D7.2 Project Dissemination and Communication Report

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Editors	Iris Finkelstein-Sagi (Nokia)
Contributors	Aurora Ramos (ATOS), Sonia Castro (ATOS), Thomas Soenen (iMinds), George Xilouris (NCSRD), Michael Bredel (NEC), Erez Biton (Nokia), Sharon Mendel-Brin (Nokia), José Bonnet (PTIN), Diego Lopez (TID), Alex Galis (UCL), Holger Karl (UPB), Manuel Peuster (UPB), Sevil Dräxler (UPB)
Reviewers	Sonia Castro (ATOS), Michael Bredel (NEC), Alex Galis (UCL)

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DEC	Web sites, patent filings, videos, etc.	
OTHER		
Dissemination Level		
PU	Public	**X**
CO	Confidential, only for members of the consortium (including the Commission Services)	

Executive Summary

This report summarizes the communication and dissemination activities undertaken under SONATA WP7 during the first year of the project, and following the introduction of the Communications & Dissemination Plan, at the face-to-face meeting in Athens in November 2015.

The report provides a brief introduction of the SONATA project, its context, core objectives and main outputs. It then presents the communication & dissemination objectives, and detailed descriptions of the various targeted dissemination stakeholders, as well as the wider and more public communication targets and audiences.

Web & social media hold an important role in the dissemination & communications plan, and the activities around each of these areas are detailed, including usage statistics and other meaningful data for each of our online communication channels. In addition, a SONATA periodic newsletter is planned; the first edition is ready and summarized in this report.

Various supporting materials have been created to provide visual reinforcements to the SONATA agenda as well as to the representatives of the member companies as they promote the project at various venues. These supporting materials include posters and a modular project presentation slide deck.

As a project immured in open source, SONATA holds close ties with both various open source communities such as OpenStack as well as with standards organizations such as ETSI, IRTF, IETF, OASIS, TM Forum. These collaborations and engagements are outlined and explored.

A list of all conference & journal publications and speaking submissions is provided (including those submitted but still under review). In addition, contributions to standards organizations are listed. As per the communications plan, a key element in promoting SONATA is participation in industry events. This is described in detail, including the various activities undertaken at events over the last 12 months, and goes into specific detail around the EUCNC event that took place in Athens at the end of June, at which SONATA was extremely well represented. The report also outlines the industry events planned for the next 6 months.

Finally, we describe our collaboration with the 5G-PPP and the various Working Groups we are involved in, and conclude with the project's KPI's.

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1. Introduction

This report summarizes the communication and dissemination activities undertaken under SONATA WP7 during the first year of the project and following the introduction of the Communications & Dissemination Plan at the face-to-face meeting in Athens in November 2015.

1.1 Intro to SONATA

This section provides a brief introduction of the SONATA project and its context.

Software Defined Networking (SDN) and Network Function Virtualization (NFV) are emerging as major transformational technologies towards “software networks”, a new paradigm that is evolving the telecom sector with new network capabilities and business opportunities. SONATA addresses the significant challenges associated with both the development and deployment of the complex services envisioned for 5G networks and empowered by these technologies. Core objectives include:

- **Reduce time-to-market of networked services:** SONATA streamlines development with abstract programing models, SDK and a DevOps model that integrates operators, manufacturers and third-party developers.
- **Optimize resources and lower costs of service deployment and operation:** SONATA orchestrates complex services to connectivity, computing and storage resources, and automatically reconfigures running services.
- **Accelerate industry adoption of software networks:** SONATA supports the full service lifecycle: development, testing, orchestration, deployment, management and operations, and is defining a roadmap for uptake of its results towards stakeholders' larger transition to SDN/NFV.

SONATA is developing an NFV framework that provides a programing model and development tool chain for virtualized services, fully integrated with a DevOps-enabled NFV service management and orchestration platform (NFV MANO).

The currently developing results include:

1. Programming model and software development kit (SDK) to facilitate network service development for third-party developers.
2. Service platform with modular NFV orchestration framework (NFVO) for network operators.
3. DevOps model for software networks that integrates these stakeholders together for an agile service lifecycle.

1.2 Document Organization

The deliverable is organized in the following manner:

- Section 1 (this section) is an introduction to the deliverable.
- Section 2 lists SONATA's communication and dissemination objectives
- Section 3 is a presentation of SONATA's communication and dissemination plan, the relevant stakeholders and its targets.
- Section 4 provides an overview of the web and social media activities around the project.
- Section 5 describes the materials that were developed to support the communication and dissimilation activities.
- Section 6 lists the activities performed around open source communities and standardizations organizations.
- Section 7 lists the publications related to SONATA in journals, conferences and others.
- Section 8 details the events and conferences in which SONATA was represented.
- Section 9 gives an overview of the role of SONATA as part of the 5GPPP, and the collaboration with other projects.
- Section 10 is a scores table of all the KPIs defined for SONATA related to communication and dissemination.
- Section 11 provides conclusions and planned next steps.

1.3 List of Acronyms

Acronym	Definition
5GPPP	The 5G Infrastructure Public Private Partnership
BSS	Business Support System
DevOps	Development & Operations
ETSI	European Telecommunications Standards Institute
EVE	Evolution and Ecosystem
FSM	Function Specific Manager
GVNFM	Generic Virtual Network Function Manager
ICT	Information and Communication Technologies
IETF	Internet Engineering Task Force
IFA	Interfaces and Architecture
IRC	Internet Relay Chat
IRTF	Internet Research Task Force
ISG	Industry Specification Group
ISV	Independent Software Vendor
KPI	Key Performance Indicator
LSO	Lifecycle Service Orchestration
MANO	Management and Orchestration
NFVO	Network Functions Virtualization Orchestrator
NFV	Network Function Virtualization
NFVI	Network Function Virtualization Infrastructure
NFVRG	Network Function Virtualization research Group
OASIS	Organization for the Advancement of Structured Information Standards
OPNFV	Open Platform for NFV
OPSAWG	Operations and Management Area Working Group
OSM	Open Source Mano
OSS	Operations Support System
PCE	Path Computation Element
PTL	Project Team Leader
PPP	Public Private Partnership

RCA	Root Cause Analysis
REL	Reliability
RG	Research Group
SDK	Service Development Kit
SDN	Software Defined Networks
SDO	Standards Development Organization
SLA	Service Level Agreement
SME	Small and Medium Enterprise
SOL	Solutions
SP	Service Provider
SSM	Service Specific Manager
TOSCA	Topology and Orchestration Specification for Cloud Applications
VES	VNF Event Streaming
VIM	Virtualized Infrastructure Management
VNF	Virtual Network Function
VNFM	Virtual Network Function Manager
WG	Working Group

Table 1: List of Acronyms

2. Communication and dissemination objectives

SONATA´s communication and dissemination plan aims to create measurable impact through proactive outreach to identified stakeholders, public, media, and other communication targets, with the ultimate purpose of producing inspiring success stories that even lay-persons and non-specialists can understand.

The main objectives are:

- Achieve measurable impact through successful penetration of SONATA results towards stakeholder communities.
- Create ongoing and valuable engagement with telco industry stakeholders.
- Encourage stakeholders to evaluate, adopt and extend SONATA's open-source results.
- Initiate a developer's program for independent VNF services creation based on SONATA SDK.

3. Communication and dissemination plan, stakeholders & targets

The SONATA partners have outlined a dissemination & communication plan that focuses on stakeholder engagement with supporting dissemination & communication activities, which are led by the Communication Manager (ATOS) and supported by WP7 partners and effort.

3.1 Plan

An initial communication guidelines and website plan was drafted during the first month of the project. The plan identified stakeholders and outlined the basic needs for the communication efforts, namely through the launch of the SONATA website. The plan also outlined the various phases of the communications efforts along the project's timeline.

A more detailed plan was defined and delivered in time of the face-to-face meeting in Athens in November 2015, where it was presented an agreed upon by the partners. This plan outlined the following:

1. The different purposes of dissemination vs. communication (as defined by the 5G-PPP) and the application thereof to the SONATA plan.
2. Dissemination content plan, including a quarterly newsletter.
3. Communications content plan, including:
    a. Content creation based on SONATA activities and results, reused as:
        i. Blogs posts, providing the personal viewpoint of industry leaders (from member orgs) on industry/market status. These to be based on a round robin schedule amongst the partners.
        ii. White papers based on project research and results. These could also be used as the basis for blog posts. An initial list of topics was brain stormed and defined during the face-to-face meeting in Athens.
4. Supporting collateral/materials/merchandising including a project mega-deck ppt, a project brochure, a poster and event giveaways as needed.
5. Social outreach: outlined the various relevant social channels and how they would be used.

6. Events/Market watch: outlined the logistics of handling SONATA related events, and created a market watch to keep track of future events.
7. Described proposed community engagement and possible developers program.

3.2 Stakeholders

The project stakeholders are mapped below, briefly summarizing the dissemination network of the project:

1. **Network Operators and Network Equipment Vendors -** Immediate partner networks of ALB, TID, BT (Telcos); NEC, Nokia (vendors), ATOS, TCS, OPT (telco customers base). Partners are active in key industry groups such as TM Forum and ETSI NFV ISG, where TID is chair of the technical steering committee, and partners NEC, ALB, BT and Nokia participate regularly in various working groups, including Management and Orchestration (MANO). Partners regularly attend industry events, and represent SONATA at such venues as Layer123 SDN & NFV World Congress and the Mobile World Congress.
2. **Supporting IT Industry ISVs, IT Providers, and System Integrators -** The industry partners are also leaders in the IT industry as a whole, and are established stakeholders in areas in the immediate proximity of networks, such as cloud computing, virtualization, service provision, security etc. ATOS and TCS are large system integrators and cloud providers to a variety of customer segments. With the convergence of IT, telcos ALB, TID and BT, and vendors NEC and Nokia also have strong partnerships with IT providers across Europe. Partners are also part of larger technology platforms, such as NESSI.
3. **SME Developers -** SME partners OPT, UBI and SYN are part of larger SME developer networks in their home countries of Portugal, Spain and Greece, such as TICE, Inova-RIA, COTEC of Portugal. Moreover, SONATA has access to a startup incubator in Belgium (iMinds) and SME Technology Park in Greece (Lefkipos via NCSRD). Large industry partners, including the aforementioned telcos, vendors and IT providers of the consortium, have established customer networks of SMEs throughout Europe.
4. **Open Source Communities -** The partners also position SONATA strategically with open source projects & communities such as OPNFV, OpenStack and OSM that represent the underlying stack below the orchestrator. SONATA benefits by having partner members in each of these communities, with direct links to propel its outreach, and is specifically engaged with various projects in their respective open source communities, as described in Table 2.
5. **Standards Groups -** Partners have active connections with key standards groups for the project, such as various ETSI NFV projects (NEC, NOKIA, TID, BT), TMForum's ZOOM (ATOS), OASIS TOSCA (Nokia), IRTF & IETF (TID).
6. **5G-PPP Collaboration -** SONATA actively collaborates in the clustering activities of 5GPPP, Networld2020 ETP and 5G Infrastructure Association, and considers them priority dissemination targets for SONATA development and results. ATOS, ALB, NEC, TID, TCS, NOKIA and IMINDS are all 5G-PPP members. Initial working group participation includes the Software Networks (which SONATA partners co-lead), Architecture, Vision and PreStandard.

7. **Scientific and Academic -** Partners UCL, UPB, NCSRD, iMinds and i2CAT have substantial scientific and academic networks. SONATA members have attended industry conferences and published relevant academic papers in conjunction with these conferences. These include the IEEE/IFIP Network Operations and Management Symposium; the Global 5G event in Beijing and the EUCNC in Athens; the IEEE Conference on Network Softwarization (IEEE NetSoft 2016) in Seoul, and the IEEE NFV-SDN 2016 in Palo Alto. More information can be found in Table 4. SONATA project members are directly involved in the organization of many of these conferences and also organize special sessions/workshops at these and other large international conferences to promote the project work and position its achievements with regard to emerging scientific areas related to the project's themes, new business opportunities and technological trends. Journal publications are also being pursued.

3.3 Communication targets

Communication activities above and beyond the peer-to-peer dissemination are targeted at all the above stakeholders, as well as at the general public, and consumers outside of the technical knowledge of the project, thus expanding SONATA's goals and results to a wider audience. Both industry and academic partners are actively involved in carrying out these activities. This is chiefly done at this stage in the project's lifetime through social channels.

4. Web & Social Media

The website was created in autumn of 2015 and updated in January 2016 with the introduction of the use-cases and architecture.

The rollout of new, fresh content for the website (www.sonata-nfv.eu/) is an essential part of SONATA's communication campaign. The website is the ideal reference point for code availability and all technical documents will be listed in the project website.

The SONATA website presents the projects high level goals and introduces the member organizations, the use cases and the architecture (which were both added to the site in January following the project deliverables). The website also has sections dedicated to the more social-media aspects such as News, Blog, Contact form and a link to the project's Twitter.

To create awareness and communicate the availability of the first prototype of SONATA results, we will run a marketing campaign. Although the code will be available earlier, in order to maximize its impact, this communication campaign won´t start until September, right after the summer holidays. The website will be updated consequently.

4.1 Website Statistics

The SONATA website came online in the first month of the project with a static overview page which was expanded in September 2015. As can be seen in Figure 1, during this time (September 2015-May 2016) we have seen:

- 2138 sessions with an average session duration of 2:30 minutes. This peaked in April 2016 with over 400 sessions in that month alone

- 1324 users
- 6185 page views
- Majority of users from Spain, followed by the US, Germany, Greece, UK, Portugal and France

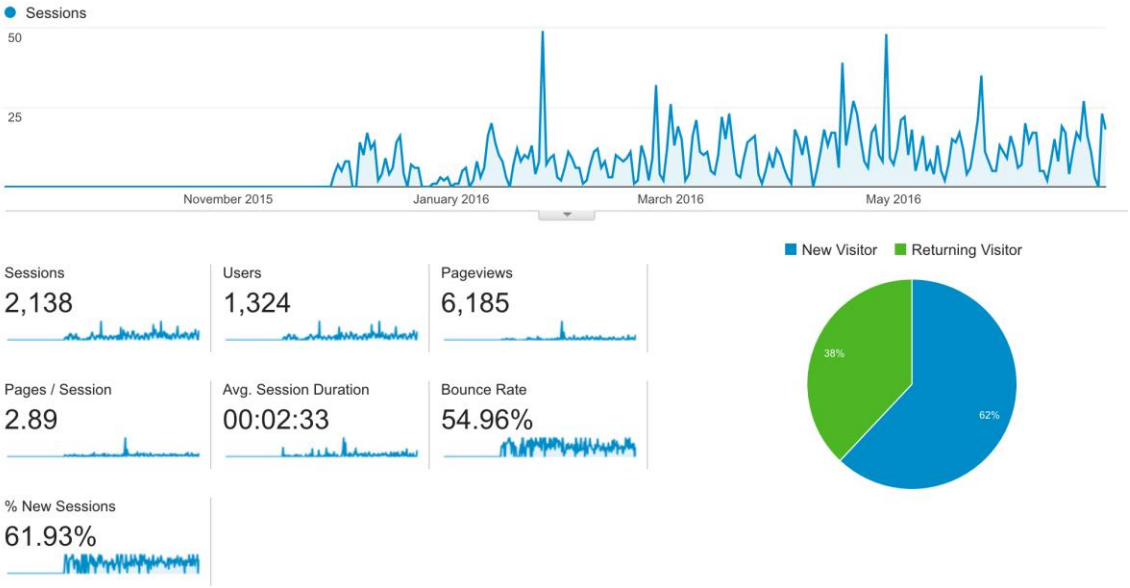

Figure 1: SONATA Website Analytics

Figure 2 shows the various acquisition channels, most of the entries were via direct and organic search.

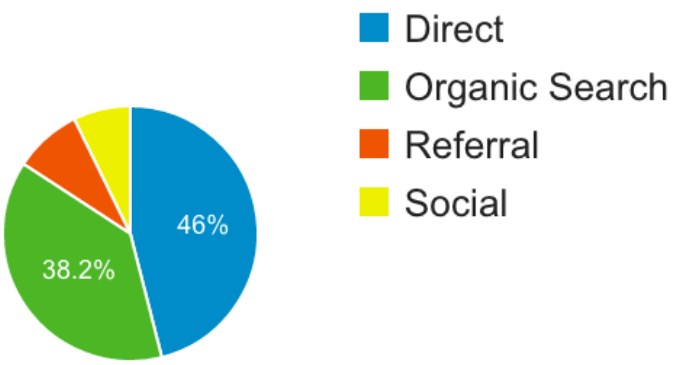

Figure 2: SONATA Website Acquisition Channels

4.2 Social Media Summary & Stats

For the first year of the project, SONATA social media outreach consisted mainly of the SONATA blog and the SONATA Twitter profile. Both of them are fed with content from the member organizations and from the project deliverables, events, conferences, academic work and more.

As per the initial communications plan, all SONATA related activities can be used as a basis for social outreach.

4.2.1 SONATA blog

The SONATA Blog objectives are:

1. To populate an ongoing influx of relevant, timely content.
2. To report on the status of SONATA deliverables and activities within and outside the member organizations.
3. To provide the personal viewpoint of industry leaders (from SONATA partners) on industry/market status.
4. To create content that can be reused extensively throughout a variety of owned communication channels to promote and extend the reach of SONATA.
5. To create content that can be used for co-marketing with community partners or for 3rd party sites (i.e. TMCNet, etc.)

The SONATA Blog is intended to be populated through a round-robin process, involving all of the member organizations in the creation of valuable content through a set schedule that also involves feedback and approval.

To date, 5 blog posts have been published:

- http://www.sonata-nfv.eu/content/sonata-briefoverview
- http://www.sonata-nfv.eu/athens_plenary_blog
- http://www.sonata-nfv.eu/Spring2016_DevMeeting
- http://www.sonata-nfv.eu/content/sonata-2016-second-integration-and-testing-meeting-taking-place-now-london
- http://www.sonata-nfv.eu/content/sonata-eucnc-2016

The blog has had 205 unique page views to date, with an average time on page of 23 seconds.

A schedule for upcoming scheduled posts with owners is posted on the project wiki. The topics suggested are:

- Intro to use-cases
- SONATA project progress
- Package, service & functions
- Catalog vision
- Slice management
- NFV & containers
- Service development needs for SME's ahead of 5G
- DevOps in NFV
- OSS implications for NFV MANO Platforms

4.2.2 SONATA Twitter

The SONATA twitter kicked off on October 27, 2015 with a tweet about the SONATA NFV workshop at Leibniz University given by Manuel Peuster, SONATA partner from University of Paderborn.

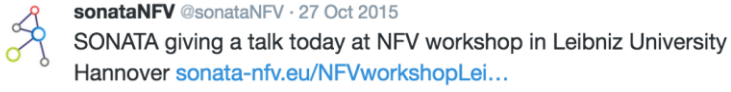

Figure 3: Leibnitz workshop tweet

- The first tweet (see Figure 3) received almost 800 impressions.
- During the first three months (Nov '15-January '16), the SONATA twitter account earned 2.4K impressions, with an average of 27 impressions per day.
- During the next three months (Feb-April '16), SONATA earned 8.3K impressions – more than tripling the previous quarter's numbers.
- The Heidelberg tweet (see Figure 4) received the highest response rate, with almost 2000 impressions and a 3.7% engagement rate.

Figure 4: Heidelberg meeting tweet

- The SONATA Twitter account has 86 followers and is following 31 users. SONATA has tweeted 36 times to date (not counting retweets).

4.3 Newsletter

The SONATA newsletter (see Figure 5) is targeted at being published quarterly and aimed at external stakeholders.

The newsletter goal is to provide the latest news and happenings on the project, to highlight new software releases, public deliverables, whitepapers, etc. and to provide a preview of project member's event participation, as well as planned workshops and more.

This communication action is aimed to start from the second year of the project, with the release of the first prototype of SONATA results.

SONATA team is already working on the first issue. Potential content for this first issue includes:

- Overview of the project
- Overview of the SONATA use-cases and architecture
- Editorial about the "softwarization" of the Telecom Market
- Overview of the 5G-PPP

Each section includes links for further in depth reading and images or architecture drawings where relevant. The newsletter includes

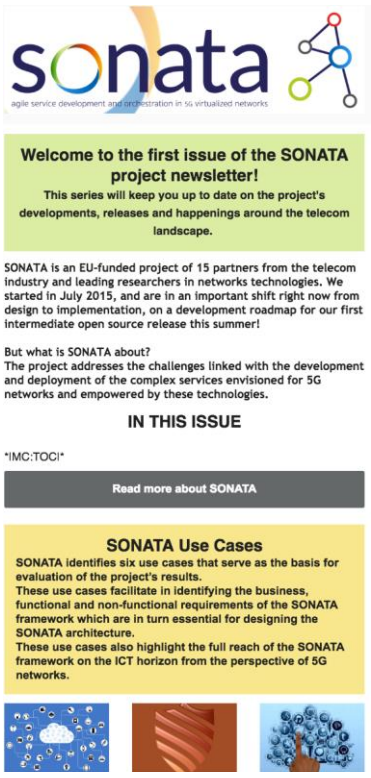

Figure 5: SONATA Newsletter

links to all the member companies and a subscription link. Figure 5 shows how the project newsletter will look.

The newsletter will go out to all members in the SONATA distribution list (i.e. project members) who will then distribute it within their networks for greater exposure.

5. Supporting Materials

In accordance with the communications plan set up in November 2015, a number of supporting materials have been created with the intention of providing visual reinforcements to the SONATA agenda.

5.1 Posters

1. The 1st SONATA poster which highlights the architecture and innovations in MANO, was created in April 2016 for the ETSI conference in Sophia Antipolis, see Figure 6.

2. The 2nd SONATA poster is a slightly modified version, created for the EUCNC conference in June 2016 and based on the architecture paper. The paper's authors are directly credited in the poster.

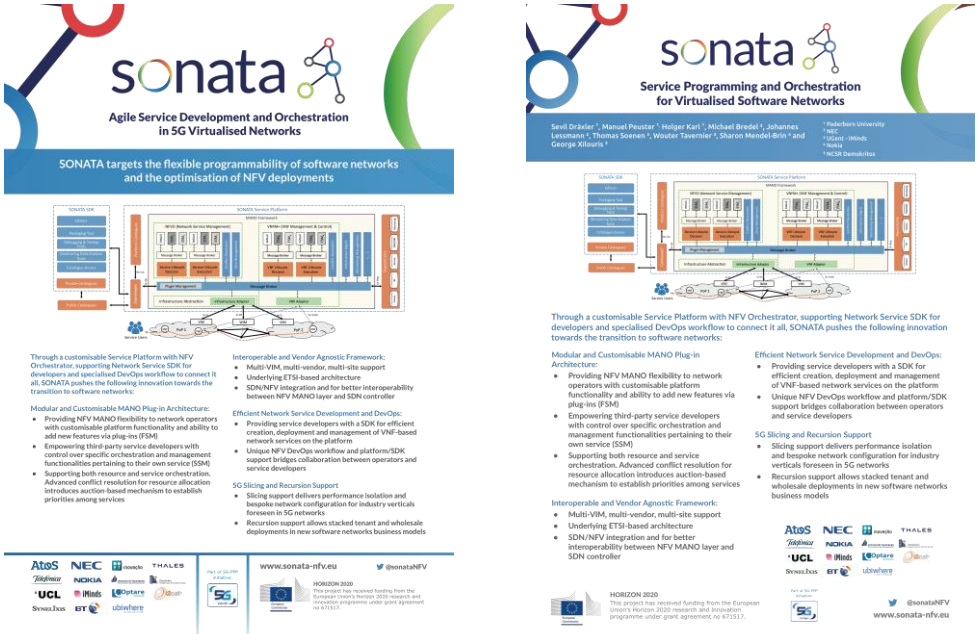

Figure 6: SONATA Posters

5.2 Slide Deck

In parallel to the meeting in Athens in November 2015, a modular, evolving slide deck was created. The deck continues to evolve with the project, adding details as they become available. Partners can use the deck as a basis for presenting SONATA where needed mixing and matching slides from the deck to fit the level of detail, venue, audience and context, etc. See Figure 7.

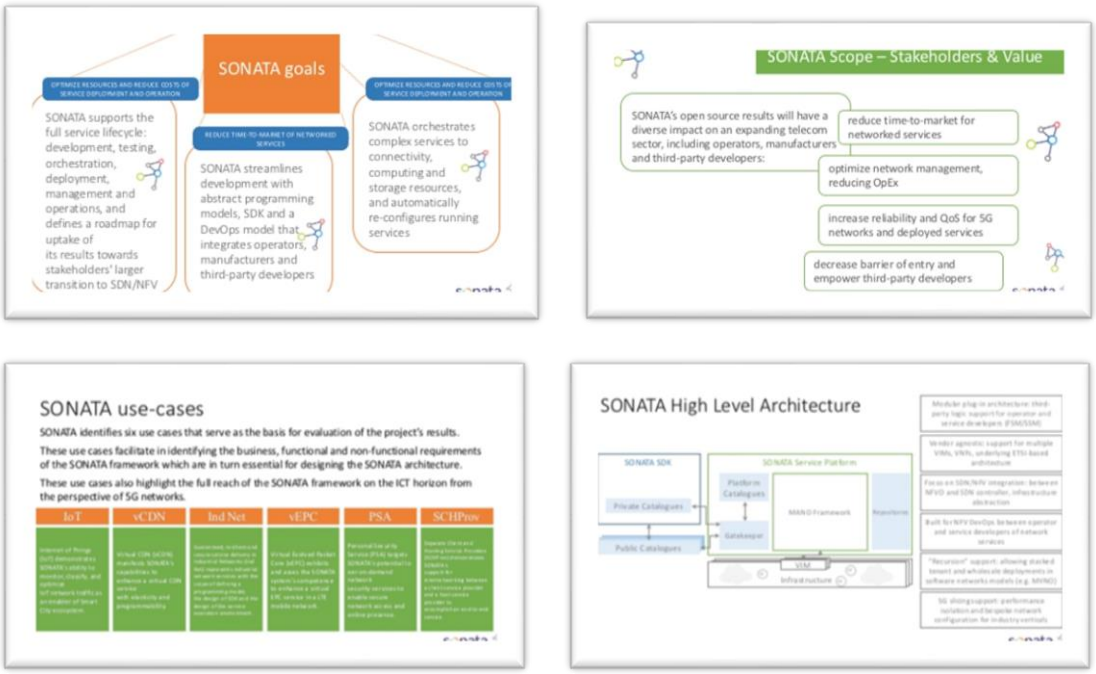

Figure 7: Screenshots from SONATA's Modular Slide Deck

6. Community and Standards Engagement

6.1 Open Source Communities Activities

Organization	Related projects	Partners involved	Project / organization Description	Activities
OpenStack	Tacker	NEC, Altice Labs, NOKIA IL	Tacker is an official OpenStack project building a generic VNF Manager (VNFM) and a NFV Orchestrator (NFVO) to deploy and operate Network Services and Virtual Network Functions (VNFs) on an NFV infrastructure platform like OpenStack. The OpenStack Tacker project aims at creating a MANO system similar to SONATA, however, dedicated to the OpenStack ecosystem only.	SONATA has established close relationships with the Tacker community. We attend the weekly Tacker meetings in the IRC and gave several presentations, e.g. about the SONATA architecture and specific components. Moreover, we had several meetings – online as well as face-to-face – with the Tacker Project Team Leader (PTL). We expect SONATA to continue and strengthen the relationship with Tacker and, e.g., contribute to Tacker blueprints directly.
OpenStack	Mistral	NOKIA IL	Mistral is a workflow service. Most business processes consist of multiple distinct interconnected steps that need to be executed in a particular order in a distributed environment. One can describe such process as a set of tasks and tasks relations and upload that description to Mistral so that it takes care of state management, correct execution order, parallelism, synchronization and high availability. Mistral also provides flexible task scheduling so that we can run a process according to a specified	NOKIA IL is highly involved in this project with Mistral PTL, Renat Akhmerov, becoming a Nokia / CloudBand employee. To this end NOKIA has designed and developed many features that are important for NFV use cases such as supporting large datasets and expiration policies. Moreover NOKIA found and fixed issues that occurred when running Mistral in full high availability mode – a must in a Telco grade application and the default topology that is used in CloudBand node. Finally NOKIA created a Mistral puppet module installation and contributed it as a

Organization	Related projects	Partners involved	Project / organization Description	Activities
			schedule. Mistral is a key component in a possible GVNFM solution for SONATA.	whole back to the community. RedHat are now using this project in order to install Mistral as part of their OpenStack distribution.
OpenStack	Heat	NOKIA IL	Heat is the main project of the OpenStack orchestration program. It allows users to describe deployments of complex cloud applications in text files called templates. These templates are then parsed and executed by the Heat engine.	NOKIA introduced NFV use cases to the core team in Heat early as the Kilo release. At that point OpenStack did not consider NFV use cases as valid and our discussions helped shaping key features in Heat (e.g., we prevented ResourceGroup index variable removal that is important for VNFs in order to support personalisation like slotId). Moreover, NOKIA found, reported and fixed many issues that concern VNF use cases starting from backward compatibility issues like Heat template fail from Kilo release on validation and performance to performance issues on massive loads like missing index on stack.owner_id. Finally NOKIA designed and contributed to resource types that are important for SONATA Mistral based VNFM like the resource type - OS::Mistral::Workflow.
OpenStack	Vitrage	NOKIA IL	Vitrage is the OpenStack RCA (Root Cause Analysis) service for organizing, analysing and expanding OpenStack alarms & events, yielding insights	NOKIA IL initiated this project, which is now under the OpenStack big tent, to allow collection on infrastructure data correlate the data and perform

Organization	Related projects	Partners involved	Project / organization Description	Activities
			regarding the root cause of problems and deducing their existence before they are directly detected.	Root Cause Analysis.
OPNFV (Open Platform NFV)	Doctor	NEC, NOKIA IL	The OPNFV Doctor project aims at creating a fault management and maintenance framework for high availability of Network Services on top of virtualized infrastructure. To this end, it bridges the gap between existing NFVI (NFV Infrastructure) and VIM (Virtual Infrastructure Manager) environments and the requirements of telco operators with respect to fault management and maintenance.	SONATA allows for monitoring and fault management from the beginning. To this end, it consumes ideas from the Doctor project and builds it into its own platform. Based on SONATA's hands-on experience, we provide feedback to the OPNFV Doctor project. Additionally, Nokia contributed requirements and code leading to the adoption of Vitrage OpenStack project as a reference implementation for Doctor.
OPNFV (Open Platform NFV)	VES	NOKIA IL	The OPNFV VES project aims to develop OPNFV platform support for VNF event streams, in a common model and format intended for use by NFV Service Providers (SPs), e.g. in managing VNF health and lifecycle. The project's goal is to enable a significant reduction in the effort to develop and integrate VNF telemetry-related data into automated VNF management systems, by promoting convergence toward a common event stream format and collection system.	NOKIA IL just joined VES (VNF Event Streaming) project to define the interfaces between the VNFs and the orchestration and to allow transfer of application metrics to the orchestration. This interfaces definition is yet another step to allow the generic VNFM that is envisioned by SONATA.
OSM		TID, BT	Open Source Mano is an ETSI-hosted project to	BT representative in SONATA (Andy Reid) is also part

Organization	Related projects	Partners involved	Project / organization Description	Activities
			develop an Open Source NFV Management and Orchestration (MANO) software stack aligned with ETSI NFV.	of OSM. Several coordination meetings between SONATA and the OSM development team have already taken place. The availability of OSM Release 0 makes easier the contribution and interaction in general. Four main lines for potential contribution have been identified: Plugin architecture: The SONATA concept of the open plugin interface, the idea of a communication based on a message broker, and the SSM) and FSM concepts. Mediation: The model-driven DevOps approach would greatly benefit from incorporating the mediation mechanisms provided by the SONATA Gatekeeper. Catalogs: A proper management of catalogs and their interactions with the different actors in the service and function lifecycle, especially in combination with the mediation facilities. Path Computation Element (PCE) Interface: Addressing the conversations started about

Organization	Related projects	Partners involved	Project / organization Description	Activities
				developing a first version of a PCE application to orchestration that could be further incorporated into OSM.

Table 2: Open Source Communities Activities

6.2 Standardization Organizations Activities

Organization	Related projects	Partners involved	Project / organization Description	Activities
ETSI NFV	Plenary level	TID, BT, NEC, NOKIA IL	ETSI was selected In November 2012as the home of the Industry Specification Group for NFV. Today there are over 290 individual companies involved in ETSI Industry Specification Group (ISG) activities. Including 38 of the world's major service providers as well as representatives from both telecoms and IT vendors.	The ETSI NFV ISG is considering 5G as one of the most important use cases and launching a dialog with other SDOs and research projects to identify the implications, in terms of requirements on the architecture and data/information models, of 5G in the NFV technology. SONATA has been specifically invited to take part in this effort, and we foresee clear opportunities of more focused contributions.
ETSI NFV	IFA	BT, NEC, NOKIA IL	The main areas of activity of the Interfaces and Architecture (IFA) Working Group (WG) are: • NFV architectural aspects • Requirements to support interoperability at	In the ETSI NFV ISG, the IFA group deals with the architecture of a MANO system. To this end, it defines the interfaces of the different components, such as the NFVO and the VNFM, as well as the descriptor and VNF packaging format. As SONATA

Organization	Related projects	Partners involved	Project / organization Description	Activities
			reference points • Information models and information flows applicable to the deployment requirements and lifecycle management of NFV abstractions by developing in house specifications or by referring and/or profiling specifications from external bodies • Interface protocols and data models, whenever possible in cooperation with other external bodies.	aims at being ETSI compatible, we follow the ETSI activities very closely. Moreover, we provide feedback to ETSI on implementation aspects and contribute to the discussions on the descriptor formats.
ETSI NFV	EVE	TID, BT	The main areas of activity of the Evolution and Ecosystem (EVE) WG are: • Analysing use cases considering new features related to infrastructure, software, management and orchestration in NFV • Analysing the relationship of NFV with other (complementary) technologies • Specify functional requirements for features in relation to a) new NFV use cases, b) new technologies for NFV and c) relationship of NFV with other technologies • Document best practices, and perform studies related to NFV	Contributions to the new work-items defined for ETSI NFV Release 3. While working on this effort were made to identify the work items suitable for direct contributions from SONATA. In particular EVE009 – a report on end to end process descriptions that covers relevant deployment and legacy interworking scenarios, considering entities which adjoin NFV including existing networks, existing services, and existing OSS/BSS, and the management processes not currently considered by the NFV IFA WG. For example - inventory management and service assurance, at a high level agnostic to specific

Organization	Related projects	Partners involved	Project / organization Description	Activities
			• Gap analysis of industry standards or de-facto specifications with respect to ISG NFV specifications and requirements on topics under its responsibilities • Keep track of NFV related activities that occur in other bodies such as SDOs, industry groups, open source communities, etc.	specification or implementation. Apart from this, contributions to EVE008 (Report on Usage Metering and Charging Use Cases and Architectural Study Charging and Billing) could be considered as well.
ETSI NFV	SOL	NOKIA IL, TID, BT	The main areas of activity of the Solutions (SOL) WG are the documentation of data models, APIs (and the underlying protocols) for a set of identified functions, templates/descriptors and interfaces of the NFV architecture framework.	The SOL WG has been recently created, but it has gathered a great attention in NFV community. Since the only current work item and many of the envisaged ones deal with service and VNF descriptors, there are important opportunities to contribute.
ETSI NFV	REL	NEC	The main areas of activity of the Reliability (REL) WG are: • Use case analysis for reliability and availability in a virtualized network environment • Analysis of service availability levels • Identification of requirements for maintaining network resiliency and service availability, the focus being additional requirements introduced by virtualization	In the ETSI NFV ISG the reliability (REL) group is looking at reliability and resiliency of NFV solutions. To this end, REL investigates on service availability and continuity during software updating/upgrading processes, detection and notification of errors occurring in NFV entities, and how to build a resilient NFV-MANO functional block. SONATA partners, like NEC, that are involved in ETSI NFV, contribute ideas, findings, and hands-on experience to the REL group. We expect SONATA to – indirectly - contribute to the

Organization	Related projects	Partners involved	Project / organization Description	Activities
			The mechanisms to be considered include the following: o Network function migration within and across system boundaries o Failure detection and reporting at the various layers o Failure prediction, prevention, and remediation o Solving network availability issues caused by overload/call blocking conditions • Engineering and deployment guidelines for maintaining network resiliency and ensuring service availability.	ETSI specification in this field.
OASIS	TOSCA	NOKIA IL	The Organization for the Advancement of Structured Information Standards (OASIS) is a global non-profit consortium that works on the development, convergence, and adoption of standards for security, Internet of Things, energy, content technologies, emergency management, and other areas. Topology and Orchestration Specification for Cloud Applications (TOSCA), is an OASIS standard language to describe a topology of cloud based web services, their components, relationships, and the processes	TOSCA is one of the descriptor languages adapted by NFV and being standardized in ETSI's SOL001. NOKIA IL was pioneering in adapting TOSCA for NFV application. Specifically, NOKIA IL led the networking group within TOSCA to allow better description on networks. NOKIA IL remains contributor for TOSCA.

Organization	Related projects	Partners involved	Project / organization Description	Activities
			that manage them. The TOSCA standard includes specifications to describe processes that create or modify web services.	
IRTF	NFVRG	TID	The Internet Research Task Force (IRTF) promotes research of importance to the evolution of the Internet by creating focused, long-term Research Groups working on topics related to Internet protocols, applications, architecture and technology. The Network Function Virtualization Research Group (NFVRG) focuses on research problems associated with NFV-related topics and on bringing a research community together that can jointly address them, concentrating on problems that relate not just to networking but also to computing and storage aspects in such environments.	Update of the results of the project to the Research Group (RG), exploring concrete contributions in the form of Internet drafts. A first one on the gatekeeper is under preparation and likely to be presented at IETF96.
IETF	OPSAWG	TID	The Internet Engineering Task Force (IETF) is an open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. The Operations and Management Area Working Group (OPSAWG) handles operational and management topics.	The Operations Area Directors have started a reflection group to analyse how the ITEF can support NFV operations, to which representatives of SONATA have been invited.

Organization	Related projects	Partners involved	Project / organization Description	Activities
TM Forum	ZOOM	ATOS, BT	TM Forum has created the ZOOM program – Zero-touch Orchestration, Operations and Management – to develop Virtualization and NFV & SDN best practices and standards in order to create a living blueprint for a new generation of service provider support systems to deliver true business agility and new digital services and revenue opportunities.	ZOOM project is the TM Forum initiative devoted to NFV. It is focused in providing business and operational orientation to NFV on-going research activities. Atos, as active member of ZOOM project, is following its activities, and have contributed in the past to some of them, such for instance in the analysis of ETSI NFV reports towards SLA management support, evolution of NFV information models towards customer facing catalogues requirements, and some other further specifications on OSS/BSS – NFV MANO interface. There can be also relevant SONATA outcomes in this context that Atos would be able to report within TMF ZOOM project.

Table 3: Standardization Organizations Activities

7. Publications

7.1 Conferences and White Papers Publications

Title	Authors	Conference Proceedings	Publication Date	Status	Links and Additional Notes
Efficient Management Solutions for Software Defined Infrastructures	S. Clayman, L. Mamatas,	The First IFIP/IEEE International Workshop on	25-29 April 2016	Accepted, published and	http://noms2016.ieee-noms.org

Title	Authors	Conference Proceedings	Publication Date	Status	Links and Additional Notes
	A. Galis	Management of 5G Networks (5G MAN) - IEEE/IFIP Network Operations and Management Symposium Istanbul, Turkey, 25-29 April 2016.		Presented	
Contributions to White Paper chapters: Overall 5G Architecture, Logical & Functional Architecture, Software Networks Technologies	A. Galis (editor & contributor), H. Karl (contributor)	Global 5G event, Beijing and EUCNC, Athens.	1st publication: June 1st 2016 2nd publication will be available after the EUCNC event	Accepted, published and presented	https://goo.gl/OOuwgF
Experimenting with Control Operations in Software-Defined Infrastructures	S. Clayman, L. Mamatas A. Galis	IEEE Workshop on Open-Source Software Networking: OSSN 2016 / IEEE NetSoft2016 - Seoul, Korea, 6-10 June 2016.	6-10 June 2016	Accepted, published and presented	http://opennetworking.kr/ossn http://sites.ieee.org/netsoft/
E-State: Distributed State Management in Elastic Network Function Deployments	M. Peuster, H. Karl	IEEE NetSoft2016 - Seoul, Korea, 6-10 June 2016.	6-10 June 2016	Accepted, published and presented	http://sites.ieee.org/netsoft/
Placement of Services with Flexible Structures Specified by a YANG Data Model	S. Mehraghdam, H. Karl	IEEE NetSoft2016 - Seoul, Korea, 6-10 June 2016.	6-10 June 2016	Accepted, published and presented	http://sites.ieee.org/netsoft/
SONATA: Service Programming and	S. Dräxler,	IEEE NFV-SDN 2016	7-9 November	Submitted	http://nfvsdn2016.ieee-

Title	Authors	Conference Proceedings	Publication Date	Status	Links and Additional Notes
Orchestration for Virtualized Software Networks ''(updated EuCNC architecture paper)''	M. Peuster, H. Karl, M. Bredel, J. Lessmann, T. Soenen, W. Tavernier, S.Mendel-Brin, G. Xilouris	(Conference on Network Function Virtualization and Software Defined Networks), Palo Alto, California, USA	2016	(under review)	nfvsdn.org; Available on arxiv: http://arxiv.org/abs/1605.05850
MeDICINE: Rapid Prototyping of Production-Ready Network Services in Multi-PoP Environments	M. Peuster, H. Karl, S. v. Rossem	IEEE NFV-SDN 2016 (Conference on Network Function Virtualization and Software Defined Networks), Palo Alto, California, USA	7-9 November 2016	Submitted (under review)	http://nfvsdn2016.ieee-nfvsdn.org
Understand Your Chains: Towards Performance Profile-based Network Service Management	M. Peuster, H. Karl	EWSDN'16 (The fifth edition of the European Workshop on Software Defined Networks), The Hague, Netherlands	10-11 October 2016	Submitted (under review)	

Table 4: Conferences and White Papers Publications

7.2 Journal Publications

Title	Authors	Journal	Publication Date	Status	Links and Additional Notes
Experimenting with Management Information Orchestration for Virtual Software-Defined Networks	L. Mamatas, S. Clayman, A. Galis	Elsevier Computer Networks Journal - Special Issue on Software-Defined Operations	August 2016	Accepted in June 2016 for publication	www.journals.elsevier.com/computer-networks Digital Object Identifier 10.1002/nem.1943
Information Management as a Service for Network Function Virtualization Environments	L. Mamatas, S. Clayman, A. Galis	IEEE Transactions on Network and Service Management (IEEE TNSM) Special Issue on Management of Softwarized Networks	August 2016	Submitted (under review)	http://www.comsoc.org/tnsm/cfp/si-msn Digital Object Identifier 10.1109/TNSM.2016.2587664
DevOps for Network Function Virtualization: The SONATA Approach	H. Karl, S. Draxler, M. Peuster, A. Galis, M. Bredel, A. Ramos, J. Martrat, M.S. Siddiqui, S. Rossem, W. Tavernier, G. Xilouris	5G issue in Transactions on Emerging Telecommunication Technologies	August 2016	Accepted in June 2016 for publication	https://www.researchgate.net/publication/304771377_DevOps_for_Network_Function_Virtualization_An_Architectural_Approach

Title	Authors	Journal	Publication Date	Status	Links and Additional Notes
SONATA: Agile Service Development and Orchestration in 5G Virtualised Networks	Full project	European 5G Annual Journal: First Edition	Q3 2016	Submitted April 2016 by Atos	

Table 5: Journal Publications

7.3 Pre Standard / Standard Publications

Title	Authors	Standard Body	Publication Date	Status	Links and Additional Notes
Draft ITU-T IMT2020 standard document [T13-SG13-151130-TD-PLEN-0208!!MSW-E] 5G High Level Architecture (appendix I), Network Softwarisation (appendix II) : contributions & acknowledgement to 5G SONATA project	A. Galis	ITU-T IMT2020	Dec 2015	Issued by ITU-T	http://itu.int/en/ITU-T/focusgroups/imt-2020/Documents/T13-SG13-151130-TD-PLEN-0208!!MSW-E.docx
Contributing Document “Overall IMT-2020 network architecture framework” as input to “Framework of IMT-2020 network architecture”/ ITU-T IMT2020	A. Galis	ITU-T IMT2020	December 2016	Contribution 17-20 May 2016 IMT2020 meeting in Beijing	http://www.itu.int/en/ITU-T/focusgroups/imt-2020/Pages/default.aspx

Title	Authors	Standard Body	Publication Date	Status	Links and Additional Notes
Contributing Document "Networks, Services and Resources Orchestration Functional Requirements" as input to "Network Management Framework for IMT-2020" /ITU-T IMT2020	A. Galis	ITU-T IMT2020	December 2016	Contribution 17-20 May 2016 IMT2020 meeting in Beijing	http://www.itu.int/en/ITU-T/focusgroups/imt-2020/Pages/default.aspx
Contributing Document "Multi Service Control and Management" as input to "Network Management Framework for IMT-2020" /ITU-T IMT2020	A. Galis	ITU-T IMT2020	December 2016	Contribution 17-20 May 2016 IMT2020 meeting in Beijing	http://www.itu.int/en/ITU-T/focusgroups/imt-2020/Pages/default.aspx
Contributing Document "NWSoft Framework" as input to the "Network Softwarization" / ITU-T IMT2020	A. Galis	ITU-T IMT2020	December 2016	Contribution 17-20 May 2016 IMT2020 meeting in Beijing	http://www.itu.int/en/ITU-T/focusgroups/imt-2020/Pages/default.aspx

Table 6: Pre Standard / Standard Publications

8. Events & Conferences

8.1 Events Participation

Event	Date	Location	Event/ Audience Profile	Activity	Partner Representing	Summary
NFV Workshop at Leibniz University Hannover	27 Oct 2015	Hannover, Germany	Academic workshop	Presentation of project	M. Peuster (UPB)	https://nfvworkshop.wordpress.com Workshop with about 30 participants from different Universities and research institutions. Presented a high-level overview of SONATA's early architecture (pre-D2.2 status).
MPS+SDN+NFV World 2016	8-11 March 2016	Paris, France	Industry event	Presentation of SONATA architecture	TID	http://www.uppersideconferences.com/mpls-sdn-nfv/ OpenAirInterface Alliance (http://www.openairinterface.org/) discussion on exploring the possibility of including the air interface within the SONATA scope. MEF (http://www.mef.net) discussion on service and resource orchestration. They would like SONATA to consider their Lifecycle Service Orchestration (LSO) framework for some of our interfaces. This will be considered for the interface between the SDK and the SP. The pros would be embracing a standard that seems to have traction in the industry and the possibility of a higher standardization impact (including acting potentially as a bridge between ETSI NFV and

Event	Date	Location	Event/ Audience Profile	Activity	Partner Representing	Summary
						MEF). Among the cons is the fact is the immature state o some of these specs.
MPS+SDN+NFV World 2016	8-11 March 2016	Paris, France	Industry event	Presentation of SONATA's Generic VNFM	Nokia	http://www.uppersideconferences.com/mpls-sdn-nfv/ The presentation at the MPLS+SDN+NFV word summit in Paris 2016 dealt with the shift towards Generic VNFM. The presentation argued that indeed it is challenging to manage the lifecycle of complex network functions. However, the pluggable architecture proposed by SONATA simplifies the shift towards Generic VNFM. It is further facilitated by a pluggable work flow engine that was introduced by Cloudband to SONATA platform.
NetWorld2020	19 April 2016	Brussels, Belgium	EU R&D	Presentation of SONATA contributions for multi-tenancy and verticals	NEC	http://www.networld2020.eu/networld2020-annual-event-and-ga-2016 The presentation focused on support for verticals (which was the topic of the session).
Huawei Technology Workshop	16-17 May 2016	Shenzhen, China	International workshop	5G Networks Architecture - keynote presentation	UCL	5G Network architecture and technology - discussion and review.

Event	Date	Location	Event/ Audience Profile	Activity	Partner Representing	Summary
IEEE NetSoft 2016- Softwarization of Networks, Clouds, and Internet of Things at the Edge' at IEEE NetSoft 2016	6-10 June 2016	Seoul, Korea Seoul, Korea Seoul, Korea	International conference	Steering committee activities, keynotes co-chairing activities	UCL	http://sites.ieee.org/netsoft Primary international conference on Network Softwarization.
			International conference	Distinguished Expert Panel on 'Network Softwarization	UCL	Discussion and views on the Network Softwarization at the Edge.
			International conference	Soft5G Panel : Enablers for 5G Management	UCL	https://www.fokus.fraunhofer.de/soft5g/program
Future Wireless Technology Workshop - Huawei	13-14 June 2016	Stockholm, Sweden	International workshop	Programmabili-ty in 5G Networks	UCL	5G network programmability and technology - discussion and review.
5G NORMA Summer School	20-22 June 2016	London, U.K.	International workshop	Participation Panel Session on 5G Architecture & presentation +	UCL	5G architecture review.

Event	Date	Location	Event/ Audience Profile	Activity	Partner Representing	Summary
				demo of Slices Monitoring and Orchestration		
KuVS Summer School 2016	20-23 June 2016	Glücksbur, Germany	International Summer School for both industry and academia		UPB, ATOS, PTIN	https://cs.uni-paderborn.de/cn/events/kuvs2016/ KuVS SDN and NFV Summer School, co-sponsored by SONATA was the 2016 edition of the summer schools organized by the Communication and Distributed Systems, a technical committee of the German Society for Computer Science and the VDE's (the Association for Electrical, Electronic &Information Technologies) Information Society. The summer school was targeted at PhD students and people from industry working closely with NFV and SDN. With presentations from leading experts of the field, theoretical background as well as practical aspects were covered to provide a comprehensive survey of key skills required to do independent research in NFV or SDN. Participants also had a chance to present their ongoing or future research work and receive feedback from other participants and experts.
EUCNC	27-30 June	Athens	EUCNC 2016 was a key event for SONATA Conference papers			

Event	Date	Location	Event/ Audience Profile	Activity	Partner Representing	Summary
	2016		Title: NFV Performance Optimization for Virtualised Customer Premises Equipment Authors: Paul Veitch (BT), Tommy Long (Intel), Paul Hutchison (Brocade) Status: submitted <u>Workshops</u> Title: Network Function Virtualisation (NFV) and Programmable Software Networks Organizers: Georgios Xilouris (NCSR Demokritos, Greece), Josep Matrat (ATOS, Spain), Carlos Bernardos (Universidad Carlos III de Madrid, Spain) Title: Research and Standards for Self-Managing 5G Networks Organizers: Diego Lopez (Telefonica, Spain), Mikhail Smirnov (Fraunhofer, Germany), Sheng Jiang (Huawei Technologies Co. Ltd, China), Laurent Ciavaglia (Nokia Bell Labs, France) <u>Panels</u> Title: ICT consolidation in 5G. The role of Software Networks Participants: Chair: Diego R. Lopez (Senior Technology Expert, Telefonica I+D, Spain), Xavier Costa (Head of 5G Networks R&D, NEC Europe Labs, Germany), Carlos Bernardos (Associate Professor, UC3M, Spain), Georgios Gkellas (System Architect, Nokia, Greece), Paul Veitch (Chief Network Researcher, BT, UK)			

Table 7: Past Events Reporting

8.2 Pre Standard / Standard Activities

Activity	Date	Location	Event/Audience Profile	Partner Representing	Summary
ETSI NFV ISG Interim meeting on Information Modelling	1 Dec 2015	Sophia Antipolis, France	Standards WG meeting	BT	http://portal.etsi.org/ Representation of project. This meeting was a preparation and planning meeting for the upcoming inter SDO meeting in Louisville.
Inter Standards Body meeting on Information Modelling for NFV Orchestration	3-4 Jan 2016	Louisville, Colorado, USA	Inter-SDO meeting organized by ETSI NFV ISG	BT, TID	http://portal.etsi.org/ Representation of project such that project and developing standards are aligned. Meeting comprised of presentations from standards bodies and open source projects (3GPP, ATIS, Broadband Forum, DMTF, ETSI NFV, IETF, ITU, MEF, OASIS/TOSCA, Open Cloud Connect, ONF, OpenDaylight, OPNFV and TM Forum) on approach to information modelling for NFV and each body's view on alignment between organizations. The conclusion were: 1) Any improvement in alignment was helpful and this was not an 'all or nothing' collaboration activity. 2) Collaboration should concentrate on the 'touch points' between info models of different bodies. 3) Informal collaboration was the best working method.
ETSI NFV ISG	6-9 Jan 2016	Dublin,	Standards WG	BT, TID	http://portal.etsi.org

Activity	Date	Location	Event/Audience Profile	Partner Representing	Summary
Meeting #13		Ireland	meeting		Consolidation of the Release 2 of the ISG specifications, especially in what related to descriptors and the interactions between security and orchestration. Approval of several work-items for Release 3, though the more related to orchestration are left open till the IFA WG consolidates its results. Initial proposal of a new work-item on E2E orchestration.
ETSI Workshop on 5G - 5G: From Myth to Reality	21 April 2016	Sophia Antipolis, France	International workshop	TID	http://www.etsi.org/news-events/events/1025-2016-04-5g-from-myth-to-reality Presentation of a poster of the project and participation in the closing panel. Discussions on the software architecture and the open source nature of the results. During the panel, the importance of Software Networks, the new cooperation paradigms, the new ecosystem where service and platform providers will have to collaborate, and the relevance of the availability of a reference implementation for NFV were highlighted.
ETSI NFV ISG Meeting #14	2-6 May 2016	Atlanta, GA, USA	Standards WG meeting	NEC	http://portal.etsi.org Discussions on update/upgrade processes of VNFs, DevOps, and identifiers for different NVF artifacts, such as NSD, VNFD, VM images, etc. Moreover, there were

Activity	Date	Location	Event/Audience Profile	Partner Representing	Summary
					presentations of OSM and Open-O.

Table 8: Pre Standard / Standard Activities

8.3 Future Events

SONATA team will continue spreading its results and innovations by attending events, workshops, congressed, etc. The table below shows some of the events that have been already identified as of interest:

Event	Date	Location	Event/Audience Profile	Additional Notes, URL, Relevance, Actions, etc.
Intel Developer Forum	16-18 Aug 2016	Sf, CA	Industry & developers	http://goo.gl/816Vc3
ETSI NFV ISG #15	19-23 Sept 2016	Sophia Antipolis	Plenary (F2F only)	https://goo.gl/Lt2IHl
Layer123 SDN & OpenFlow World Congress	11-14 Oct 2016	The Hague, Netherlands	Industry	Planned activity - A demo by TID http://www.layer123.com/sdn http://www.layer123.com/etsi-nfv-poc-zone (last year's PoC zone)
OpenStack Summit	24-28 Oct 2016	Barcelona, Spain	OpenStack community	https://www.openstack.org/summit/barcelona-2016/
Broadband World Forum	18-20 Oct 2016	London, UK	Industry	https://tmt.knect365.com/bbwf/
ECFI	4-7 Nov 2016	Hamburg, Germany	Industry	http://www.ecfi.eu/
IEEE NFV-SDN	7-9 Nov 2016	Palo Alto, CA	Industry, Standards	

Event	Date	Location	Event/Audience Profile	Additional Notes, URL, Relevance, Actions, etc.
OPNFV summit	Not published yet	Not published yet	Open Source community	
Carrier Network Virtualization	12-14 Dec 2016	Santa Clara, CA	Industry	https://carriernetworkvirtualization.com/
ETSI NFV ISG #16	12-15 Dec 2016	Shenzen, China	Plenary (F2F only)	https://goo.gl/fHtmxp

Table 9: Future Event Planning

9. 5G-PPP Collaboration

As it is well known, the 5G-Infrastructure-PPP is a joint initiative between the European ICT industry and the European Commission to rethink the infrastructure and to create the Next generation of communication networks and services that will provide ubiquitous super-fast connectivity and seamless service delivery in all circumstances.

The 5G Infrastructure PPP operation is relying among others on multiple working groups created around the initiative and the first wave of 5G PPP projects. Some of them are addressing technical topics such as spectrum usage and allocation of new band (Spectrum WG), 5G architecture topics (architecture WG), SDN/NFV (Software network WG) and other are more on strategic points such as vision and societal challenges, contribution to standards, to drive international cooperation or SME support. SONATA project has been actively contributing to many of them, as detailed in Figure 8.

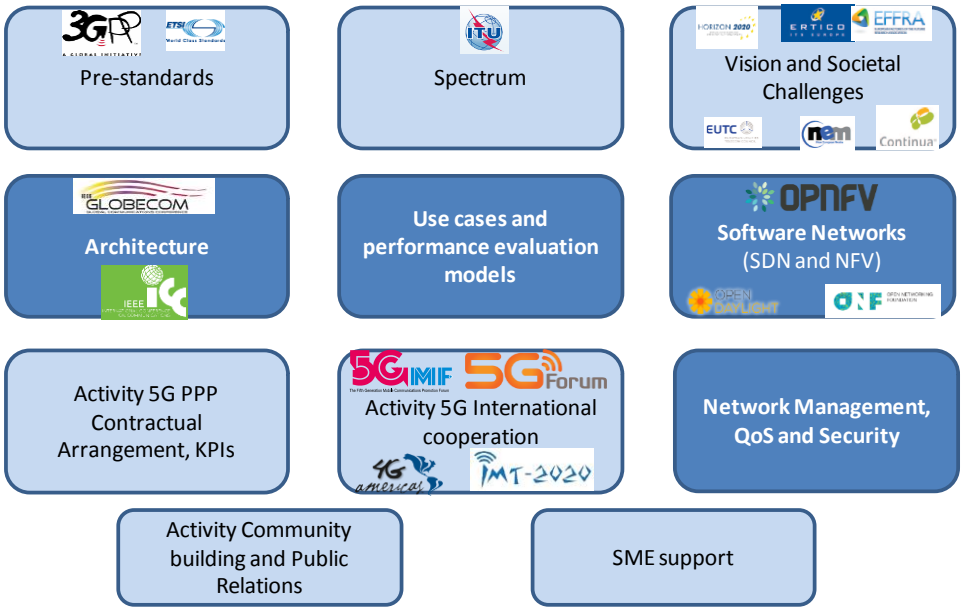

Figure 8: 5GPPP Working Groups

9.1 Software Network WG

SONATA project is leading the Software Network WG (Mr. Josep Martrat from Atos chair the WG) together with 5GEX project (represented by Carlos Bernardos from UC3M acting as co-chair).

The main focus of Software Networks WG consists of working on the combination of both SDN and NFV. Ideally this WG would be focusing on common set of northbound interfaces, what is exposed to the network applications. The group also is identifying standardization activities from the different projects in the area of software networks with the goal of identifying both gaps and also potential common topics for collaboration among projects.

In the scope of this collaboration, SONATA launched a survey about the open source usage by telecom operators and vendors. The result of this survey is available at the BSCW (common intranet where the 5G projects exchange deliverables or other relevant documents) and included as an annex in deliverable D7.5.

There are 10 projects contributing to the WG with different research focus. At this moment the following projects have already presented some technical topics at the regular on-line meetings related to the combination of SDN/NFV: Crosshaul, SONATA, Superfluidity, SESAME, SELFNET and Charisma.

This WG presented a Workshop Session in EuCNC 2016 conference in Athens (FP7 and H2020 projects). The workshop was focused on FP7 results (T-NOVA, UNIFY, NEtIDE were invited) and 5G Infrastructure PPP projects (SONATA, 5GEX, SELFNET, etc) on architectural progress in SDN/NFV combination per topic (e.g. terminology, joint SDN/NFV aspects, standardization gaps).

As current and future plans of the Software Network WG we can highlight. The WG is working on a white paper combining the contribution of the 5G projects. There will be a preliminary version in summer 2016 for internal discussion within the WG. It is necessary to carry out a huge text harmonization together with an analysis of the architecture white paper, which is delaying the elaboration of certain sections. The current target is to have an updated public version of the white paper by November'16 (on time for the 5G Global Event in Rome).

9.2 Architecture WG

In the Architecture WG, SONATA has heavily contributed to the 5G PPP white paper on architecture, mostly by means of 2 representatives Dr. Alex Galis and Dr. Holger Karl as project representatives:

- There have been numerous telephone conferences and two physical editing meetings (hosted in Brussels and London), both with discussions on general structure of the white paper and actual text work
- This Architecture WG also submitted and run a workshop session in EuCNC 2016 conference in Athens to which SONATA participants contributed. The white paper has been thoroughly presented by sections to the community and all in all, the white paper can already now be seen as a huge success.

9.3 Involvement in other WGs and 5GPPP Collaboration

SONATA also contributed to the KPIs WG providing input about the requested questions launched by this WG. Also links to the recently created Security WG have been done. Additionally, it is relevant to mention that SONATA partners have also contributed to other general WG such as the Vision and Societal challenges WG.

Finally, it is also relevant to mention that there has been an explicit activity of coordination with several 5G PPP projects addressing goals aligned with SONATA's. In particular, the SONATA architecture has been presented and discussed with the 5GEX (about multi-domain topics and orchestration) and CogNet (about the SDK functions and the orchestration) teams.

Contacts with other projects exist, though they have not translated into a direct interaction yet.

10. KPI's

As previously mentioned in this document, one of the main objectives of SONATA communication and dissemination plan is to achieve measurable impact through successful penetration of the project results towards stakeholder communities.

For this reason, SONATA´s initial plan was accompanied by a battery of potential Key Performance Indicators (KPIs) to add quantitative metrics to the campaign.

The table below shows those KPIs for each of the outreach activities that take part of our communication and dissemination plan. First year achievements are also reflected in order to facilitate the overall progress of the whole plan.

Outreach Activity	KPIs	Year 1 Achievements	Status
Web Campaign			
Project Website	≥ 5000 visits	1880 visits, almost 38% of the expected ones during the life time of the project	
Social Media Campaign	≥ 2 social media channels used regularly, including Twitter and LinkedIn	⇨Twitter was the social media channel used during the first year of the project ⇨A blog is also available in SONATA website ⇨Other channels, such as LinkedIn, will be evaluated during year 2	
Project updates on partners' websites	= 15 (all) partners posting to company related portal ≥ 2 posts/partner	To be planned	
Press and Media Channels			
External Media Channels	≥ 5 external media channels covering the telecom sector	To be planned once SONATA first prototype is available publicly for major impact	
Project Press Release	≥ 100 downloads via website ≥ 5 external media covered		
Online publishing, blogs, online magazines and newspapers	≥ 20 publications		

Project Newsletters	≥ 100 recipients per 2 issues each period ≥ 50 people reported back/asked	Planned to start in year 2. First issue in progress.	
Demonstrations			
Demonstrations	≥ 10 demonstrations online and face to face ≥ 50 organizations	Not possible until year 2, when the first SONATA prototype is available.	**NA**
Tutorials and developer advocacy	≥ 10 sessions ≥ 100 attendees	Together with the public delivery of the first year open source code of SONATA results and, in order to guarantee its use and uptake, the consortium is committed to provide and update all the documentation that may help SONATA adopters and developers to fully use and adapt the code to their liking and needs. Continuous additional engagement will be built from this first important milestone	
Events, Workshops and Conferences			
Presentations	≥ 10 presentations and ≥ 50 organizations	SONATA partners have been present in a total of 8 industry events, international conferences, academic and industry workshops, summers schools, etc. In all of them, the project members have been actively involved via coordination/management activities, presentations (SONATA specific or more general ones), panels, etc...	
Organization and/or attendance to conferences/workshops/events	≥ 8 events ≥ 300 participants		

Publications			
Open Access publications	≥ 10 publications	⇨8 conference publications submitted, 5 of them already accepted and presented and 3 under review ⇨4 Journal publications submitted, 2 accepted and 2 under review ⇨5 contribution documents within ITU-T IMT2020 context	
Reports and other Documents (public)	≥ 20 public documents (including deliverables)		
Whitepapers	≥ 2 whitepapers		
Collaboration			
Contribution to Standards	≥ 2 working groups – active collaboration	SONATA is already active in several working groups: ETSI NFV, OASIS, IRFT, IEFT, TM Forum…	
Involvement in Open Source communities	≥ 2 communities (OpenStack, OpenNVF, etc)	SONATA is already collaborating with several Open Source communities. Among them, Openstack and OSM deserve special mention.	
Organization of 5G PPP cluster activities with other projects	≥ 4 projects	SONATA is constantly seeking for direct collaboration opportunities with other 5GPPP projects, reusing their results and consolidating them into a common NFV orchestration practice for 5G. T-Nova and 5GEx are examples of it.	
Material (Online and Printed)			
Project Flyer, Booklet, Poster, etc.	≥ 1000 recipients (online +printed) ≥ 10 events distributed ≥ 2 posters, multiple events	⇨Two posters printed so far ⇨Presented at the ETSI conference in Sophia Antipolis in April 2016 and at EUCNC event in Athens in June 2016 ⇨ Modular slide deck also available for partners project presentations	

Table 10: KPIs

As can be gathered from Table 10, SONATA communication and dissemination plan is progressing well. There are only two areas where we will have to focus during the next year of the project: Press and media channels and demonstrations.

Regarding the demonstrations activity, it was not possible to start until year 2, when the first SONATA prototype is available.

Regarding the press and media channels activity, it will start once SONATA code is made available in M12. The open source code launch will be accompanied by a marketing plan to ensure maximum awareness and outreach.

11. Conclusion & Next Steps

This deliverable has described the results and plans for the dissemination, communication and standardization activities defined for the Year 1 of the project, aimed at ensuring wide impact of SONATA outcomes in the most relevant European and worldwide communities.

SONATA dissemination targets audience from academic, industrial and open source/open solutions communities in the 5G networking area. The consortium has identified a set of target international conferences, journals and events where the project results are and will be published or presented. The consortium has already published some joint papers and continue participating in international workshops and events with posters, presentations and keynotes.

The strong involvement of some of the SONATA partners in open source activities in OpenStack, OPNFV and OSM, in standardisation bodies like ETSI, ITU-T, IRTF, IETF, OASIS, TM Forum and in the 5G PPP Working groups is a key point to create significant, multiple and targeted impact related to the SONATA technical topics. Plans for potential contributions in these SDOs have been revised according to the availability and maturity of project results to be promoted and discussed in these SDOs.