GRANT AGREEMENT NO.: 731677

Call: H2020-ICT-2016-2017
Topic: ICT-13-2016
Type of action: RIA

FLAME

Facility for Large-Scale Adaptive Media Experimentation

4th OPEN CALL

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1 General Open Call information

The FLAME project hereby announces its fourth Open Call for 3rd party projects.

With this Open Call FLAME intends to further support the implementation of the 3rd party projects that were funded under the First, the Second and Third Open Call of the project to extend their experimentation activities using the FLAME infrastructure.

2 Call information

Project full name:	FLAME - Facility for Large-Scale Adaptive Media Experimentation
Project grant agreement number:	731677
Call identifier:	FLAME-OC4
Call title:	Fourth FLAME Open Call
Opening of Open Call	15th May 2020
Final Submission deadline:	31st May 2020 @ 17:00 CET
Notification of the final result:	10th June 2020
Webinar for explaining Open Call details and providing guidelines for proposers	A doodle will be done for last week of May
Estimated start date of 3rd party projects	No later than 15th June 2020
End of 3rd party projects	No later than 15th September 2020

3 Financial information:

Category and call identifier	Call budget	Max. budget per 3rd party project	No. of 3rd part projects to be funded	Total Guaranteed support[1]
a. FLAME-OC4-Replicator	€130.000	€55.000	1	€139.812,50
b. FLAME-OC4-Experiment		€25.000	3	
Total number of 3rd party projects to be funded			4	

4 Requirements related to the proposer:

- For category "a. **FLAME-OC4-Replicator**: **FLAME replication extension of OC2 replicator**" proposals selected from the funded beneficiaries of Open Call 2 – Replicators from European secondary and higher education establishments, research institutes and other not-for-profit research organisations or companies from the private sector acting as enablers for innovative new Future Media Internet technologies are eligible.
- For category "b. **FLAME-OC4-Experiment**: **FLAME experimentation extension of OC1, OC2 and OC3 experiments"** proposals selected from the funded beneficiaries of Open Call 1, Open Call 2 and Open Call 3, under the categories of SME trials and Industry Trials are only eligible.
- A total number of four (4) third party projects will be funded for further experimentation based on the final ranking.
- For category **a. FLAME-OC4-Replicator** will further experiment in the same city where originally implemented.
- For category **b. FLAME-OC4-Experiment** one 3rd party projects in each city (Barcelona, Bristol and Buseto Palizzolo) will be funded.

5 Other conditions:

- Language in which the proposal must be submitted: English
- Proposals must follow the provided template (see Section 11 of this document and Appendix A)
- Proposals must be submitted through the online submission portal (accessible from https://www.ict-flame.eu/open-calls/)[2]

6 Contact

For more information: opencalls@ict-flame.eu

[1] An extra budget of typically € 34.954,125 per 3rd party project will be allocated to the FLAME consortium partner acting as Mentor for guaranteed support.

[2] Please note that the submission portal for FLAME Open Call proposals is NOT the H2020 portal.

7 The FLAME Project

FLAME is an initiative designed to create a sustainable FMI ecosystem through experimentation, collaboration and innovation. Within this scope, FLAME works within the creative industries to create exciting, viable applications for the Future Media Internet (FMI) that bring value to the many sectors dependent on effective production and distribution of media content, such as broadcast, gaming, education, and beyond into healthcare and smart city management.
FLAME aims to change the way people interact by fundamentally changing how they send, receive, and perceive the world around them using the power and flexibility of the FMI.
For more technical details and how-to please refer to the Resources section of the FLAME website https://www.ict-flame.eu/.

7.1 Introduction to the project

FLAME aims to optimise media content delivery by enabling deep interactions between media service providers and an underlying communications infrastructure using software defined networking and information centric networking techniques. The main target is to provide a significant leap forward for media delivery supporting personalized, interactive, mobile and localized (PIML) workflows. The FLAME platform provides this leap through capabilities for low latency distributed computing as well as content over a 5G-enabled programmable infrastructure, providing the user with faster access to media and services, lower latency and higher personalization of the experience through closer media processing (Figure 1). Through the platform's fast and dynamic service request routing capability, media service providers will have fine-grained control over load and therefore costs across the network. This offers the potential to significantly reduce the overall costs while ensuring fast availability of services towards end users.

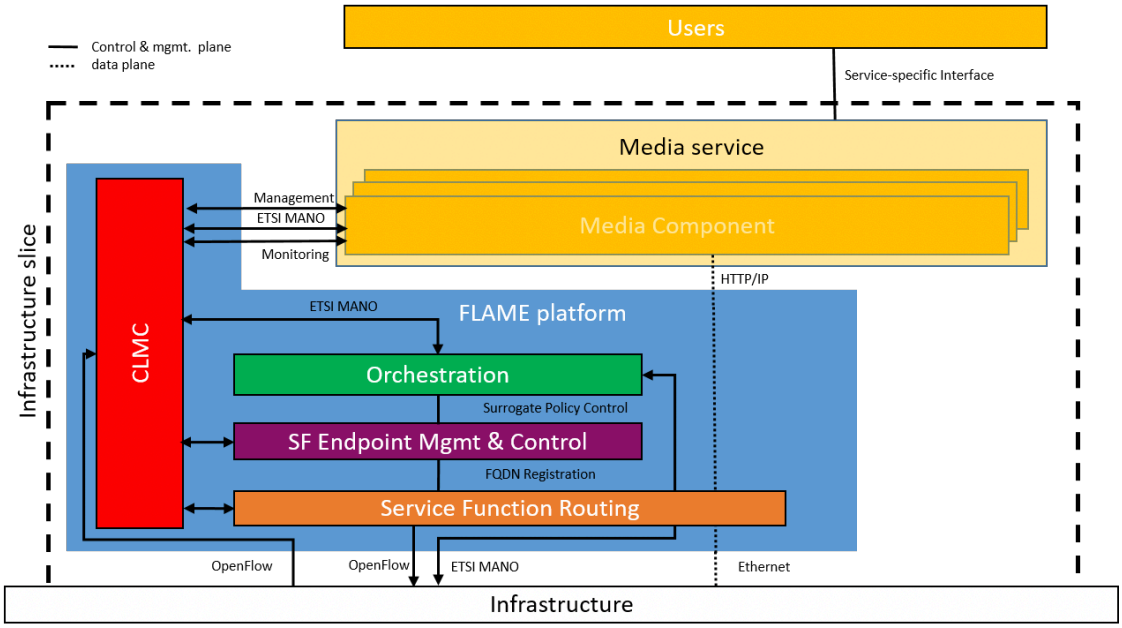

Figure 1: FLAME Overview

FLAME is composed by 3 main components that will be outlined in the next sections: The Platform, the Infrastructure, and the Media Services.

7.2 Platform Capabilities

The Platform benefits are described in detail in Section 7 of D3.1 "FMI Vision, Use Cases and Scenarios". In general, the goal is to improve performance of interactive media systems whilst managing costs associated with infrastructure resources. Figure 2 provides a summary of four key performance requirements for FMI and generally the 5G space along discussion of associated benefits:

• Reduce latency: latency has long been recognized as a major impact on user experience, leading not only to the deployment of content delivery networks but many past and ongoing protocol improvements (e.g., introduction of QUIC aiming at browsing latency improvements). Reducing the service path length is an important target for FLAME through utilizing an intelligent service endpoint management and flexible routing solutions.

• Stem unicast proliferation: the emergence of HTTP as the de-facto streaming protocol in the Internet, infrastructure providers are currently incapable of utilizing in-network multicast capabilities to stem the linear cost explosion that the unicast delivery model of HTTP creates. Through its capability to deliver HTTP response through in-network native multicast, FLAME provides a unique capability that significantly reduces costs for multi- viewer scenarios.

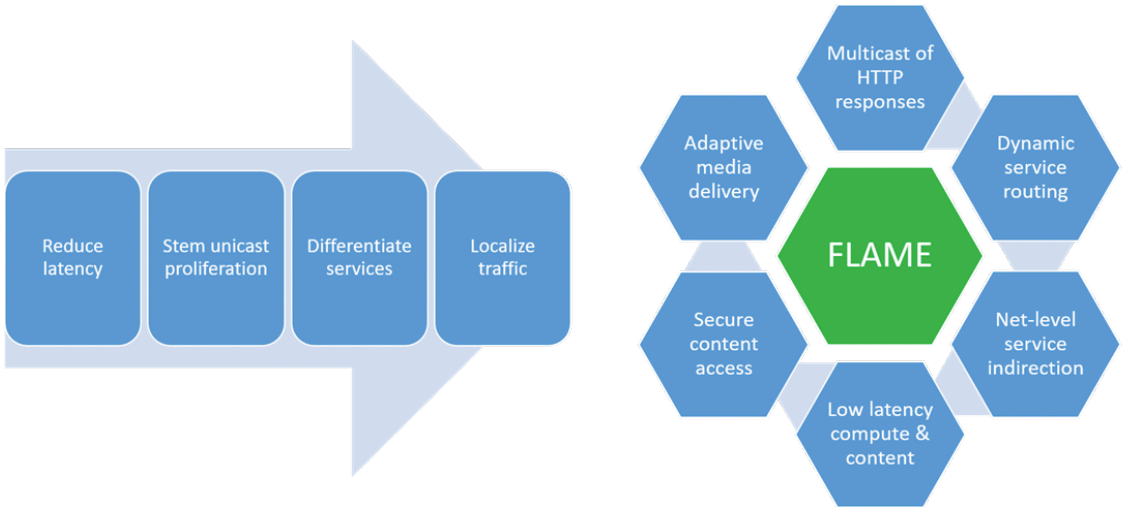

Figure 2: FLAME Platform Benefits Addressing FMI and 5G Requirements

- **Differentiate services:** virtualization opens up the capability to differentiate services by placing service endpoints throughout the network with localized and personalized behaviour. This, however, requires the network to provide a dynamic service routing capability that directs traffic to the most appropriate local service instance. Also, a failover mechanism is required to indirect service requests if a local instance is unable to provide sufficient service response. Furthermore, adaptive media delivery is crucial for differentiation of services, allowing for adapting services, for instance, to different user

device requirements by adding transcoding capabilities to the service path for specific users. FLAME provides exactly these capabilities.

- **Localize traffic**: reduction of network traffic is often realized through localizing traffic wherever possible, also addressing the aforementioned latency reduction. Capitalizing on FLAME capabilities to dynamically route requests to the most appropriate service instance achieves a likely significant reduction of traffic being sent over longer paths. It also allows for keeping data local in terms of information security as well as possibly exposing the traffic to fewer parties involved. This ability to localize traffic needs to be balanced in a real-life deployment with the possibly higher operational costs for the distributed servers in comparison to centralized data centres. FLAME provides this ability to trade off these aspects towards a commercially viable offering.
- **Remove insecure content access**: the FLAME capability to elevate content delivery from intermediary Content Delivery Networks (CDNs) to fully secured surrogate service endpoints provides further security (e.g., secure content delegation will remove the need for triangular routing to origin servers). Insecure content references would be removed by allowing content to be hosted at surrogate service endpoints with minimal computational authorization functionality. This ensures that content is not exposed to unauthorised parties.

For more information and details please refer to deliverable D3.3 FLAME Platform Architecture and Infrastructure Specification v1

7.3 Infrastructure Capabilities

This section describes the FLAME infrastructure in the cities of Bristol, Barcelona and Buseto Palizzolo. For more details please refer to deliverable D5.1 Replication Process v1

7.3.1 Bristol

The Bristol infrastructure is a rich testbed comprised of several networking and computing technologies, interconnecting a significant area in the Bristol city centre. This testbed aims to provide a managed platform for the development and testing of new solutions delivering reliable and high-capacity services to several applications and vertical sectors here referred to as FLAME. The University of Bristol's 5G testbed is a multi-site network connected through a 10km fibre with several active switching nodes. The core network is located at the High-Performance Network (HPN) laboratory at the University of Bristol and an extra edge computing node is available in another central location, known as Watershed.

7.3.2 Barcelona

The Barcelona infrastructure offers a real deployment of a wireless access and backhaul scenario. The implementation of the FLAME architecture consists of (1) the on-street deployment that provides Radio Access Network (RAN) capabilities and a dedicated wireless backhaul, (2) the Multi-Access Edge Computing (MEC) installations to provide light added value services close to

the edge, and (3) the main DC deployment in i2CAT facilities. Main DC IT resources are used to provide heavy computational / storage services, e.g. high definition video content, video transcoding, quality of service and consumption analytics, as well as resource orchestration and management logic, e.g. OpenStack, ODL, DHCP servers, etc.

7.3.3 Buseto Palizzolo

The Buseto Palizzolo 5G infrastructure, located in Sicily, is composed of dense infrastructure composed of several nodes currently interconnected via wireless links, however it is forecasted that the infrastructure will be upgraded to fiber network accordingly to the Italian telecommunication plan for Southern Areas. The PRIS infrastructure, owned and operated by Level7, upgraded to the FLAME based testbed allows to operate both outdoor and indoor experiments in Buseto Palizzolo rural area.

7.4 Media Capabilities

FLAME provides a set of media capabilities as a part of the project offering. These media capabilities will be available for experimenters and particularly for the entities that participate in the project as result of the open calls. These capabilities are provided in FLAME by means of Foundation Media Services, which offer an initial set of basic functionalities useful for a variety of media implementations, such as storage capacity and adaptive streaming. In this way, the Foundation Media Services can be seen as packetized media components. FLAME has defined a list of Foundation Media Services, which will be implemented along the project work plan. Some of these Foundation Media Services has been selected to take advantage of the key FLAME benefits, based on the project technical approach, such as reduced latency or secure content access, as described in Section 7.2.

The Foundation Media Services that will be ready for the 3rd parties involved in the project after the first open call are depicted in the table.

Name	Description
Metadata database	This component consists in a generic database to store metadata, which is a required module in most of media services. Some complex media services require the stateful replication of a synchronised database. For example, a certain service may require a replicated metadata database in the edge to improve the availability of media contents. FLAME benefits and technological innovations enable an efficient procedure for the replication of databases.
Content ingest and storage	This component enables the insertion of assets to be delivered in media services. By means of a REST API, assets can be uploaded, deleted and downloaded. The component includes a local database to keep some data about the stored contents. The FLAME platform capabilities enable a smart replication of this component for a better service performance.

Name	Description
Media quality analysis	This component provides information about a certain media asset, including technical information (codec, duration, framerate, resolution, bitrate) and also an estimation of its visual quality.
Transcoding and transrating and content conditioning	Transcoding consists in the change of the video or audio specification to represent the content of an asset (source encoding). Transrating is a similar process but in this case the encoding specification does not change. Transcoding and transrating typically aim to reduce the bitrate of an asset (this processing will cause a reduction of the quality, too). This component enables the encoding based on the video formats AVC and HEVC. By means of a REST API, the user can specify the characteristics of the output video, such as the resolution, the framerate and the desired bitrate or rate factor. Content conditioning consists in the processing of the media assets to make them available in an adaptive streaming service. Assets are split in chunks and encoded at different bitrates to offer a video-on-demand adaptive streaming service by means of this component.
Adaptive streaming	Adaptation is the process that allows a player to take into account the network and the receiver capabilities to automatically and instantaneously adapt the transmitted bitrate (and the quality) in a streaming service. In this way, adaptive streaming optimises the instantaneous quality along the asset duration. This component requires a previous step of content conditioning. This service supports two different adaptive streaming technologies: MPEG-DASH and HLS.

8 Scope of the call

With this 4th Open Call, FLAME intends to further support the implementation of the 3rd party projects that were funded under the project cascade funding scheme to allow them to extend their activities using the FLAME infrastructure in Bristol, Barcelona and Buseto Palizzolo. Each extension will seek adaptation of experiments/replications in ways that offer new services and added value to local communities, as follows:

- One FLAME replication extension selected from Open Call 2 replicator
- Three FLAME experimentation extension from Open Call 1, Open Call 2 and Open Call 3 experiments

9 Submission Information

The proposal must be:

- Submitted on-line through: https://www.ict-flame.eu/open-calls/4th-flame-open-call/
- Submitted in English

Once the deadline for submitting a proposal is reached, the call will be closed, and the evaluation process will start. The duration of the evaluation of the proposals and approval by the EU will be kept within 10 working days.

In case of this specific Call, the target date for acknowledgement of selection is set at latest on 10th June 2020.
The outcome of the evaluation will be communicated to the proposers via email as soon as the process is completed. The notification will include a detailed report of the evaluation process where for each criterion the score and the motivation of the evaluators will be reported.
Selected 3rd party projects can start at 15th June 2020.
The deadline for the final report for the different 3rd party projects is 1 month after the start of the 3rd party project, but no later than the end of 15th October 2020.
Please note that a later start may imply a shorter 3rd party project.
The final evaluation of the 3rd party projects will happen at a review meeting with the EC. The exact date will be fixed during the execution of the project.

10 Mentoring

This section also identifies the Mentor of the 3rd party projects, who is the lead contact person within the project who will be responsible for the follow up. Once the winner projects have been identified and a commencement date has been agreed the mentoring process will start.

The key responsibilities of the mentors to the third-party projects will be to:

- Understand the requirements
- Monitor the implementation of the projects based on the proposed time-plan
- Providing insight into the technical capabilities
- Making recommendations to the FLAME consortium for updates, and recording lessons learned
- Coach the 3rd party project partners during implementation
- Follow up with the results/outputs.

FLAME operates a pool of mentors that are dedicated to 3rd party projects and have a distinct interest in their success. ITINNOV coordinates the pool of mentors and is responsible for the overall mentoring process. ITINNOV will ensure that mentors are allocated to each project and that each mentor fulfils their responsibilities of:

- Providing regular reports on the progress to the FLAME consortium.
- Identifying issues to be escalated to the FLAME partners which pose a risk to the project.
- Allocating FLAME partners to assist with troubleshooting issues with the projects.
- Reporting on the review of each project at the completion stage.

11 Proposal Information

It is considered that the proposals that are submitted under the fourth Open Call, are extensions of the proposals submitted in the First, Second and Third Open Call, describing the newly

suggested experimentation activities. Thus, it is not expected that the full templates will be filled, but only the updated ones.
Nevertheless, the use of a specific proposal format as described in this section is mandatory. Here you may find a short description of all the proposal template sections:

Section A **Proposal Overview** (maximum 200 words)
This section needs to be updated according to the activities that will be executed in the project extension

Section B **Detailed description of the experimentation activities** (maximum ½ page)
This section describes the details of the proposed further experimentation activities and demonstration potential.

Section C **Usage of FLAME platform, infrastructure and media services** (maximum ½ page)
This section describes how the proposers intend to use the FLAME platform, infrastructure and media services during the suggested further experimentation activities.

Section D **Data Management Plan**
Not applicable

Section E **Feasibility check**
Not applicable

Section F **Background and qualifications**
Not applicable

Section G **Expected feedback to FLAME Consortium**
Not applicable

Section H **Requested funding** (½ page)
This section provides an overview of the budgeted costs and the requested funding. A split is made in personnel costs, other direct costs and indirect costs.

Section I **Use of proposal information**
In this section the proposing party is asked to select some statements related to sharing information of his proposal with the EC and the FLAME consortium.

Section J **Use of proposal information**
In this section the proposing party is asked to update some ethical and privacy statements (if necessary).

The full proposal template can be found in Annex A to this document.

12 Evaluation Process

Evaluation and ranking will be carried out internally by a jury nominated within FLAME partners . Proposals submitted by Parties meeting the requirements will be further evaluated according to the following criteria:

1. ***Clarity and methodology*** (Cf. Section B of the Proposal Template)

   The 3rd party projects should have a clear plan for the implementation of the extended experimentation activities.

2. ***Use of Service Design Pattern*** (Cf. Section C of the Proposal Template)

   The 3rd party should have a clear idea of which FLAME service design patterns will be utilised

3. ***Demonstration potential (***cf. Section B of the proposal template)

   The expected results of the 3rd party project should have potential for demonstration of the results on relevant events (exhibitions, congresses, technical seminars, networking events, user group events, etc.). The proposer is expected to identify relevant demonstration opportunities.

Criterion	Short description	Weight	Maximum score
1	Clarity and methodology	1	5
2	Use of Service Design Pattern	1	5
3	Demonstration potential	2	10
		Maximum Total score	**40**

13 Reporting

As the selected proposers Third Party in the FLAME project, no input will be required for any of the regular project reports (FLAME deliverables), which the FLAME consortium needs to submit to the EC.
The Third Party only has to submit a final report after completion of the 3rd party project. A specific template needs to be used and will include:

Part A. ***Summary***

Part B. ***Detailed description***

This section describes the details on the 3rd party project
It includes:

- B.1 Concept, Objectives, Set-up and Background
- B.2 Technical results and Functionality Validation
- B.3 Impact

Part C. ***Feedback to FLAME***

This section contains valuable information for the FLAME consortium and describes the Third Party's experiences while performing the 3rd party project.

Part D. ***Promotion Material***

This section provides information that can be used to make a leaflet/poster and a blog of your 3rd party project for promotional purposes

This report will not only serve as an evaluation tool to judge payment of the Third Party, but will also serve as:

- input to the evaluation of the user-friendliness of the FLAME facilities, and
- identification of gaps in the offered facilities and functionalities.

Part of this report may be used by the FLAME consortium for inclusion in their reporting documents to the EC and in public presentations. Inclusion of confidential information should therefore be indicated and discussed with the FLAME consortium.

This report will also be used for the formal review by the European Commission. Each Third Party is expected to attend this formal review meeting with the EC. In exceptional cases (to be motivated by the Third Party), the Third Party can be represented by his Mentor.
The template for the final report will be made available during the execution of the 3rd party project.

14 Financial and Contractual Information

As in Info documents of OC1 (https://www.ict-flame.eu/open-calls/1st-flame-open-call/), OC2 (https://www.ict-flame.eu/open-calls/2nd-flame-open-call/), OC3 (https://www.ict-flame.eu/open-calls/3rd-flame-open-call/) the FLAME Contract, to be signed between The University of Southampton and the Open Call Company will be finalised by the end of the open call period and include:

Contracting parties

1. General provisions
2. Entry into force of the contract and termination
3. Performance obligations and responsibilities of the Company
4. Conflict of Interests
5. Breach of contractual obligations
6. Funding and financial provisions
7. Liability of the Company
8. Confidentiality
9. Intellectual property rights
10. Force Majeure
11. Information and Dissemination
12. Financial audits and controls
13. Termination and Suspension
14. Language
15. Amendments
16. Applicable law
17. Settlement of disputes
Annexes to the Contract
Annex 1: 3rd party project description
Annex 2: Guide for applicants
Annex 3: Bank account information form
Annex 4: Declaration of honour
Annex 5: Administrative data form
Annex 6: Company validation information
Annex 7: Data Sharing Agreement

Annex A Proposal template