Final project review report – D1.5

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Abstract

This OneFIT Deliverable D1.5 "Final project review report" presents an overview of the project stating its objectives and its major goals to which it has committed, a complete report on the work performed in the period from April 2012 to December 2012 (including the objectives, project achievements, standardisation and regulation contributions), the impact (including dissemination work) and exploitation plans of the project, as well as a comprehensive self-evaluation. Information on the websites of the project (both public and private) is given and the objectives of the forthcoming period are also presented.

Keywords List

Audit, Achievements, Cognitive Management Systems, Opportunistic Networks, Self-Evaluation

Executive Summary

Opportunistic networks and Cognitive Management Systems for Efficient Application Provision in the Future Internet (OneFIT) aims at developing and validating the vision of opportunistic networks that are managed, and coordinated with the infrastructure, by advanced cognitive systems. Validation will show enhanced wireless service provision and extended access capabilities for the Future Internet, through higher resource utilization, lower costs, and management decisions with a larger "green" footprint. OneFIT leads to better services for the user and creates market opportunities for manufacturers, operators and service providers. OneFIT efficiently addresses several technical challenges, and evolves, bundles and exploits different types of approaches, ranging from dynamic spectrum management and infrastructureless networks to social networks.

The main requirements which define the Future Internet, and intrinsically influence the socio-techno-economic future of Europe, provide the incentive for OneFIT:

- Demand for new applications/services and expanded use of wireless,

- Support for diversified applications/services, and

- Need for increased efficiency in resource provisioning and utilization.

OneFIT aims at addressing the requirement to satisfy the demand for applications/services and respective resources, through increased efficiency in resource provisioning and utilization. OneFIT will achieve its target by advancing the state of the art through the development and validation of a *solution* that comprises:

- *Opportunistic networks*, which are operator-governed, temporary, coordinated extensions of the infrastructure. They are dynamically created, through operator spectrum/ policies/ information/ knowledge, in places and at the time they are needed to deliver multimedia flows to mobile users, in a most efficient manner (with respect to the targets outlined above). They can comprise network elements of the infrastructure, and terminals/devices potentially organized in an infrastructureless manner.

- *Cognitive management systems*. Two types of systems are envisaged called "*Cognitive systems for Managing the Opportunistic Network*" (CMONs) and "*Cognitive management Systems for Coordinating the Infrastructure*" (CSCIs). A fundamental idea of the OneFIT concept is to provide the means to facilitate close cooperation between the infrastructure and the opportunistic networks. Such collaboration is essential for ensuring viability, deployment and value creation for all the stakeholders.

- *Control Channels for the Cooperation of the Cognitive Management Systems* (C4MS).

The OneFIT cognitive management entities (CMONs and CSCIs) provide the means for determining the suitability, creating, modifying and handling forced terminations of opportunistic networks. The two entities will have synergies for accomplishing the role.

In the light of the above, this OneFIT Deliverable D1.5 "Final project review report" is an overview of the project stating its objectives and its major goals to which it has committed, a complete report on the work performed in the period from April to December 2012 (including the objectives, project achievements, standardisation and regulation contributions), the impact (including dissemination work) and exploitation plans of the project, as well as a comprehensive self-evaluation. Information on the websites of the project (both public and private) is given and the objectives of the forthcoming period are also presented. Following the contractual project overview, this deliverable is introducing the work undertaken by OneFIT partners from April to December 2012, depicting the objectives for this period, the relationship of the project with the Programme, the work and

achievements in current period, the standard impact and the public demonstration and dissemination events, as well as the future plans for the final audit of March 2013.

In particular, as presented herein, on top of the research development and workpackages achievements, the **major OneFIT project achievements** include:

1. Final Functional and System Architecture

2. C4MS final specifications and performance evaluation

3. Algorithms

4. Prototype for the experiments and validation of the OneFIT solution

5. Standards

6. Dissemination, Regulation, Standardization, Exploitation & Training

On the standardization front, the OneFIT consortium initiated efforts and created a Work Item in ETSI RRS titled "Feasibility Study on Control Channels for Cognitive Radio Systems". The work culminated in ratification of TR 102 684 "Reconfigurable Radio Systems (RRS); Feasibility Study on Control Channels for Cognitive Radio Systems", in 2012. OneFIT partners also joined an initiative (Work Item) in 3GPP dedicated to the "proximity-based services" on the basis of device-to-device communications as an enabler of the concept of Opportunistic Networks. Consortium members provided Contributions related to device-to-device communication (D2DC) towards TR 22.803 "Feasibility Study for Proximity Services (ProSe)". Furthermore, the OneFIT partners have been active in contributing and participating to ITU-R WP5A meetings and promoting control channel related topics in the report tentatively called "Cognitive radio systems [(CRS) applications] in the land mobile service".

Furthermore, the gains that derived from the OneFIT solution comprise performance as well as energy benefits both for the operator and the end-user. Indicatively, regarding the communication quality of congested infrastructure, the delay of successfully delivered messages dropped approximately 15-35% after the OneFIT solution enforcement, while an average decrease of 15-40% has been achieved in the load of the congested infrastructures. As far as energy aspects are concerned, the energy consumption of the problematic infrastructures was reduced by 15-25%, while the transmission power of terminals that switched to ON was reduced by 27% approximately.

In order to ensure that dissemination and exploitation of the results is a major objective of the different partners of the OneFIT consortium, and also keep the competences and skills of such a technology in Europe as far as practicable, the partners are very attentive to promoting a rapid technology transfer. OneFIT is supporting and cross-fertilising related activities so that they collectively benefit from each other technical know-how and expertise. Additionally, the OneFIT consortium is always proactively taking additional measures to raise awareness and promote the adoption of the OneFIT technical concepts though the development of the OneFIT public website https://www.ict-onefit.eu/, that is on-line since the very beginning of the project in July 2010, and is being continuously updated and enhanced with the OneFIT upcoming events and activities.

During the period from April to December 2012, the dissemination activities were focusing on further establishing the framework of the project and ensure the widest possible degree of dissemination of the results and awareness raised inside the project. The OneFIT dissemination approach and achievements are presented in terms of publishing of journal papers, book chapters, conference contributions, tutorials, presentations in concertation and cluster meetings, patents' filing, standardisation contributions and regulatory contributions.

In terms of organisation and participation to events, the very active role of OneFIT is highlighted. The OneFIT project co-organised and participated to the Federation Workshop, in the context of Future Networks and Mobile Summit (FNMS) 2012, in collaboration with UniverSelf, One and GEYSERS Projects. This workshop was organised for the second time, as a continuation of the collaboration established in 2011. In this workshop two presentations and one panel session were given on the part of OneFIT. Finally, OneFIT participated to a panel session in the context of "White Space" Panel at SDR'12-WInnComm-Europe, as well as to the COST/ECC Workshop, ETP Net!Works Experts Workshop, Cognitive Radio Workshop - NGMN, "White Space" Panel at SDR'12-WInnComm-Europe and Second FIA Roadmapping Open Workshop.

Furthermore, the OneFIT project is actively participating in the activities organised at programme level relating to the ICT area with the objective of providing input towards common activities and receiving feedback (e.g. from clusters), offering advice and guidance and receiving information relating to ICT programme implementation, standards, policy and regulatory activities, national or international initiatives, etc.

Based on the conclusions from the internal evaluation over the complete consortium, it is clear that the project is very strong from focus, consortium skills, coherence, structure, and management perspectives. The quality of the work performed in the period from April to December 2012 is very good and all contractual commitments have been respected. The research and outcomes are widely disseminated and the project has even been further introduced to several standardization and regulatory bodies.

In conclusion, during the fourth and final reporting period, the full STREP and consortium dimensions have been developed, and therefore OneFIT has fully reached its objectives.

The project achievements are huge and exceed the expectations.

Building on the successful achievements of the four reporting periods of OneFIT, the project will pursue in 2013 its successful completeness in the Final Audit 2013, demonstrating its full STREP dimension and potential, through various streams.