



TNOVA

NETWORK FUNCTIONS AS-A-SERVICE  
OVER VIRTUALISED INFRASTRUCTURES

GRANT AGREEMENT NO. 619520

Deliverable D8.31

# First Report on Dissemination and Communication Activities

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## **Executive Summary**

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This document outlines the dissemination activities during the first year of the project as well as the dissemination planning for the following year. It provides a list of all related activities including publications, presentations, and dissemination through the Internet and social media.

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## 1. INTRODUCTION

Dissemination of the project results to a wider audience is one of the primary aims of T-NOVA. We have been pursuing communication and dissemination through the dual avenues of publications/presentations and Internet/social media. The T-NOVA concept and early project results have been already presented in several international conferences and workshops. Additional presentations have been given by T-NOVA partners at various events, including the FIA Assembly in Athens, the IRTF NFVRG meeting (co-located with the 91<sup>st</sup> IETF) in Hawaii, US, and the interim NFVRG meeting in Austin Texas.

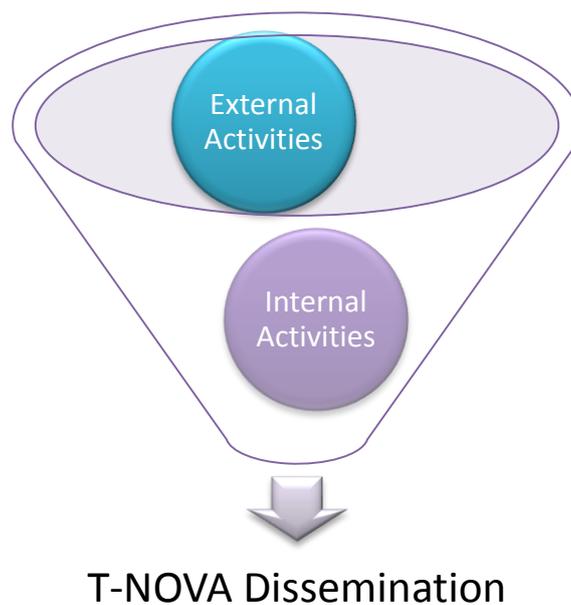
We have also taken advantage of Internet and social media (*i.e.*, LinkedIn, Twitter) to further increase the project visibility and establish communication channels with the academic and industrial community. Furthermore, we have initiated engagements with ongoing projects thematically relevant to T-NOVA, such as UNIFY, NETIDE, and MCN, as well as with the recently started (1/9/2014) ESA project CLOUDSAT. We further plan to initiate discussion with the ICT project VITAL, which is due to start in February 2015.

In this deliverable, we provide an overview of the project dissemination activities during 2014. We further present our dissemination plan for the following year.

## 2. DISSEMINATION PLAN

Communication and dissemination activities are important enablers in ensuring appropriate visibility and maximising benefits of FP7 funded research to the European scientific community. These activities are focused on generating an effective flow of information and publicity regarding the target objectives, the key project contributions, and the benefits to EU citizens as well as the collaboration on Europe-wide scale.

The T-NOVA dissemination plan consists of internal and external activities.



**Figure 1: T-NOVA Dissemination**

External dissemination is focused on the industrial and academic communities both in Europe and internationally, while spanning across individual researchers, providers, end-users, and stakeholders involved or interested in the T-NOVA concept. External dissemination includes the project's website, scientific publications, project presentations, participation in conferences and organization of events, such as workshops.

Internal dissemination encompasses all the activities carried out between the consortium members. Such activities include mailing lists, plenary and technical meetings, conference calls, online tools, common documentation, and deliverables.

## 2.1. Dissemination and Communication Tools

The following figure illustrates the dissemination and communication tools used to disseminate the project's results.



**Figure 2: T-NOVA dissemination & communication tools**

## 2.2. Plans for Liaisons with other Projects

Within T-NOVA's plans are the selection of a number of projects with relevant objectives and activities and establish a continuous link with them, in the following areas:

- Bi-lateral discussions between participants of T-NOVA and other projects in order to develop a common understanding of potential synergies.
- Exchange of technical information in order to identify the common areas of R&D for which both T-NOVA and other projects have interest and mutual benefit
- Organisation of joint workshops preferably at the side lines of conferences in areas of mutual interest
- Common participation in conferences/workshops in order to inform the wider scientific community about the key outputs and planned activities of the projects
- Exchange of deliverables
- Providing access to technical results of other projects in order to properly adapt them for the needs of T-NOVA, as well as to tools and results from T-NOVA to other projects
- Participation of T-NOVA consortium members in technical meetings of other projects and vice versa

The consortium identified two EU projects that are thematically relevant to T-NOVA, namely UNIFY and NETIDE. Engagement with these two projects has already been

initiated before the official starting date of T-NOVA, under the encouragement of the EC.

## 2.3. Scientific Journals

The following table provides a list of scientific journals with high impact factor that will comprise submission targets for the T-NOVA architecture and results.

**Table 1: Scientific Journals**

Journal	Publisher	Thematic Area	Journal Information
IEEE Communications Magazine	IEEE	Networking	dl.comsoc.org/ci1/
IEEE Network Magazine	IEEE	Networking	<a href="http://www.comsoc.org/netmag">www.comsoc.org/netmag</a>
IEEE Transactions on Network and Service Management	IEEE	Network Management	<a href="http://www.comsoc.org/tnsm">http://www.comsoc.org/tnsm</a>
Computer Networks	Elsevier	Networking	<a href="http://www.journals.elsevier.com/computer-networks/">http://www.journals.elsevier.com/computer-networks/</a>

## 2.4. International Conferences

A list of international conferences that will be targeted by the T-NOVA consortium is shown below. Several of the targeted conferences (*e.g.*, INFOCOM, CONEXT) constitute premier venues for the publication of networking research results.

**Table 2: International Conferences**

Conference	Type of Audience
IEEE GLOBECOM	Research and Industry
IFIP/IEEE Networking	Research
IEEE INFOCOM	Research
ACM CONEXT	Research
IEEE ICC	Research and Industry

## 2.5. Build a Network of Interest (NoI)

The dissemination activities planned in the T-NOVA project aim to foster collaboration opportunities, exchange knowledge, and raise awareness among a large group of stakeholders and players in the NFV and SDN domains.

More specifically, the T-NOVA NoI should include actors from the industry and SMEs. It will be enriched by stakeholders from public bodies, European Commission representatives, press and media organisations, academic and research institutions and other related EU projects. The T-NOVA consortium will identify potential collaboration opportunities; promote the T-NOVA project and results while helping to develop synergies between related initiatives in order to expand the project's Network of Interest.

## 2.6. Individual Partner Dissemination Activities

Besides publications of project results in conferences and journals pursued by all partners, we provide a list of additional planned dissemination activities on a per partner basis:

**Table 3: Partners' Dissemination Plans**

Activity	Partner
Preparation and submission of technical papers to international scientific journals of high impact factor	ALL
Participation in seminars and workshops	ALL
Dissemination of project results in the annual Summer School in Telecommunications that is organised in its premises	NCSR D
Organisation of workshops in NFV	NCSR D
Internal bulletins, news feeds and internal networking with account managers to ensure awareness of the project and its main innovations as future assets for ATOS	ATOS
External reach to promote innovation and research activity through our corporate website, ARI Booklet and the ATOS' Scientific Community	ATOS
Publication of technical and business white papers at "ATOS Insights & Innovation" and participation in project papers.	ATOS
Internal dissemination within HP, through workshops/presentations, internal website, and newsletter.	HP
Dissemination of results within Portugal Telecom group via internal workshops and technical publications	PTIN

Promotion of T-NOVA results through key public Intel showcase events such as the Intel Developer Forum (IDF) and Research@Intel (US and Europe annual events)	INTEL
Promotion T-NOVA results at industry events such as mobile world congress	INTEL
Promotion of T-NOVA through the PrimeTime magazine (also available online) and the company's website	PTL
Preparation of promotional material such as video and leaflets	PTL
Promotion of T-NOVA through the company's quarterly SpaceTalk magazine and the company's website	SPH
Investigation and communication of the benefits of the T-NOVA solution as a member of the integral Satcom Initiative (ISI) European Technology Platform ( <a href="http://www.isi-initiative.org">http://www.isi-initiative.org</a> )	SPH
Organization of a T-NOVA workshop in Athens, where attendees from local and international enterprises from the telco/networking sector will be invited to see a "hands-on" demonstration of the T-NOVA services and capabilities	SPH
Organization of pilot sites and demonstrations for potential clients	VIO
Campaigns in specialized press, testing websites (CNET, ZDNet, etc.), media shows, social networks buzz through renowned tech experts	VIO
Promotion of T-NOVA in MEF conferences and meetings	CLDST
Promotion of T-NOVA through FINT's website and news releases about project progress and related events	FINT
Promotion of T-NOVA through Italtel website and social networks	ITALTEL
Workshop organisation as part of the TEMU2014/2016 International conference (TCS by IEEE/ComSoc)	TEIC
Promotion of T-NOVA through TEIC's and PASIPHAE's websites, as well as through press releases related to project's activities and results	TEIC
Dissemination and communication of T-NOVA concept and results among students through ERASMUS Life Long Learning activities (e.g. Intensive Programmes, Summer Schools, etc.)	TEIC
Open-source software releases	LUH
Organization of demos/exhibitions of the developed systems	UNIMI
Dissemination of the project results among the regional members of its board	i2CAT

## 2.7. Dissemination KPIs

The following table summarizes the key performance indicators (KPIs) related to the dissemination activities. These KPIs will be continuously monitored to ensure the successful accomplishment of the project's dissemination objectives.

**Table 4: Dissemination KPIs**

KPI	Target
Number of papers published in international refereed journals	> 15
Number of papers presented in international conferences	> 30
Number of demonstrations in exhibitions and other events	> 6
Number of workshops/meetings with liaised projects (UNIFY, NETIDE)	4

### 3. DISSEMINATION AND COMMUNICATION ACTIVITIES DURING THE FIRST PERIOD

#### 3.1. Activities for Liaisons with other Projects

As already referred in section 2.2, the T-NOVA consortium identified two EU projects that are thematically relevant to T-NOVA, namely UNIFY and NETIDE, and, under the encouragement of the Commission, initial discussions with them already started even before the official starting date of T-NOVA.

During the first year, T-NOVA identified two more EU projects which are relevant, namely MCN and PACE, and started discussions on common fields of interest. We also identified the ESA project CLOUDSAT started on 1/9/2014 and also the EU project VITAL, which is due to begin in February 2015, with both of them having common areas of interest and willingness to collaborate. The following table shows the fields of possible collaboration with the identified projects and the actions taken.

**Table 5: Activities for liaisons between T-NOVA and other projects**

Project acronym	Field of possible collaboration	Actions taken	Reference/Link
<b>UNIFY</b>	NFaaS enabling architectures	Participation in common workshops, exchange of relative technical and architectural views	[1] <a href="http://www.netide.eu/events/fia-athens-2014">http://www.netide.eu/events/fia-athens-2014</a>
<b>NETIDE</b>	SDN4SDK	Participation in common workshops, exchange of relative technical and architectural views	[1] <a href="http://www.netide.eu/events/fia-athens-2014">http://www.netide.eu/events/fia-athens-2014</a> [2] <a href="http://www.netide.eu/news/successful-joint-netidet-nova-session-eucnc-2014">http://www.netide.eu/news/successful-joint-netidet-nova-session-eucnc-2014</a>
<b>MCN</b>	Service composition engine developed in MCN	Investigation of possible reuse of source/binary code produced by MCN for T-NOVA composition engine – in progress	[1] <a href="http://www.mobile-cloud-networking.eu/site/">http://www.mobile-cloud-networking.eu/site/</a>

<b>PACE</b>	Path computational element in SDN environment	Investigation of possible reuse of PCE implemented algorithm in T-NOVA  Initial contacts	[1] <a href="http://ict-one.eu/pace/public_wiki/mediawiki-1.19.7/index.php?title=Projects">http://ict-one.eu/pace/public_wiki/mediawiki-1.19.7/index.php?title=Projects</a>
<b>CLOUDSAT</b>	Investigation on the efficiency of usage of SDN and NFV technologies in satellite networks. Elaboration on NFV architectures.	Initiate discussions with the PM and participation in one deliverable	The project started in September, and NCSR D is a partner.
<b>VITAL</b>	Investigation on the re-use of the T-NOVA orchestrator in composite satellite-terrestrial networks	Initial discussions with the PM	The project is due to start on February 1 <sup>st</sup> 2015, NCSR D is Technical Coordinator.

### 3.2. Publications in Conferences and Journals

Conferences, workshops, and journals are the main targets for the dissemination of scientific knowledge gained throughout the project. As such, T-NOVA has been actively seeking the publication of project results in reputable international conferences and scientific journals. Tables 6 and 7 show the papers published, accepted or submitted to conferences, workshops, and journals till December 2014.

**Table 6: T-NOVA papers published or accepted by conferences and journals**

Authors	Title	Journal/Conference	Status
I. Giannoulakis, E. Kafetzakis, G. Xylouris, G. Gardikis, A. Kourtis	On the Applications of Efficient NFV Management Towards 5G Networking	The International Conference on 5G for Ubiquitous Connectivity (5GU)	Published
Z. Bozakov and P. Papadimitriou	Towards a Scalable Software-Defined Network Virtualization Platform	IEEE/IFIP International Workshop on SDN Management and Orchestration (SDNMO 2014)	Published
G. Xilouris, E. Trouva, F. Lobillo, J. Soares, J. Carapinha, M. J. McGrath, G. Gardikis, P. Paglierani, E. Pallis, L. Zuccaro, Y. Rebahi, and A. Kourtis	T-NOVA: A Marketplace for Virtualized Network Functions	European Conference on Networks and Communications (EUCNC 2014)	Published
Ferrer Riera, J., Hesselbach, X., Escalona, E., Grasa, E., García-Espín, J.A.	On the Complex Scheduling Formulation of Virtual Network Functions over Optical Networks (Invited)	International Conference on Transparent Optical Networks (ICTON 2014)	Published
Ferrer Riera, J., Batallé, J., Escalona, E., Grasa, E., García-Espín, J.A	Virtual Network Function Scheduling: Concept and Challenges (Invited)	International Conference on Smart Communications in Network Technologies (SACONET 2014)	Published
A. Abujoda and P. Papadimitriou	MIDAS: Middlebox Discovery and Selection for On-Path Flow Processing	7th IEEE International Conference on Communication Systems and Networks (COMSNETS 2015)	Published
Jorge Carapinha, Antonio Cimmino. Authors from D2.1	Requirements and Use cases system for Virtualised Network Functions platforms	Journal of Telecommunication Systems and Management, Vol. 3, Issue 2	In Press

**Table 7: T-NOVA papers submitted to conferences and journals**

Authors	Title	Journal/Conference
D. Dietrich, A. Rizk, and P. Papadimitriou	Multi-Provider Virtual Network Embedding with Limited Information Disclosure	IEEE Transactions on Network and Service Management
N. Herbaut, D. Negru	The path to residential gateway cloud operations	IEEE NetSoft 2015
Aiko Pras, Anastasios Kourtis	Position Paper of FP7 Future Internet Cluster	FP7 Future Internet Cluster
D. Dietrich, A. Abujoda, and P. Papadimitriou	Network Service Embedding across Multiple Providers with Nestor	IFIP/IEEE Networking
Z. Cao and P. Papadimitriou	FreeSurf: Application-centric Wireless Access Architecture	IEEE Network
Jordi Ferrer Riera et al	T-NOVA an Open Extensible Architecture Supporting Virtualized Network Functions as a Service	IEEE Network

### 3.3. Dissemination through Presentations in various events and fora/SDOs

The T-NOVA concept, architecture, and early results have been presented at the events shown in the following tables.

**Table 8: Dissemination through presentations in clusters, workshops and conferences**

Event	Location	Date
<b>EU Net-Tech Future Coordination Meeting - Future Internet (FI) Cluster Meeting</b>	Brussels, Belgium	October 2013
<b>Software-Defined Networking (SDN) Concertation Workshop</b>	Brussels, Belgium	January 2014
<b>Pre-FIA Workshop</b>	Athens, Greece	March 2014
<b>FIA Assembly</b>	Athens, Greece	March 2014
<b>Cloud Computing Conference</b>	Athens, Greece	March 2014
<b>ENISA Security Conference</b>	Athens, Greece	May 2014

<b>SDN &amp; NFV workshop</b>	Paris, France	May, 2014
<b>European Conference on Networks and Communications</b>	Bologna, Italy	June 2014
<b>IEEE International Conference on Telecommunications and Multimedia</b>	Heraklion, Greece	July, 2014
<b>SDN &amp; OpenFlow World Congress</b>	Dusseldorf, Germany	October 2014
<b>SDN &amp; NFV 2014 conference</b>	Nice, France	September 2014
<b>EU Net-Tech Future Coordination Meeting - Future Internet (FI) Cluster Meeting</b>	Brussels, Belgium	October 2014
<b>EU-Taiwan Workshop on 5G Research</b>	Brussels, Belgium	October 2014
<b>5<sup>th</sup> Fokus Fuseco Forum</b>	Berlin, Germany	November 2013

**Table 9: Dissemination through presentations in international organisations**

Event	Location	Date
<b>MEF - SOC, T-NOVA presentation. Explore possible synergies</b>	Teleconference	February 2014
<b>IETF Meeting 91, Proposed Network Function Virtualization Research Group (nfvrg)</b>	Honolulu, Hawaii	November 2014
<b>IETF 2<sup>nd</sup> Interim Meeting Network Function Virtualization Research Group (nfvrg) (stable status)</b>	Austin, Texas	December 2014

The T-NOVA partners have further carried out the following dissemination activities:

- Presentation of T-NOVA's concept, architecture and impact during IEEE International Conference on Telecommunications and Multimedia (TEMU 2014) at Heraklion, Greece, 28-30 July, 2014.
  - Conference participants had the opportunity to visit FINT's booth during the event where a special introductory poster was presented and visitors had the chance to be engaged with the basic functions of the T-NOVA subsystems. The poster is shown in [1].
- Presentation of T-NOVA in corporate newsletter "SPACETalk", May 2014 (printed version distributed to all company partners and clients) – ([http://www.space.gr/EmentorImages/File/Newsletter/SPACETALK\\_MAY2014.pdf](http://www.space.gr/EmentorImages/File/Newsletter/SPACETALK_MAY2014.pdf))
- Periodic presentation of T-NOVA progress on ZHAW blog (<http://blog.zhaw.ch/icclab/>)

- Periodic presentation of T-NOVA progress on NCSR D MNL blog (<http://www.medianetlab.gr>)
- Presence on PrimeTel's R&D site - plans to add project news on development, demos (<http://primetel.com.cy/research/projects/current/t-nova/>)
- Presentation of T-NOVA to Technology Consulting staff of HP Italy in October 2014

### 3.4. Dissemination KPIs for the first year

This section outlines the dissemination and communication activities carried out during the first year of the project. The following table summarizes the achieved key performance indicators (KPIs), as compared to the planned ones

**Table 10: Achieved Dissemination KPIs**

KPI	Target	Current
Number of papers published in international refereed journals	> 15	1
Number of papers presented in international conferences	> 30	6
Number of demonstrations in exhibitions and other events	> 6	0
Number of workshops/meetings with liaised projects (UNIFY, NETIDE)	4	2

### 3.5. Public/social Activities

#### 3.5.1. Public Website

A public website for T-NOVA was set up at the beginning of the project (January 2014) and will be available after the end of the project. The website is regularly updated with project-related activities and announcements.

The T-NOVA website is accessible online at <http://www.t-nova.eu>. We have added the Google Analytics tracking code in the template of T-NOVA website, enabling the tracking of statistics of the project's website. The number of visits (currently ~300 visits/month) and other key statistics are shown in Figure 3.

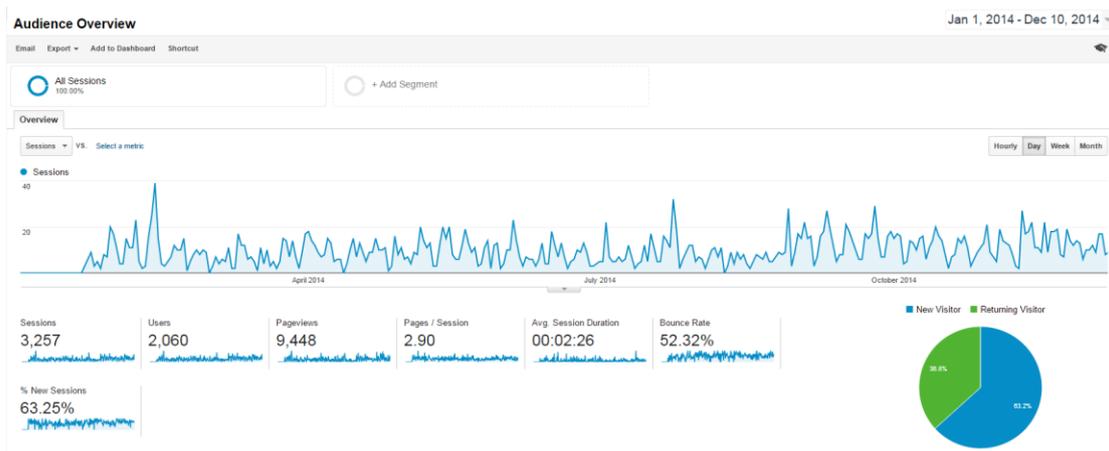


Figure 3: T-NOVA Website Google Analytics Stats

### 3.5.2. Social Network Accounts

Apart from the public website, we have created social network accounts on Twitter, LinkedIn, and Slideshare to further increase the visibility of the project.

#### 3.5.2.1. Twitter

We have created an account on Twitter in order to explore this as a conversational channel by posting live events and news about the project. The T-NOVA account **@FP7TNOVA** has been active since January 2014 and currently has 55 followers, as shown in Figure 4.

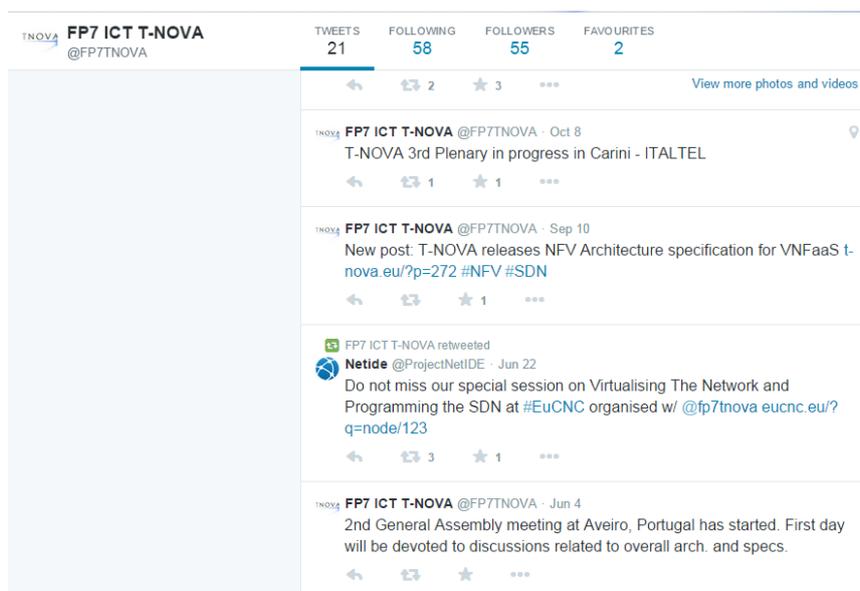


Figure 4: T-NOVA Twitter account

### 3.5.2.2. LinkedIn

A group on LinkedIn was established in September 2014 with the objective of sharing news from T-NOVA, attracting the attention of researchers, practitioners, and stakeholders involved or interested in the thematic areas of T-NOVA. The LinkedIn group is available at: <https://www.linkedin.com/groups/FP7-TNOVA-6760388>

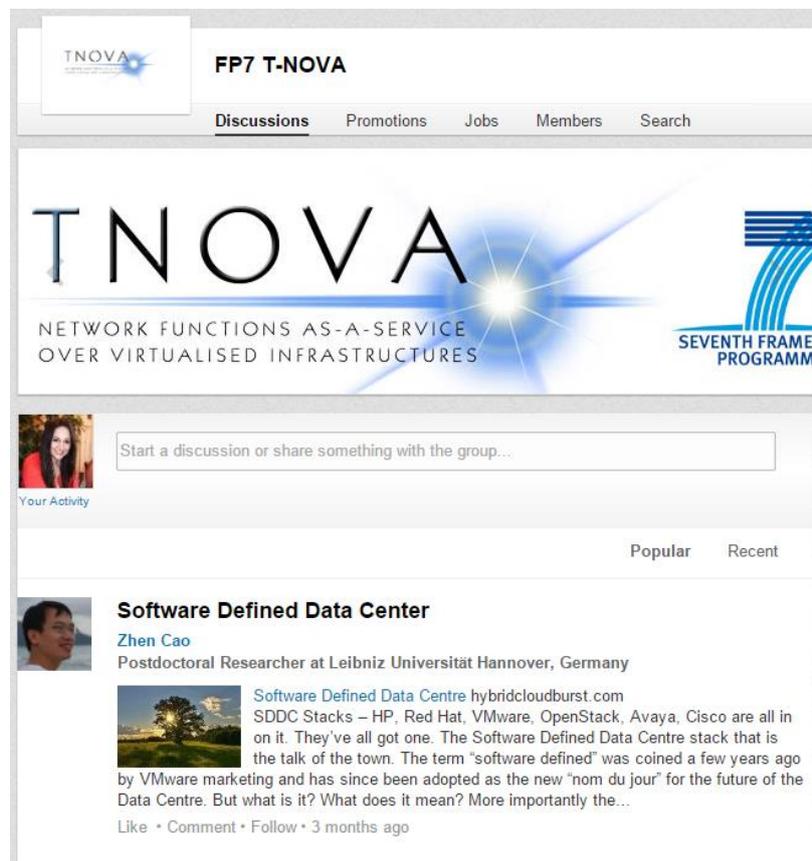
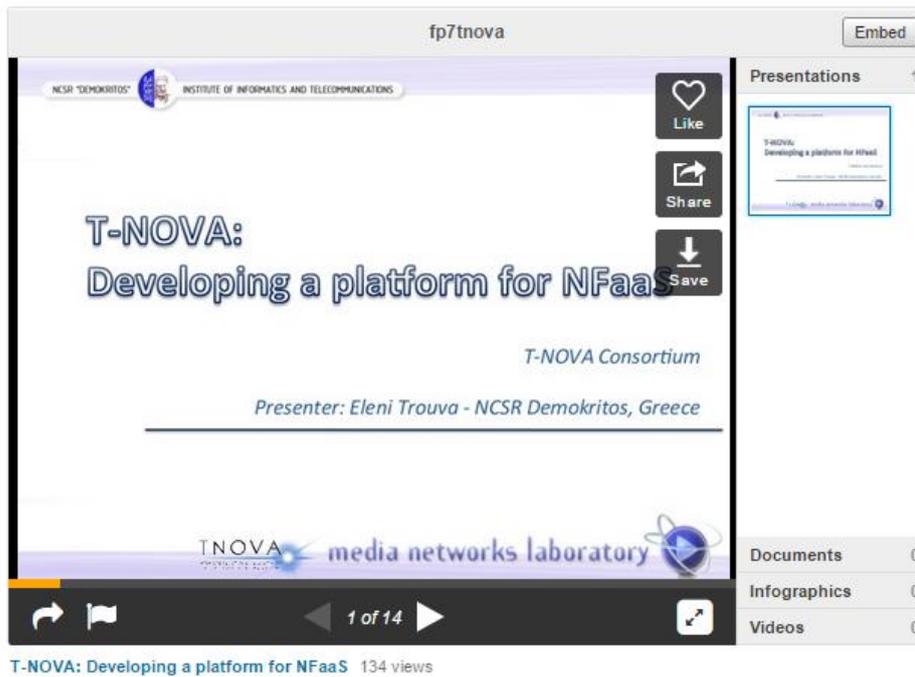


Figure 5: T-NOVA LinkedIn account

### 3.5.2.3. Slideshare

A Slideshare account has been set up to publish presentations and documentation of T-NOVA, in addition to the project website. The Slideshare account has been active since September 2014 and is accessible at: <http://www.slideshare.net/fp7tnova>



**Figure 6:** T-NOVA SlideShare account

## 3.6. Internal Activities

### 3.6.1. Wiki

A Wiki has been setup based on the open-source MediaWiki platform [2] to support daily communication between the project participants. The T-NOVA wiki page has promoted efficiency the centralised management of project tasks and activities among the partners.

### 3.6.2. Mailing Lists

In addition to Wiki, a general T-NOVA mailing list as well as a mailing list for each work package have been setup in order to communicate information within the consortium. All mailing lists have been created using the open-source GNU Mailman software [3].

### 3.6.3. F2F Meetings

The T-NOVA consortium organized face-to-face meetings, including 3 plenary meetings, 1 technical meeting during the first year of the project.

#### Plenary Meetings

- Kickoff Meeting in Athens, Greece - January 2014
- Plenary Meeting in Aveiro, Portugal – June 2014
- Technical (WP3 & WP4) Meeting in Winterthur, Switzerland – September 2014
- Plenary Meeting in Palermo, Italy – October 2014

### 3.6.4. Conference Calls

The Work package leaders organized a weekly or bi-weekly conference call for each task in the project. Minutes and actions defined during the conference calls are recorded on the wiki to ensure that all partners are appropriately informed if unable to participate in a call. In addition, these meeting minutes act as record of decisions made among the participants. The conference calls are also used by partners to provide presentations of enabling technologies and/or their ongoing research work.

## 4. DISSEMINATION PLANS FOR THE SECOND YEAR

According to the time plan of T-NOVA, the work carried out during the first year was mainly focused on the overall architecture and on the development and implementation of an initial version of some tools and techniques. As NFV is a relative new area, the T-NOVA architecture has to be aligned, as much as possible, with current trends in standardisation bodies and other fora, like the ETSI ISG NFV. In this respect, the dissemination of the project's results was more on the architectural level and its compliance with current technological trends.

In the second year, more tangible technical results are expected to be available, which will offer a better ground basis for a wider dissemination of T-NOVA in the industry, as well as in the scientific community.

T-NOVA has already made the appropriate arrangements for participation in two major events, namely Mobile World Congress (MWC) in Barcelona (2-5 March 2015) and EuCNC in Paris (29<sup>th</sup> June – 2<sup>nd</sup> July). In addition, major worldwide conferences have been set as probable dissemination targets, *i.e.*, IEEE SDN&NFV Conference, IEEE INFOCOM, GLOBECOM and ICC.

With respect to international scientific journals, apart from the open calls that exist for submitting research papers, special issues directly related to T-NOVA area of interest will be considered. In addition, Open Access publications that provide fast track publication and dissemination opportunities will be sought.

Finally T-NOVA results will be disseminated to IRTF NFVRG research group or/and other WG in scope (*e.g.*, SDNRG).

## 5. CONCLUSION

The deliverable outlined in brief the plan for the dissemination activities during the whole period of the T-NOVA project and the actual dissemination activities for the first year and also the key plans for the second year. The deliverable provides a detailed description of the activities both internally and externally undertaken in order to increase the project virility and its research output.

The dissemination activities so far include the creation of a public project website, the creation of T-NOVA account on various social networks, conference, workshop and journal papers, T-NOVA presentations and workshops organization.

This deliverable will be revised in the future as new dissemination activities are carried out during the course of the project. Deliverable D8.32 will report the respective activities at the end of the second year of the project.

## LIST OF ACRONYMS

Acronym	Description
<b>ACM</b>	Association for Computing Machinery
<b>API</b>	Application programming interface
<b>F2F</b>	Face to Face
<b>FIA</b>	Future Internet Assembly
<b>EU</b>	European Union
<b>FP7</b>	7 <sup>th</sup> Framework
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>IFIP</b>	International Information Security and Privacy
<b>IRTF</b>	Internet Research Task Force
<b>KPI</b>	Key Performance Indicators
<b>NFV</b>	Network Functions Virtualization
<b>SDN</b>	Software Defined Network

# ANNEX

## [1] T-NOVA – FINT Poster



### T-NOVA

Network Functions as-a-Service over virtualised infrastructures

**Project details**

START DATE: 2014-01-01  
 END DATE: 2016-12-31  
 DURATION: 36 Months  
 REFERENCE: CNECT-ICT-619520  
 BUDGET: 10.027 m €  
 FUNDING: 6.743 m €  
 CALL: FP7-ICT-2013-11  
 PROJECT COORDINATOR: NCSR Demokritos  
 URL: <http://t-nova.eu>



**Partners**



**What is T-NOVA?**

Network Functions Virtualisation (NFV) is an emerging concept, which refers to the migration of certain network functionalities, traditionally performed by dedicated hardware elements, to virtualised IT infrastructures, where they are deployed as software components. NFV leverages commodity servers and storage, including cloud platforms, to enable rapid deployment, reconfiguration and elastic scaling of network functionalities.

With the aim of promoting the NFV concept, T-NOVA introduces a novel framework, which allows operators not only to deploy virtualised Network Functions (NFs) for their own needs, but also to offer them to customers, as value-added services. Virtual network appliances (gateways, proxies, firewalls, transcoders, analysers etc.) can be provided on-demand as-a-Service, eliminating the need to acquire, install and maintain specialized hardware at the customer's premises.

To this end, T-NOVA will design and implement a management/orchestration platform for the automated provision, configuration, monitoring and optimization of Network Functions-as-a-Service (NFaaS) over virtualised Network/IT infrastructures. T-NOVA leverages and enhances cloud management architectures for the elastic provision and (re-) allocation of IT resources assigned to the hosting of Network Functions. It also exploits and extends Software Defined Networking platforms for efficient management of the network and cloud infrastructure.

**Project objectives**

**Objective 1:** The detailed design and specification of an integrated NFV-enabled architecture for the provision and maintenance of composite network services (network connectivity + Network Functions as a Service), including:

1. An Orchestrator for federated management of Network and Cloud resources for NF accommodation.
2. A common, multi-actor Repository for NF publication and exchange ("Function Store").
3. An "NFV Marketplace" which will enable the brokerage of NFaaS to the end user.
4. A Control Plane for the configuration and management of the virtualized network and compute infrastructure.

**Objective 2:** The development of sample functions & their deployment & testing as part of the T-NOVA framework in several pilot sites.

**Objective 3:** The study of a business model and elaboration of associated business plans for the T-NOVA architecture, addressing all involved actors.

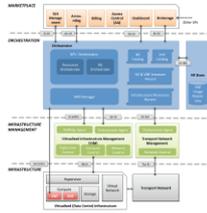
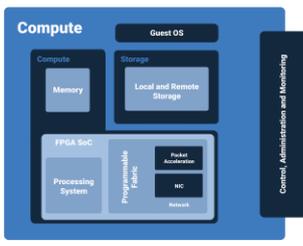


f-in.co.uk

**FINT role**

FINT investigates the use heterogeneous architectures to accelerate the virtualised platforms within T-NOVA. Accelerator integration into data centers has been at the forefront of the research into increasing data center performance. This is a consequence of processor computation power per watt stagnating which leads operators to explore alternative implementations that can offer the performance increases required to cater to Internet of Things, which is predicted to lead to an explosion in the volume and volatility of the data to be processed.

Heterogeneous processors can comprise different functional units like GPUs, FPGAs and DPSs. FINT's focus will be mostly on FPGA and more specifically on FPGA SoCs, which combine programmable fabric with standard ARM processors and thus enable the designer to reap the benefits of both worlds. Thus, the processor will execute the necessary software (e.g. a Hypervisor) and any non-critical part of the application and offload the more demanding parts to the programmable fabric. The inherently flexible nature of an FPGA is thus leveraged and augmented in order to maximize performance.

[2] MediaWiki, <https://www.mediawiki.org/wiki/MediaWiki>

[3] GNU Mailman Software, <http://www.gnu.org/software/mailman/>