

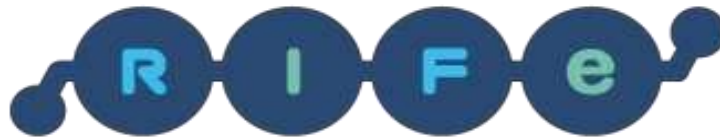


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D5.5: RIFE Standardization Activity

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PP	Restricted to other programme participants (including the Commission Services)	
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¹ R: report, P: prototype, D: demonstrator, O: other

EXECUTIVE SUMMARY

Standardization contributions are an important form of dissemination and exploitation of the RIFE results. Thus, we contributed to ongoing work in standardization bodies and ensured that RIFE research activities were aligned with the existing trends.

This deliverable reports on the progress, contributions and activities in the relevant standardization bodies during RP2.

TABLE OF CONTENTS

EXECUTIVE SUMMARY..... 3

TABLE OF CONTENTS 4

1. INTRODUCTION..... 5

2. STANDARDIZATION ACTIVITIES..... 5

 2.1 Identification of the standardization bodies targeted in RIFE 5

3. STANDARDS CONTRIBUTIONS..... 6

 3.1 ETSI 6

 3.2 IETF 6

 3.3 ITU-T 7

 3.4 3GPP 7

4. STANDARDIZATION DRAFTS..... 8

5. CONCLUSION..... 10

1. INTRODUCTION

This deliverable outlines RIFE's main achievements in terms of standardization activities throughout RP2 of the project.

2. STANDARDIZATION ACTIVITIES

RIFE's specific standardization activities included contributing to (draft) specifications or concepts, and taking the initiative in designing system and protocol aspects, as applicable.

Partners contributed in the Internet Engineering Task Force (IETF) and Internet Research Task Force (IRTF), but also within the ETSI, ITU-T and 3GPP, in order to position DTN and ICN as an exploitable technology.

For instance, we actively contributed to scenario and research challenge definitions as well as position the RIFE functional components as a possible approach for traversing ICN, DTN and traditional IP deployments.

Different approaches have enabled to maximize the RIFE influence. In the following, we present our strategy, and our main achievements for the major standardization bodies.

2.1 Identification of the standardization bodies targeted in RIFE

Regarding RIFE's ambition to be broadly deployed, monitoring but also contributing to standardization bodies has been an essential task.

We have identified during the project several main standardization organizations we thought useful for pushing the RIFE vision forward, and promoting its outcomes for increasing the level of interworking and integration between systems and networks. Specifically, the consortium's targets were:

- **ETSI: European Communication Standard Institute** with the goal of introducing satellite-related work, specifically regarding backhaul reservation, allocation and scheduling solutions into suitable working groups within ETSI.
- **IETF: Internet Engineering Task Force**, with the goal of introducing content placement and best-effort traffic engineering solutions into suitable working groups. In addition, we are currently investigating the possibility of organizing a joint BOF event for the formation of a new IETF WG on IP-over-ICN solutions, together with the POINT H2020 project.
- **IRTF: Internet Research Task Force**, provides a suitable route for evangelizing the vision and the solutions of RIFE towards a practitioner audience in the space of global access. Specifically, the GAIA working group (Global Access for the Internet for All) is a key forum for RIFE. We have increased the visibility of RIFE through informational and trial-related drafts but also architectural work that strives towards laying out key architectural foundations for a Future Internet for Everybody. In addition, we have

injected key contributions into the ICNRG (Information-centric Networking RG), specifically on the intersection of ICN and DTN as well as the utilization of IOverICN solutions in RIFE.

- **3GPP: Third Generation Partnership Project** is a leading organization in the development of standards for cellular systems, worldwide. One of its main task is to provide the specifications agreed upon by the Telecom Industry, and through the coordination of work issued by different regional regulators (such as ETSI in Europe, ATIS in USA, ARIB/TTC, CCSA. Due to the development of mobile usage in our everyday life, 3GPP also has strong interactions or impacts based on interactions with the standardization of other telecom systems (including non-mobile access systems, networks, and protocol standards).

3GPP addresses three main aspects: (1) Radio Access Network; (2) Service and System aspects; and (3) Core Network and Terminals.

The organization has been responsible for the standardization of mobile broadband standards of the different generations (technically issued as “Release”) from 2.5G systems (EDGE, GPRS), 3G (UMTS; HSDPA; HSUPA) to 4G (LTE; LTE Advanced).

The 5G generation is a main next target for 3GPP. Commercial deployment of the 5G system is expected from 2020, in which much efforts are currently engaged by the 3GPP supporting industry, including at the European institutional level.

- **ITU-T: International Telecommunications Union Telecommunication Standardization Sector** and the specific interest in the ITU are the ongoing activities around 5G, specifically in the IMT2020 working group. The ICN Study Group was established in 2016 with calls to the community for contributions.

3. STANDARDS CONTRIBUTIONS

The following are contributions, participations and presentations to the various targeted standardization organizations described in Section 2.1.

3.1 ETSI

1. **ETSI MEC** (Multi-access Edge Computing), March 2017, Sophia Antipolis, D. Trossen (IDC) participated in the consideration for ETSI MEC Phase 2.
2. **ETSI MEC**, Contribution to ETSI MEC conference call with a new use case and requirement document, explicitly listing the need for POINT routing capabilities, D. Trossen (IDC).

3.2 IETF

1. **IETF 97th Proceedings, IETF Operations, Administration, and Technical Plenary**, 13th - 18th November 2016, Seoul, Korea, J. Ott (TUM) participated in the conference.

2. **IETF 99**, 16th - 21st July 2017, Prague, Czech Republic, A. Rahman (IDC) presented SFC draft on service surrogate routing.
3. **IETF 99 - IRTF GAIA**, 19th July 2017, Prague, Czech Republic, R. Baig (guifi.net) presented “Cloudy, a cloud stack for community cloud.”
4. **IETF SROLS2 barBOF at IETF 99**, 16th - 21st July 2017, Prague, Czech Republic, D. Trossen (IDC) organized an afternoon session on the service routing over L2 (SROL2) problem, introducing FLIPS/POINT as a solution, to an audience of operators, vendors and interested individuals.
5. **IETF 100 Singapore 2017**, 11th - 17th November 2017, Singapore, D. Trossen (IDC) contributed to ICNRG on deployment of ICN (IRTF ICNRG) and to SFC WG on service request routing (IETF SFC WG) and also organized a follow up meeting.
6. **IETF 101 London 2018**, 17th - 23rd March 2018, London, UK, D. Trossen (IDC) organized a large meeting with operator and vendor presentations around service routing.
7. **IETF RTG (Routing) WG, IETF 101**, 17th - 23rd March 2018, London, UK, D. Trossen (IDC) presented service routing over path-based forwarding to the larger Routing WG.

3.3 ITU-T

1. **ITU-T IMT-2020**, 5th - 7th December 2016, Geneva, Switzerland, D. Trossen (IDC) presented and demonstrated at the ITU IMT2020 ICN Study Group.
2. **ITU IMT-2020 ICN SG**, July 2017, U. Olevera (IDC) presented and demonstrated surrogate routing.

3.4 3GPP

1. InterDigital together with Deutsche Telekom, Huawei, Orange and NEC contributed to the inclusion of ‘service-based architecture’ (SBA) as a fundamental paradigm shift to control plane design for 5G systems through the 5GPPP project CONFIG. The SBA paradigm was included into Release 15 of 3GPP. In the course of those discussions, IDC wrote a whitepaper on ‘service routing over L2 (SROL2)’ as a problem statement for work in 3GPP and the IETF.
For Release 16, the 3GPP has created a study item on SBA to identify key issues to its realization with HTTP being the main application protocol. In collaboration with Deutsche Telekom, InterDigital has realized a joint SBA demo based on its new FLIPS (Flexible IP services) platform.

4. STANDARDIZATION DRAFTS

The following is a comprehensive list of accepted standardization drafts during RP2.

No.	Date	Draft Title	WG	URL	Authors
1	August 2016	Alternative Network Deployments: Taxonomy, Characterization, Technologies, and Architectures	IRTF RFC 7962	https://www.rfc-editor.org/rfc/rfc7962.txt	J. Saldana, ED (Univ of Zaragoza) A. Arcia-Moret, A. Sathiaseelan (UCAM) B. Braem (iMinds) E. Piertrpsemoli, M. Zennaro (Abdus Salam ICTP)
2	11 th March, 2017 18 th May, 2017 17 th October, 2017	Deployment Configurations for Information-Centric Networks (ICN)	ICNRG	draft-rahman-icnrg-deployment-guidelines-00 draft-rahman-icnrg-deployment-guidelines-01 draft-rahman-icnrg-deployment-guidelines-04	A. Rahman, D. Trossen (IDC) D. Kutscher, R. Ravindran (Huawei)
3	19 th September, 2017	Native Deployment of ICN in LTE, 4G Mobile Networks	IETF 100	draft-suthar-icnrg-icn-lte-4g-03	M. Stolic, A. Jangam (Cisco Systems) D. Trossen (IDC)
4	1 st July, 2017 27 th October, 2017	Use Case For Handling Dynamic Chaining and Service Indirection Alternative Handling of Dynamic Chaining and Service Indirection Presentation at IETF 100 and 101	NWG Internet Draft	draft-purkayastha-sfc-service-indirection-00 draft-purkayastha-sfc-service-indirection-01	D. Purkayastha, A. Rahman, D. Trossen (IDC) D. Purkayastha, A. Rahman, D. Trossen (IDC) Z. Despotovic, R. Khalili (Huawei)
5	12 th February, 2018	Deployment Considerations for Information-Centric Networking (ICN)	IRTF ICNRG Presentation in IETF 98 (Chicago) and IETF 100 (Singapore)	draft-irtf-icnrg-deployment-guidelines-00	A. Rahman, D. Trossen (IDC), D. Kutscher, R. Ravindran (Huawei)
6	2 nd March, 2018	Optimized Service Function Chaining	Presentation at IETF 100	draft-khalili-sfc-optimized-chaining-00	D. Purkayastha, A. Rahman, D. Trossen

					(IDC) Z. Despotovic, R. Khalili, A. Hecker (Huawei)
7	20 th March, 2018	Delay-Tolerant Networking TCP Convergence Layer Protocol Version 4	IETF DTN	draft-sipos-dtn-tcpclv4	B.Sipos (RKF Engineering), M. Demmer (UC Berkeley), J. Ott (Aalto)
8	27 th October, 2017 1 st March, 2018	Multicast HTTP using BIER Presentation at IETF 100 & 101	NWG Internet Draft IETF BIER (BIT Indexed Explicit Replication)	draft-purkayastha-multicast-http-using-bier-00 draft-ietf-bier-use-cases-04 .txt	D. Purkayastha, A. Rahman, D. Trossen (IDC) N. Kumar, R. Asati (Cisco Systems) M. Chen, X. Xu (Huawei) A. Dolganow (Alcatel-Lucent) T. Przygienda (Ericsson) A. Gulko, T. Reuters (id3as-company Ltd) D. Robinson, V. Arya (DirecTV Inc) C. Bestler (Nexenta)

5. CONCLUSION

This deliverable has reported on the progress, contributions and activities to the relevant standardization bodies during the 2nd Reporting Period (RP2) of the RIFE project. Contributions have been made to the Internet Engineering Task Force (IETF), Internet Research Task Force (IRTF) and the ICN Research Group (ICNRG) in order to position DTN and ICN as an exploitable technology.

The RIFE consortium has participated, presented and made important contributions to various standardization meetings by forwarding the technologies developed within the RIFE project such as service based architecture (SBA) and service surrogate routing. 11 standardization drafts have been published by the above mentioned organizations, as well as one RFC (7962). Partners also organized co-located events at standards body meetings, making presentations and demonstrations.

RIFE's ambition to monitor - but also to contribute to standardization bodies - has been successfully achieved, based on the original strategy defined.