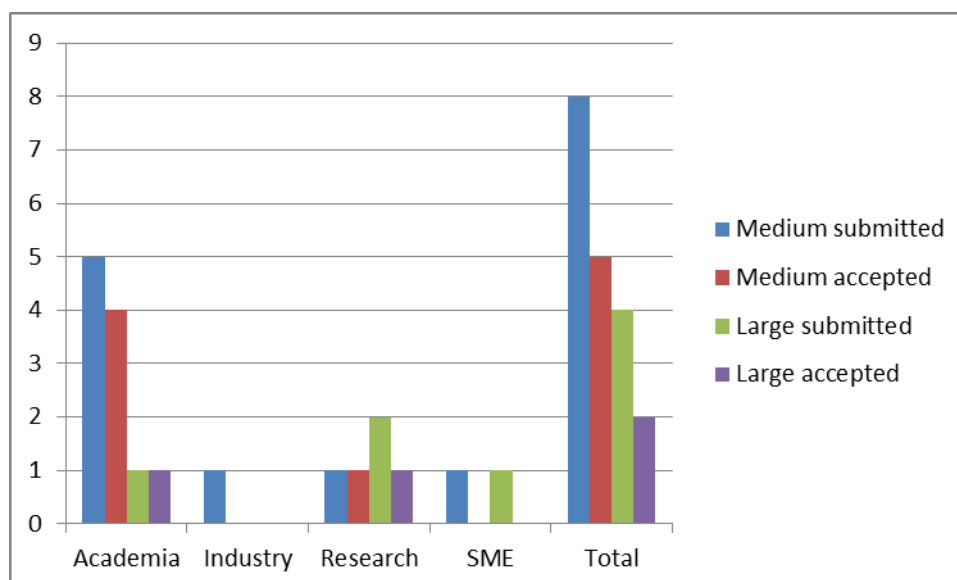
Figure 10: Outcome of the 5th Open Call per type of organizations

Thus, the overall success rate of the 5th Open Call was 58%; 62% for medium and 50% for large experiments. Academic and research institutions were successful in this call with 83% and 67% success rates, respectively.

Number of submitted and accepted experiments per country of origin of the proposing organizations is presented in the Figure 11 below.
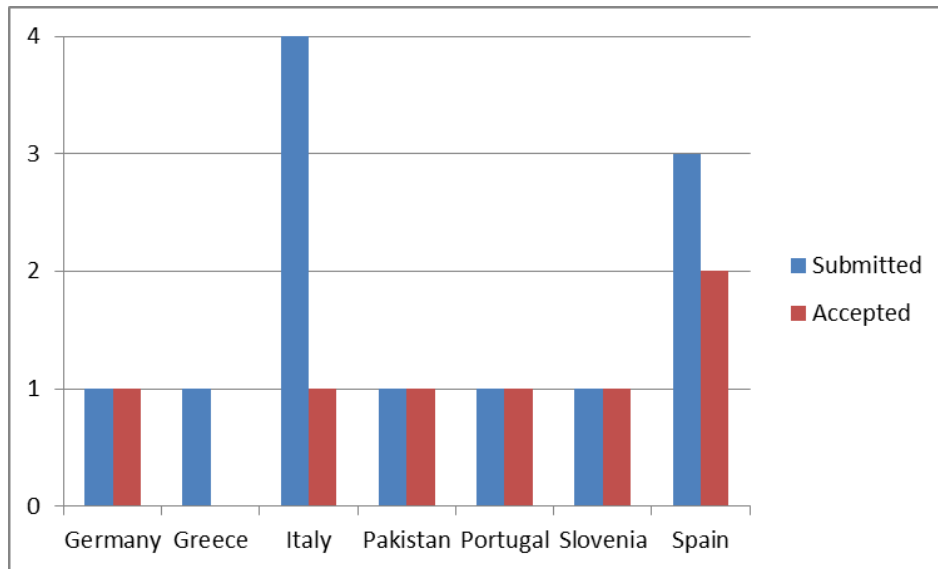
Figure 11: Outcome of the 5th Open Call per country of origin

3.3   6ᵀᴴ OPEN CALL

3.3.1 Call definition and objectives

The 6th Fed4FIRE+ Open Call - Call identifier: F4Fp-06 targeted Innovative Experiments in categories "Medium Experiments". Submission deadline was on 10 September 2019.

Total available funding for this call was: 300,000€.

Maximum requested funding per experiment was set to 60,000€ (duration of max. 5 months).

The amounts mentioned above include the budget for the Fed4FIRE+ partner(s) acting as Patron for the experiment (max. 5,000€ per experiment/patron).

Formal requirements for participation / eligibility remained the same as for the 5th Open Call.

The general call objectives and benefits for the experimenters remained the same as in the 5th Open Call. Particular focus of the 6th Open Call was on wireless experimentation.

The 6th Open Call was also open for the second stage experiment proposals, which could be made by experimenters who were accepted in the first stage (OC-2) or in the continuous SME Open Call (Section 0).

3.3.2 Call outcome

For the standard part of the Open Call (without second stage proposals), we received 25 proposals. After evaluation of the received proposals by independent experts, five experiments have been accepted – 20% success rate. The Figure 12 below presents number of submissions received from different types of organizations and number of proposals accepted per type of organizations.
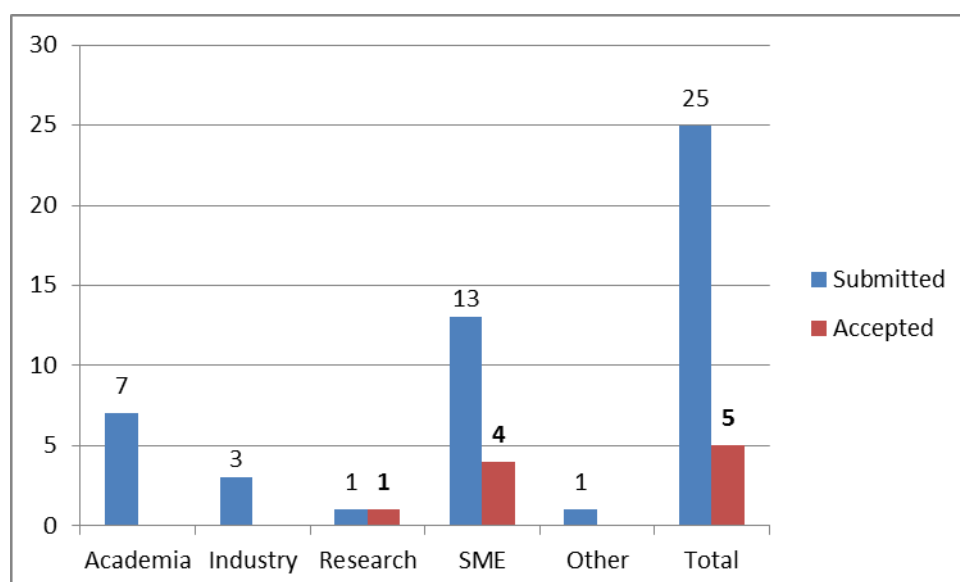

Figure 12: Outcome of the 6ᵗʰ Open Call per type of organizations (without second stage proposals)

Numbers of submitted and accepted experiments per country of origin of the proposing organizations are presented in the Figure 13 below.
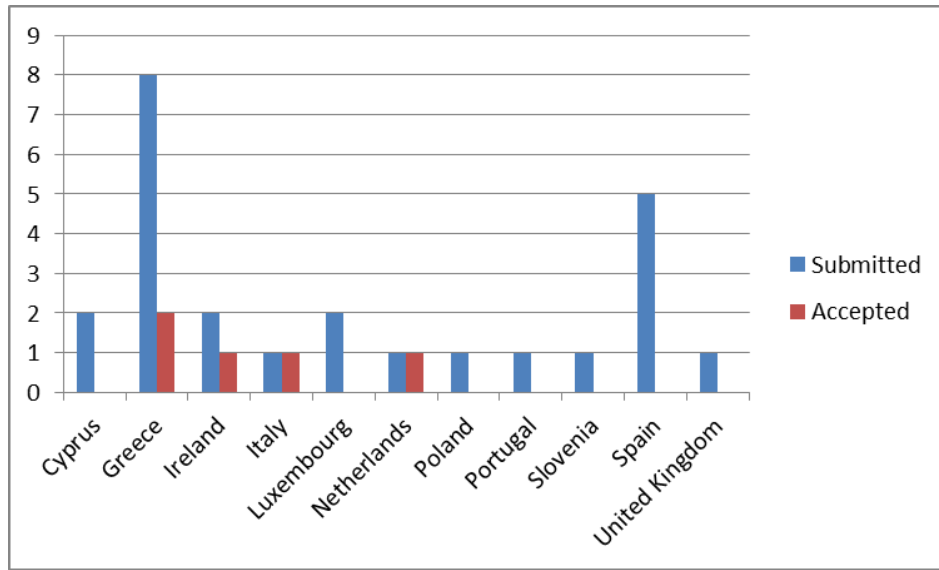
Figure 13: Outcome of the 6th Open Call per country of origin (without second stage proposals)

3.4 CONTNUOUS OPEN CALL FOR SME-S

The Fed4FIRE+ project continuously builds on this experience and organizes series of Open Calls for experiments and testbeds and by using the Cascade Granting mechanism. During its life time of five years, the Fed4FIRE+ project organizes bi-annual open calls for various types of experimentation (large, medium, small) and experimental infrastructures. In addition, a continuous call with cut-off submission dates (starting on 6 November, 2018) every two weeks for Stage 1 of the experiment proposals have been organized.

The Continuous Open Call means that SMEs can submit a proposal for Stage 1 all the time and the review process will start after each cut-off dates. Notification of selection is done fast i.e. targeting in 2 weeks after each cut-off dates for submitted proposals, but in practice the notifications have been done within one week.

3.4.1 Call definition

The Continuous Fed4FIRE+ Open Call for SMEs - Call identifier: F4Fp-SME is targeting the Innovative Experiments to be performed by SMEs. The continuous open calls will be organized until the related planned budget is used (500,000€ for 40 proposals to accept).

Maximum requested funding per experiment is set to 12,500€ (incl. a max of 2,500€ for patron).

Corresponding stage 2 proposals/experiments are typical medium size Fed4FIRE+ experiments. The overall planned budget for the 2nd stage is 480,000€ (for eight proposals to accept).

Eligibility and resubmissions:

- Proposals will only be accepted from a single party eligible for participation in the EC H2020-projects
- Can only be selected for funding for one proposal every 6 months
- For stage 2 only successful proposals from stage 1 can be submitted
- For stage 1 a proposal, if rejected can only be re-submitted after 6 months
- For stage 2 a proposal, if rejected, can only be re-submitted once

3.4.2 Objectives and benefits

The major objective of this Open Call is to make the federated infrastructure directly available for execution of innovative experiments by experimenters from SMEs with a limited amount of effort in preparing the proposals and increasing the quality of the experiments.

Standard Open Calls work in a 1-stage scenario, and imply a relatively significant investment in time and effort for the proposing party to prepare and submit a proposal. It also takes a significant amount of time for the proposer to receive notification of acceptance / rejection of the proposals. These considerations regularly restrict the submissions by SMEs and their participation in Open Calls.

To overcome these thresholds, Fed4FIRE+ has run a 2-staged submission process in the 2nd Fed4FIRE+ Open Call and based on the positive feedback implements this staged submission in a continuous way through this Open Call.

The principle is as follows:

1) A 1st stage submission requires the submission of a very limited-sized proposal for a short-duration experiment after consultation with the required testbeds.

2) Bi-monthly, all submitted proposals are collected and submitted to an external panel of reviewers for a fast review.

3) This quasi continuous review process targets a notification of acceptance / rejection within 2 weeks. In exceptional circumstances like holiday periods,… this period may be slightly longer but feedback will always be provided within 4 weeks.

4) This review process involves a review by:

- at least 3 reviewers as well as
- a review on technical feasibility by the Patron(s), i.e. the responsible of the testbeds intended to be used.

5) Once accepted, the experiment runs for 3 months

6) The budget is max. 12 500 euro including the support for the Patrons (testbed providers). How the split of the budget is made the experimenter and the patron is flexible however the budget of the Patron cannot exceed 2 500 euro in Stage 1

7) At the end of the experiment a report is produced by the experimenter to Fed4FIRE+.

8) If desired, the proposers can submit a more elaborated proposal for a more extensive experiment (duration 5 months) together with the testbeds, which will be used in the experiment, at specific submission deadlines (submission deadlines will be set with a periodicity of 6 months)

9) The submission process for this 2nd stage runs synchronised every 6 months with the standard Open Calls of Fed4FIRE+ but acceptance is independent from these standard Open Calls and runs on a separate budget.

10) Once accepted the 2nd stage experiment runs for 5 months

11) The budget is max. 60 000 euro including the support for the Patrons (testbed providers). How the split of the budget is made the experimenter and the patron is flexible however the budget of the Patron cannot exceed 5 000 euro in Stage 2

12) At the end of the experiment, a report is produced by the experimenter to Fed4FIRE+.

13) If a proposal is not accepted in the 1st stage, re-submission is only allowed after 6 months.

14) If a proposal is not accepted in the 2nd stage, only 1-time re-submission is allowed.

The experiments submitted in Stage 1 are innovative experiments with a limited time in order to collect information on feasibility, requirements, challenges, etc. to prepare for the 2nd stage. The experiments submitted in the 2nd stage are proposals for more extensive innovative experiments which are built upon the proposals and experiments run after selection in the 1st stage.

Examples of such experiments may include but are not limited to testing of new protocols or algorithms, performance measurements, service experiments. It is required that these experimenters will come from parties or organisations that are not part of the Fed4FIRE+ project consortium and which have NOT submitted any proposal yet in the previous Open Calls of the Fed4FIRE+ project. Parties which have submitted proposals in Open Calls from other projects are eligible.

The Fed4FIRE+ project is issuing this series of open and competitive calls for experiments with a degree of industrial and/or scientific innovation, relevance for the Fed4FIRE+ federation and an appropriate scale of complexity. Independent evaluations of the submitted proposals will be performed, in order to select experiments which will be executed within the project. It is required that the experiments are performed by a single organization.

An extra benefit which is offered in this call to the SMEs is the

- ⮕ 2-stage approach with a minimum effort in Stage 1
- ⮕ A dedicated support from specific Fed4FIRE+ members – Each proposer, preparing a proposal is required to seek a supporting Fed4FIRE consortium partner or partners (the "Patron") that will be in charge of dedicated (advanced) support of the experiment.
- ⮕ A limited budget available for running small experiments in preparation of the Stage 2 proposal submission.

3.4.3 Results

The first cut-off-date for submission of proposals to the Continuous Open Call for SMEs – Stage 1, was on 6 November 2018. Until 17 December 2019, 23 cut-off-dates for submission of the proposals have been offered to the community, resulting with 25 received proposals in total, whereas 21 of them have been accepted – success ratio of 84%.

Numbers of submitted and accepted experiments per country of origin of the proposing organizations are presented in the Figure 14 below.
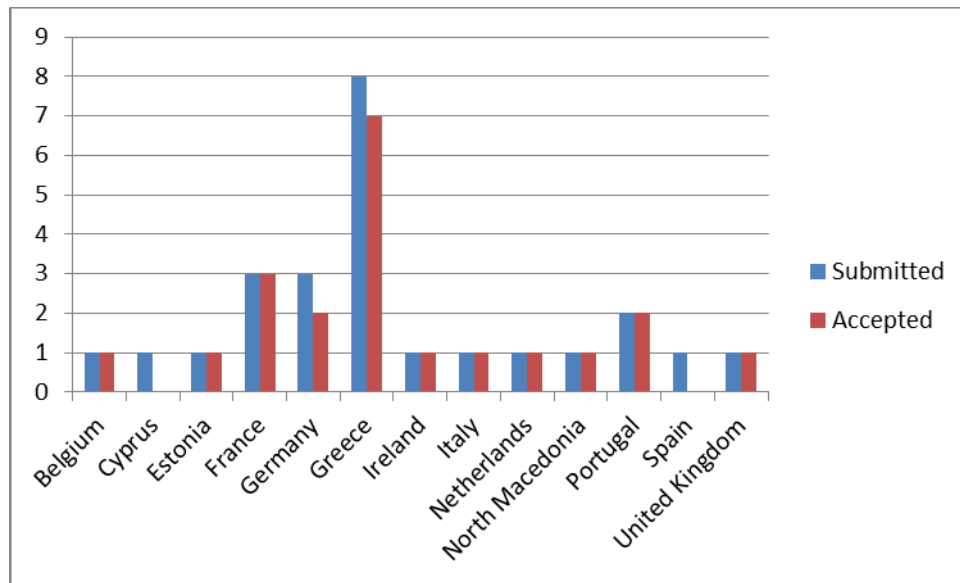
Figure 14: Outcome of the Continuous Open Call for SMEs (Stage 1) per country of origin

For Stage 2, 1 proposal was received in parallel with OC-5 but this was rejected at that time. In parallel with OC-6, seven proposals have been received and all of them accepted. The proposals have been submitted from Estonia, Germany, Greece, Italy, Netherlands, Portugal, and UK.

3.5   7TH OPEN CALL

The 7th Fed4FIRE+ Open Call - Call identifier: F4Fp-07 – targets Innovative Experiments in category "Large Experiments" with focus on "Cloud, Big Data, and Machine Learning. Submission deadline is on 25 February 2020.

Total available funding for this call is 200,000€.

Maximum requested funding per experiment is set to 100,000€ (duration of max. 10 months).

The amounts mentioned above include the budget for the Fed4FIRE+ partner(s) acting as Patron for the experiment (max. 5,000€ per experiment/patron).

Formal requirements for participation / eligibility remained the same as for the 6th Open Call.

Evaluation of the received proposals is expected to be completed during first half of March 2020, so that the successful proposers can participate and already discuss their sub-projects at the Fed4FIRE Engineering Conference (FEC), which will be held at the end of the same month.

4 FEEDBACK FROM EXPERIMENTERS

Following the end of each experiment, the proposers are requested to submit a final report, a poster and a presentation. They are also requested to present a demo at one of the FEC meetings at which occasion also a formal review is organized. At the FEC events, our partner P08 Martel also takes a 2-minute interview from each of the experimenters, to be used for dissemination purposes. Most of this material is available through the Fed4FIRE+ website.

The submission of the final report, which is required to follow a specific template, opens the possibility to pay 75% of the agreed budget to the experimenter. The remaining 25% can only be paid after the formal review which includes the poster presentation, the demo and PowerPoint presentation of the experiment at one of the FECs.

In view of the size of all reports and the presentations, and as some of these might contain proprietary information, they are not included in this report, but are made available for review.

More information on the feedback from the experiments can be found in Deliverable D2.10 which describes the end-user evaluation.

Co-funded by the Horizon 2020
Framework Programme of the European Union

5 FEEDBACK FROM AND ACTIONS TAKEN BY THE TESTBED OPERATORS.

Running the experiments also provides very useful information for the testbed owners. The support provided by the Patron to the experimenter directly brings the testbed in contact with the experimenter and results in direct feedback on the use of the testbed and the implementation of the experiment. This kind of interaction, as well as the continued contacts after the experiment has finished as well as the impression on how the testbed owner profits from the experiment was previously grabbed through on-line surveys ran amongst all testbeds after completion of the experiment. The results of these surveys were summarized in the previous PPR1 report.

In this section we provide a short overview of the feedback picked up by the testbeds with actions taken by the testbeds in response to these comments.

5.1 USE OF FED4FIRE+ TESTBEDS

It should be noted that the testbeds are not only used with the Fed4FIRE+ project. The usage of each of the testbeds in the Open Calls is shown below (Figure 15), and for some of the testbeds this usage is minimal, so consequently updates and adding new features is most frequently done as a result of feedback and experiences with these non-Open Call experimenters.
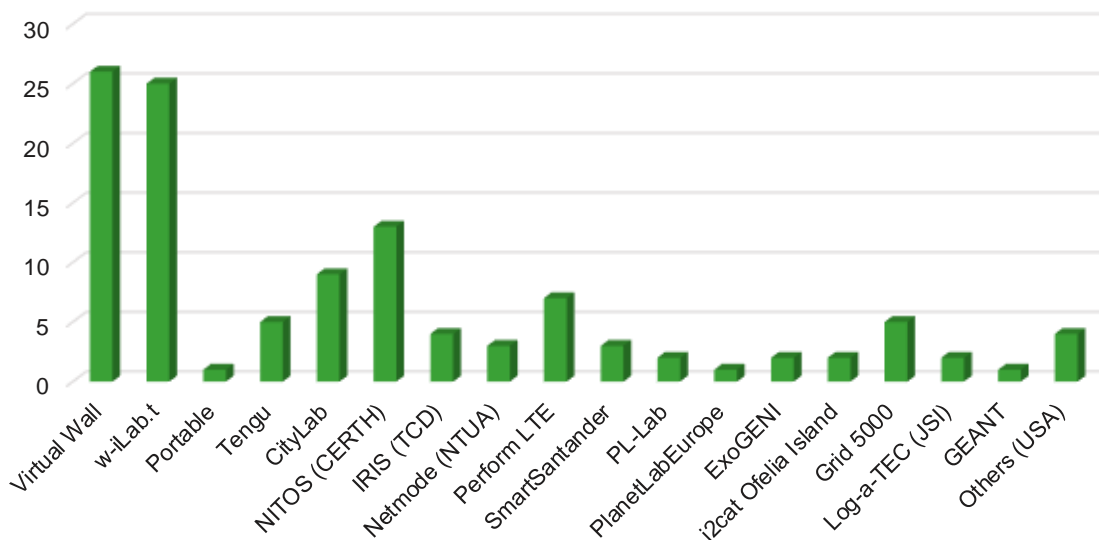

Figure 15: Use of Fed4FIRE+ Testbeds with Open Call experiments

On the Fed4FIRE authority, run by imec, in total about 215 new projects were created during the last 12 months. This authority does not cover all Fed4FIRE+ testbeds, but, compared to the usage above (Figure 15), it already shows that the usage by these Open Call experiments is small with respect to the overall usage. Out of these 215 projects, about half were created within imec, about half from outside. About 15 users can be assigned to the use of the testbeds through academic teaching (classes).

During this period, 158 of those projects were started by new users (new during the last 12 months). 57 projects were started by existing users.
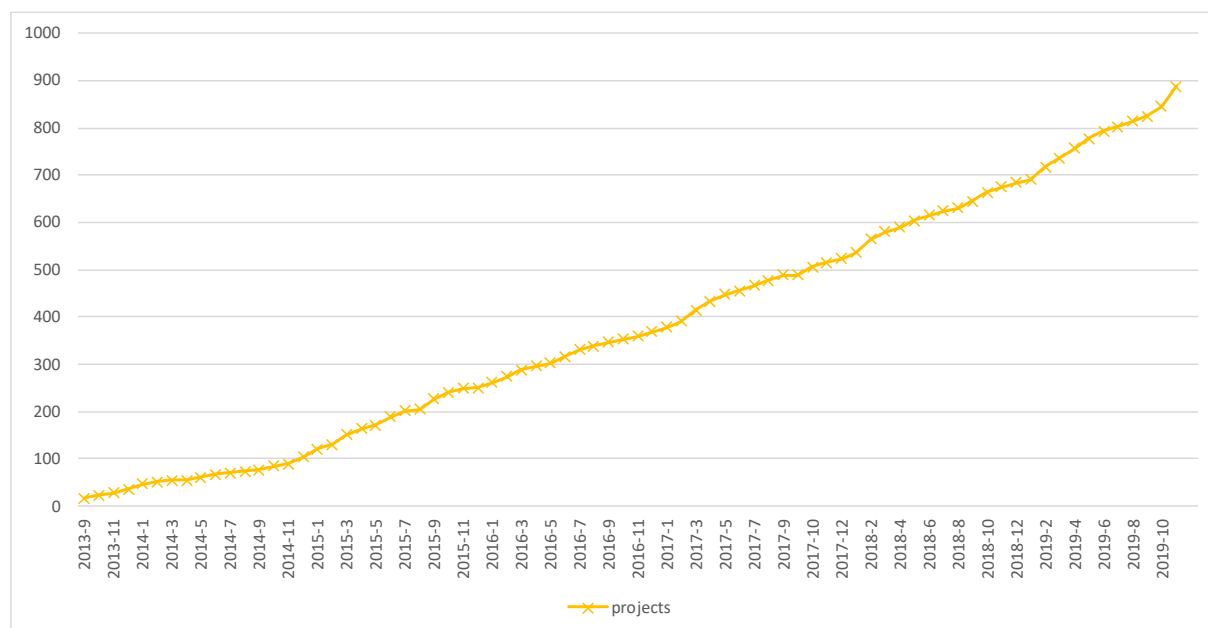

Figure 16: Number of projects on the Fed4FIRE+ testbeds, through the Fed4FIRE authority

Over the last 12 months, 338 different users were active on Fed4FIRE testbeds via a Fed4FIRE account. In total they set up 23004 slivers (average of 68 per user) for a total of 406 nodeyears. (a nodeyear is the usage of 1 node during 1 year, or e.g. 2 nodes during 6 months).

Apart from the Fed4FIRE testbeds, also the following non-European testbeds were used with Fed4FIRE accounts:

- ➲ Brazilian Futebol testbeds: 33 unique users over the last year with 1288 slivers (39 slivers per user), for 1.1 nodeyears in total
- ➲ US GENI testbeds: 31 unique users for a total of 310 slivers (10 slivers per user) and 46.5 nodeyears (of which 1 user used more than 35 nodeyears)

Further details on the sue of the testbeds are included in Deliverable "D2.08 – Sustainable Governance of the Federation".

5.2 IMPROVEMENT ON FACILITIES / TOOLS IMPLEMENTED DURING THE REPORTING PERIOD

5.2.1 Testbed CityLab (imec)

We have added the smart highway C-V2X testbed, which is closely related to the CityLab testbed, as part of our CityLab offer. This directly answers open questions regarding vehicular networks and allows us to validate new infrastructure.

Moreover, we have requested an LTE testing license, to further enable LTE testing and collaborations with the portable testbed.

Finally, we have also added ath9k WiFi cards, to support low-level IEEE 802.11 experiments.

5.2.2 P06 - Testbed IoT Lab (Mandat International)

During the period covered by this report, IoT Lab has technically joined the Fed4FIRE+ federation of testbeds. Thanks to the strong collaboration between the engineers of Mandat International and imec, the integration was mainly planned during the year 2019 taking into account all the technical constraints discovered in the initial phase of technical study done in 2018. Concretely, the IoT Lab integration was effective since the 5th February 2019: indeed, since this date, the status of the IoT Lab testbed is monitored online on Fedmon: https://fedmon.fed4fire.eu/testbed/iotlab. Afterwards, Mandat International has done some improvements and updates on the IoT Lab side to correct some bugs and ensure a better service availability at the long run.

5.2.3 P10 - Testbed Netmode (NTUA)

NETMODE testbed aims to shift from a wireless testbed to a modern testbed for Mobile Edge Computing experimentation. Towards this direction, an educational robot, i.e. Waveshare AlphaBot, and two Raspberry Pi 3 devices are added in the testbeds.

5.2.4 P14 - Testbed i2cat Ofelia (i2cat)

During this period, and specifically in the beginning of 2019, we implemented the logic to serve a privacy section in the OFELIA i2CAT Control Framework stack (accessed via the https://f4f.lab.i2cat.net/privacy/ endpoint). This allows new users to review and accept (or not) the OFELIA i2CAT Terms & Conditions in a fully integrated form with jFed, or to alternatively point their browsers to read the conditions. Their Fed4FIRE certificate is used to extract information and save their preferences on the above stated.

5.2.5 P16 - Testbed SmartSantander (UC)

No software upgrades have been carried out during this reporting period. However, new infrastructure based on LoRaWAN technology and new sensor devices have been deployed into the SmartSantander platform.

5.2.6 P17 - Testbed Triangle (PerformLTE) (UMA)

Implementation of new measurement points adapted to the experiment requirements. These measurement points helped to evaluate the main aspects target of analysis increasing also the accuracy of the results reported previously.

5.2.7   P19 - Testbed Log-a-Tec (JSI)

During the reporting period several new software solutions and updates were performed:

- ➲ Contiki-NG operating system was ported in order to support TSCH standard for IIoT applications
- ➲ Enabling Continuous Integration (CI) approach
- ➲ Implementation of the Zero-Touch configuration WiFi solution

5.2.8   P20 - Testbed IRIS (TCD)

The objectives of the WINS_5G 5GINFIRE – project are aligned with our goals as infrastructure providers in Fed4FIRE+. Essentially, the WINS_5G 5GINFIRE project has acted as a foundation to the upgrade the Iris testbed infrastructure to support a dynamic 5G cloud environment. Towards integrating the Fed4FIRE+ and 5GINFIRE projects during the second Fed4FIRE+ reporting period (July 18' to Dec 19'), we extended the O2CMF aggregate manager framework, an open platform for control and management of experiments (O2CMF) developed during the FUTEBOL H2020 project, to support SDR devices in the 5GINFIRE OpenStack cloud environment (Figure 17)

O2CMF is an SFA entity responsible for managing testbed resources and Fed4FIRE+ slivers. It was designed to support repeatable and reproducible experimentation of heterogeneous computing and networking resources by utilizing NFV principals. This is seen as an extension to current Fed4FIRE+ and GENI capabilities which did not offer adequate virtualisation mechanisms to support NFV functionality 1. Due to this extension, both the 5GINFIRE project and Fed4FIRE+ projects share the same cloud-based infrastructure and USRP equipment among project experimenters. The OpenStack VIM central access point for O2CMF and 5TONIC OSM enables VM and USRP resources to be shared between both projects. Furthermore, there is no resource over provision or conflict between project experimenters as the OpenStack VIM allocates resources on a first come, first served (FCFS) basis. This has the added benefit of making Fed4FIRE+ equipment available to the 5GINFIRE community and vice versa. In total, this represents 29 NI USRPs and 13 high powered Dell servers. We plan to make the Iris testbed O2CMF extension to support USRPs available as a branch on O2CMF GitLab 2 to the 5GINFIRE and Fed4FIRE+ communities.

As a consequence of the 5GINFIRE cloud upgrade to use OpenStack, the Iris radio testbed now pairs underlying flexible radio and computations resources with various hypervisors in the form of software defined radio (SDR) frameworks, virtualized network functions (VNFs), and SDN network slicing capabilities to realize various research and experimentation configurations. We employ a Dell Networking S4048T-ON high performance SDN/OpenFlow 1.3 enabled switch connected to underlying radio devices. Radio resources include 24 NI USRP N210 ceiling mounted nodes equipped with SBX daugtherboards supporting frequency ranges of 400 MHz-4400 MHz offering up to 20 MHz of bandwidth. This equipment supports experimentation with Wi-Fi, WiMAX, S-band transceivers and 2.4 GHz ISM band transceivers, and so forth. We also employ 5 NI USRP X310s supporting DC to 6 GHz

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frequencies and up to 40 MHz of baseband bandwidth. These platforms are connected to a private computational cloud based on the OpenStack suite of technologies, allowing us to deploy an array of dynamic virtualised computational environments. To expose the functionality of these platforms for applications, we employ a variety of radio hypervisors that freely enable prototyping of wireless systems, as exemplified by GNURadio, srsLTE 3GPP, and Open-Air Interface. These radio hypervisors combined with dynamic distributed network functions enable the realization of heterogeneous radio platforms that can support malleable and adaptable networks.
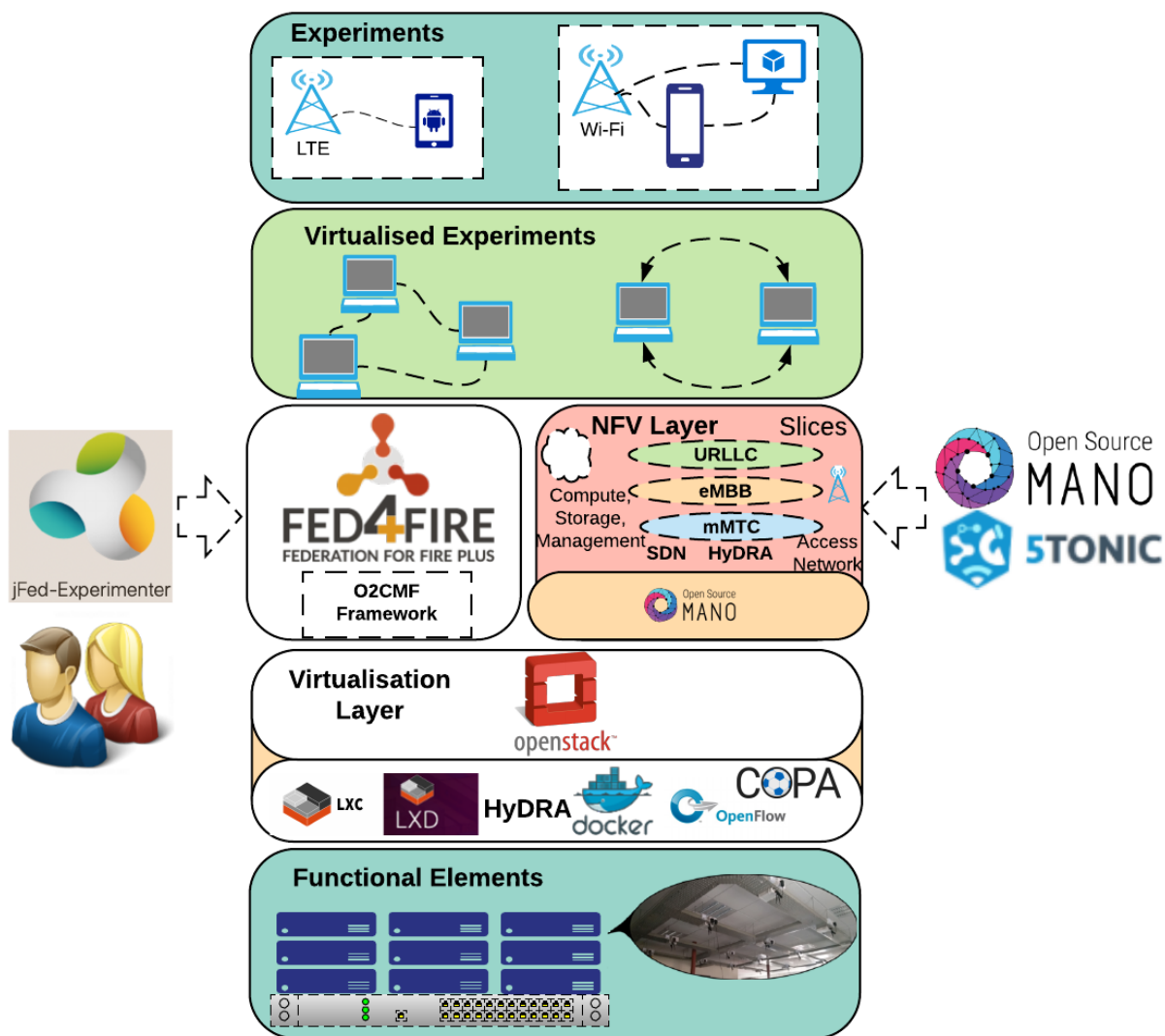

Figure 17: FIRE integration at WINS_5G

5.3   THEMATIC CALLS

From the start of this reporting period onwards, the standard Open Calls were also "Thematic Open Calls" by which the consortium responds to the interest of the community and by which the Open Calls target a specific area of activities and a specific set of testbeds. The main reason for doing this is to align the tutorials and the testbed presentations at the FEC's with the closure of these Open Calls.

As an example, the results of Open Call 6 are represented below in Figure 18. Here it is clear that the response to this call is very well within the "wireless experimentation" area. The tutorials scheduled at FEC6 which followed the closure and selection of this Open Call as well as the testbeds presented during FEC6 are also in this wireless domain, making FEC6 more targeting these new experimenters.
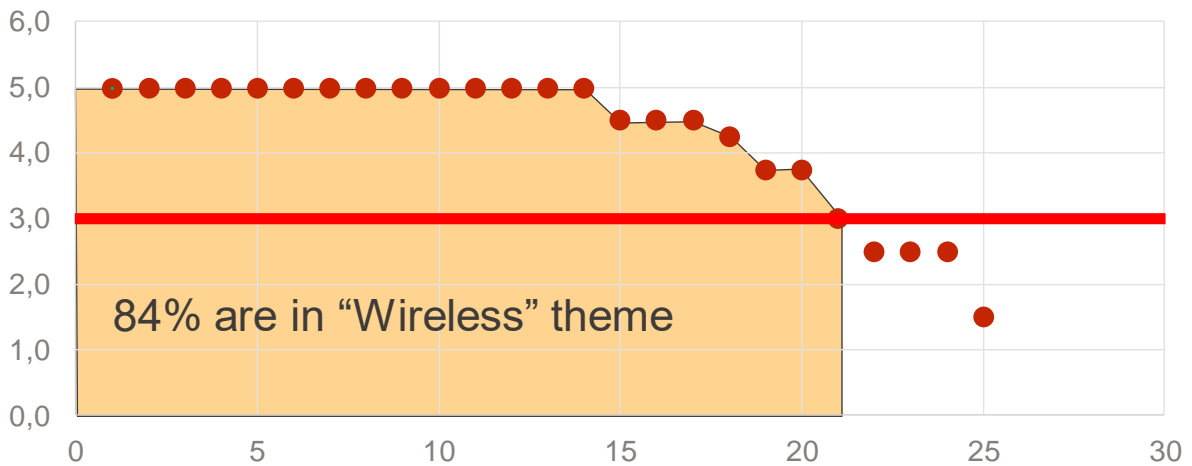

Figure 18: Review score on the criteria IX which evaluates the alignment of the proposal with the theme of the call (in this case "Wireless Experimentation")

6   CONCLUSIONS AND OUTLOOK

During its first 18 months of operation (the first project period January 2017 – June 2018), the Fed4FIRE+ project established all necessary processes for implementation of competitive Open Calls, planned in the scope of the project, as listed below:

- ➲ Process for technical and formal definition of the Open Calls.
- ➲ Templates for Open Call proposals.
- ➲ Wide promotion of the Open Calls.
- ➲ Submission tool.
- ➲ Permanent support for potential proposers.
- ➲ Evaluation criteria and needed evaluation forms.
- ➲ Group of independent experts for evaluation of Open Call proposals.
- ➲ Evaluation process consisting of remote evaluations and consensus meetings.

By applying the Open Call process, the Fed4FIRE+ project organized four standard competitive Open Calls for innovative experiments during the current reporting period. The 4th, the 5th, and the 6th Open Calls are completed, whereas the 7th Open Call is defined and announced with the submission deadline on 25 February 2020.

In addition, a Continuous Open Call for SMEs has been organized with the so-called cut-off submission dates, starting on 6 November 2018, usually every two weeks. This type of the Open Call allows SMEs can to submit a very small proposal for Stage 1 of the call at any of the cut-off-dates, whereas the review process will start after each cut-off dates, and the notification of selection is done fast (in practice the notifications have been usually done within one week). After finishing the experimentation in Stage 1, the SMEs are qualified to apply for a medium size experiment within Stage 2 of the Open Call.

Details about number of submitted proposals from various categories of the proposers' organizations, countries of origins, and type of experiments are presented along the document. Below, the key-figures for the Open Calls implemented during the reporting period:

- ➲ 4th OC – 33 proposals received, five accepted, success ratio of 15%
- ➲ 5th OC – Medium experiments: eight proposals received, five accepted (success ratio 62%), Large experiments: four proposals, two accepted (50% success)
- ➲ 6th OC – 25 proposals received, five proposals accepted, success ratio of 20%.
- ➲ 7th OC has been announced – submission deadline on 25 February 2020

23 cut-off-dates for submission of the proposals to the Continuous Open Call for SMEs (Stage 1) have been offered to the community, resulting with 25 received proposals, whereas 21 of them have been accepted – success ratio of 84%. For Stage 2, seven proposals have been received and all of them accepted.

Beside the already announced OC-7 (submission deadline in February 2020), the following Open Calls are planned to be launched in the upcoming period:

- Continuous Open Call for SMEs (submission cut-off dates every two weeks) will continue to serve as first stage evaluation point for larger experiments by SMEs in the second stage.
- 8th & 9th (standard) Open Call

Other calls which were scheduled in the original DoW are:

- Open Calls for Testbeds which will focus new testbeds and new additions to the federation, as well as;
- Open Calls for new Functionality which will focus on new functionalities within the federation and over tall testbeds; and
- Internal Open Calls for on-demand extensions.

However, as explained in the PPR2, it has been noted that

- no specific request or need has been picked up on new testbeds which need to join the federation
- new functionalities to the testbeds have been implemented without the requirement of an internal Open Call
- no requirement for an internal call on "on-demand" extensions, has also been identified.

Therefore, the proposal will be made to shift some of the budget for the above listed remaining "other" Open calls along the following lines:

- Re-scheduling of budget allocated to 3rd parties:
  - New Testbeds / New Equipment   € 800 k   - € 400 k   € 400 k
  - Extra functionality   € 200 k   - € 200 k   € 0 k
  - Experiments   € 1.300 k   + € 600 k   € 1.900 k
  - Travel grants / individual experimenters   + € 100 k   € 100 k

- Re-scheduling of budget allocated internally:
  - Patrons   € 500 k   € 500 k
  - On-demand extensions   € 500 k   - € 400 k   € 100 k
  - Marketing and users-meetings   + € 300 k   € 300 k

So basically, the budget allocated to the Open Cal on new Testbeds is reduced and this budget is shifted to the SME Open Calls as these have proven to be successful. Part of the budget remains to allow new equipment to be included as some experiments have indicated that it would be nice e.g. to be able to compare performances of equipment form different suppliers on our testbeds.

The budget for the "extra functionality" is also shifted to support the SME Open calls.

Internally within the consortium, the support for the Patrons, guiding the experimenters is kept untouched, while the budget for the "on de mand extensions" is reduced and split into a budget for active marketing events (roadshows) to seek new users as well as a small budget to support students to attend the FEC';s and tutorials through travel grants.