Grant Agreement No.: 644663
Call: H2020-ICT-2014-1
Topic: ICT-05-2014
Type of Action: RIA

architectuRe for an Internet For Everybody

D5.11: architectuRe of an Internet For Everybody (RIFE) document

Work package	WP 5
Task	Task 5.3
Due date	31.03.2018
Submission date	31.03.2018
Deliverable lead	Thales Alenia Space
Version	1.0
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Abstract	This final version of the project summary provides a public description of the project that includes its main goals, objectives and overall achievements.

Keywords	Future Internet architectures, Information-Centric networks (ICN), Delay-Tolerant Networks (DTN)

Project co-funded by the European Commission in the H2020 Programme		
Nature of the deliverable	**R**	
Dissemination level		
PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to bodies determined by the RIFE project	
CO	Confidential to RIFE project and Commission Services	

architectuRe for an Internet For Everybody

Our objective: to provide sustainable and affordable access to the Internet to everybody, in particular including those who cannot afford such access under the current economic constraints of Internet service provisioning.

Concept

The vision of RIFE was to address the problem of providing affordable and sustainable access to the Internet by realising an *architecture for an Internet for everybody* that enables access to information and services at economically sustainable price points unmatched by today's technologies, while also catering to challenges, such as intermittent connectivity, posed by the varying environmental challenges that are imposed on those who want to connect.

The RIFE project objectives' aim was therefore to provide innovations for *an Internet for everybody*.

Building on prior academic work, the following major outcomes have been realised:

1. The definition of *a unifying architecture* with clear interfaces provided to application developers. The focus has been placed on the convergence between ICN, DTN and caching mechanisms,
2. The development of *novel dissemination strategies* that jointly optimise bandwidth, storage and computation resources available, integrating diverse network environments into the single RIFE architecture, and
3. A set of service and application functions that enables the full utilisation of the RIFE architecture in real-life settings.

For achieving these objectives, the following steps have been taken:

- A RIFE prototype platform has first been implemented and then tested against Key Performance Indicators in both testbed and emulation settings, and
- An operational Field Trial was deployed within a community network that is linked via real-life satellite connectivity.

Finally, an accurate *evaluation of the commercial viability of the RIFE platform* has been realised to provide the basis for a sustainable value chain, and *establish RIFE as a key driver in the wider community* of practitioners and researchers in this field.

Technical Approach

Our vision to make the Internet ubiquitous and accessible is a holistic one that couples social and economic incentives with ongoing and envisioned future Internet architectures. Through this coupling, we spur innovation for a wide range of new business models, such as:

- Opportunities for non-governmental organisations and local governments (driven by social goals rather than economic) to become virtual network operators,
- New models for revenue creation from currently under-utilised infrastructure, allowing lower-quality time-shifted services, and

We utilised well-researched practices, results, and working platforms in key networking areas, such as DTN and ICN, combined into a novel approach to provide such Internet services at unforeseen price points over a wide range of connectivity options. Our solid technological starting points allowed us for moving our ideas quickly from the lab to the market by deploying initial trials within the lifetime of the project and getting real users to experience the Internet for everybody.

The following components have contributed to the RIFE success:

- Our *unifying technical platform* to enable the services we envision,
- Our *business platform* to enable the markets necessary to make these services holistically sustainable, and
- Our *deployment platform* to provide a concrete and tangible proof of the readiness of our approach, aiding the engagement with the growing community in this space and interested stakeholders in the Internet value chain.

Achievements

Our trial has been deployed for real users based in Tarragona in Catalonia, Spain, and now forms part of the Guifi community network.

We have succeeded in:

- Deploying an ICN network with six supernodes in six villages in Tarragona, Catalonia, Spain,
- Gaining insights into the suitability of IP-over-ICN for providing cheaper Internet connectivity given that regular operators are often much more expensive in their provisioning of Internet service for such remote locations,
- Innovating in areas such as surrogate management, multicasting, edge caching, and low-cost satellite connectivity,
- Developing local services using DTN technologies and interworking them across different locations,
- Evolving DTN technologies towards broader application use cases and easier programmability,
- Gaining insights into stimulating localised service deployments,
- Gaining insight into the operational complexity of such a deployment,
- Providing technical guidance to develop the next version of IP-over-ICN.

