NESSI Open Framework – Reference Architecture
IST-FP7-216446

Deliverable D 11.3d
Collaboration Report

Clara Pezuela

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EXECUTIVE SUMMARY

In order to increase the awareness and impact of the European Research ICT projects funded by the 7th Framework Programme there is an ongoing effort of establishing collaboration activities under the service and software architectures, infrastructures and engineering area.

This document includes everything related to the collaboration for NEXOF-RA project, from the plan for establishing the guidelines for this collaboration, the tools or instruments used for implementing the collaboration plan and the report of all the collaboration activities along the project duration.

It also outlines main target audiences as well as projects considered of interest by NEXOF-RA to collaborate with in order to strength links and achieve common shared and tangible results. In addition, the report also contains the modalities of such collaboration covering exploitation of technical synergies as well as joint actions for the dissemination of results. Outlining main collaboration actions done during the NEXOF-RA project but also the sustainability planned actions to be considered for the future.

This document has been a life folder updated through subsequent versions of the deliverable taking into account the outcomes of all the actions carried out by NEXOF-RA and concerned projects under the collaboration framework here proposed.
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1 INTRODUCTION

The scope of this document is to compile all the activities achieved in regards to the collaboration between the NEXOF-RA project and other projects in terms of projects involved, main collaboration modalities and to define the sustainability development after the project finished in order to achieve the highest possible project impact.

This report has been created with the support of consortium partners and collaborating projects. As public document is shared with people from other projects NEXOF-RA has decided to collaborate with.

Besides the executive summary and the introduction to the document, the main sections consist of:

- Chapter 2 consists of the collaboration plan that includes the strategy and main projects considered by NEXOF-RA to collaborate with.
- Chapter 3 contains the modalities of collaboration in which NEXOF-RA has implemented the collaboration with other projects.
- Chapter 4 describes the collaboration actions between NEXOF-RA and other projects.
- Chapter 5 refers to the project sustainability from the collaboration point of view; that is how the collaboration with other projects or initiatives may help for NEXOF-RA sustainability.
- Chapter 6 refers to the conclusions.

This document is related to the report ‘D.11.1c Dissemination Report’ produced also at M28 that summarizes all the dissemination activities during the project from the beginning. Some collaboration activities have been workshops or events organized in common with some other projects and then they are dissemination and collaboration activities at the same time.
2 COLLABORATION PLAN

This section contains the strategy for collaborating and the main projects to collaborate with.

The strategy followed in the project for fostering the collaboration has been based on these pillars:

- Identify the main projects or initiatives to collaborate with (described shortly in this section)
- Explore the different ways of collaboration (section 3)
- Collecting the collaboration actions of NEXOF-RA with other projects (section 4)

In principle the NEXOF-RA target audience are people who want to build service-based applications. NEXOF-RA provides to this audience a Reference Architecture implemented through a conceptual model and a set of patterns that help the development of any service platform.

Because of its open approach, the NEXOF-RA results are available to other research (or to identify new research gaps), experimental, or commercial initiatives covering all the economy sectors. In order to assure its wide adoption, the Reference Architecture is domain, technology and business size independent, fostering the adoption and usage by the large business as well as the dynamic world of SMEs.

Although many projects could be object of the collaboration with NEXOF-RA, we decided to focus the collaboration in NESSI Strategic and Compliant projects. The common environment of NESSI and the own nature of all these projects have done this collaboration easier than with others.

Figure 1 - Related projects to NEXOF-RA
Following a brief description of the projects which NEXOF-RA has mainly collaborated with.

2.1 EZWEB description

Started before NEXOF-RA, EzWeb project was developed in the context of MORFEO Community, funded by Spanish Avanza R&D Program where was labeled as a “singular and strategic project”. Key member and promoter of the Open Alliance on Service Front-Ends, EzWeb contributed to NEXOF-RA delivering the infrastructure elements required for Service Front-end Layer. At its turn, EzWeb shared with NEXOF-RA the Europe leading role ambition in the future Internet of services by joining forces and work together in the development of open standard components.

The project provides an open source reference implementation of standard technologies for the front-end web access layer in next-generation SOA and the Future Internet of Services, facilitating end users easily create their own front-end completely adapted to their real needs and personal processes (user centric).

Therefore the project based on 4 main principles:

- user empowerment
- contextual adaptation
- user knowledge sharing
- exploitation and integration with a service marketplace infrastructure

Benefits of this approach are listed below:

- Users become part of the development lifecycle: they build and personalize their own applications by self-servicing from a universe of available resources
- Users can collaborate and share resources (contents and applications) as well as knowledge about them by means of the catalogue
- Interaction can adapted and made relevant to the context, using “context” with its widest meaning possible (device, situation, social context, …)
- The platform is also proactive and assists users through smart agents that exploit knowledge about context and learn from users’ interaction
- Captured knowledge is analyzed in order to propose automation of routine processes
- Provide the foundation for an open marketplace and sustainable business ecosystem where back-end providers publish resources and brokers/ aggregators make these resources available to end-users.

EzWeb is dealing with the development of the following front-end components:

- Web Platform: web-resources front-end mash up, wiring, tagging, navigation, correlation, discovery, Context-based adaptability
• Resource market-place components: resource registration, link to back-end services, usage accounting.
For more information please check http://ezweb.morfeo-project.org/

2.2 MASTER description

MASTER project (‘Managing Assurance, Security and Trust for Services’), coordinated by Atos Origin, develop a compliance checking engine for SOA-based enterprises by focus on security compliance of related regulations and standards, like SOX, HIPPA, Data protection laws, ISO2700X, and the like. MASTER produce security metrics to assess the level of compliance of a particular regulation, while helping the CIO/CTO ensure compliance to multiple regulations/standards at once, since MASTER helps match different requirements to a single control, thereby simplifying the task of compliance.

Trust pillar of the European Technology Platform NESSI, MASTER project aimed to help information officers, security officers and auditors better understand the security, trust and assurance implications of compliance with security policies, regulations and best practices. Aided both in the deployment of controls, and the monitoring, management and auditing of compliance.

MASTER translate business level to IT challenges in 3 domains:

- Support Decision
- Trusted Monitoring Infrastructure (SOA and outsourced infrastructure)
- Enforcement Infrastructure of security and trust decisions

For more information please check http://www.master-fp7.eu/

2.3 RESERVOIR description

RESERVOIR project (‘Resources & Services Virtualization without Barriers’) aims to make cloud computing a European reality by developing technologies to support a service-based online economy, where resources and services are transparently provisioned and managed. Provides to NEXOF-RA an infrastructure blueprint (the “right” capabilities for a cloud computing environment) which service providers in Europe (businesses or governments) will use in implementing their product and service offerings. In turn, help to provide higher quality services and competitive costs reliability, benefitting the European economy.
In line with Europe’s Future Internet of Services Initiative makes clear separation between services providers and infrastructure providers (IPs) – enabling service providers to use federations of IPs and access resources beyond the capacity limitations of an individual IP. Therefore RESERVOIR drives the development of next generation data centers and federated cloud infrastructures, demonstrating quantified and significant improvements in service delivery productivity, quality, availability and cost. Other key technologies developed in RESERVOIR include:

- Development of technologies to enable the migration of both virtual machines and Virtual Java Service Containers across network and storage boundaries
- Algorithms for allocation of resources conform to SLA (Service Level Agreement) requirements
- Creation of a formal Service Definition Language to support service deployment and life cycle management across RESERVOIR sites
- Security mechanisms for safe deployment and relocation of virtual machines across physical machines and RESERVOIR sites
- Development of business information model, business oriented payment and billing mechanisms to charge for resources used across one or more RESERVOIR sites
- Test-bed development to benchmark performance of actual industrial use cases in a RESERVOIR environment.

RESERVOIR services are accessed via 3 sets of interfaces:

- Service Management Interface (SMI) – to manage service delivery, deployment and the service lifecycle
- Virtualization Management Interface (VMI) – to manage the virtual allocation of resources, control and monitor
- Virtual Host Interface (VHI) – to shield high level management components from specific virtualization technologies used by a site.

The corresponding core functional components of the RESERVOIR cloud middleware are:

- A Service Manager
- A Virtual Environment Manager (VEEM)
- A Virtual Environment Host (VEEH)

This infrastructure support the setup and deployment of services on demand, at competitive costs, across dispersed administrative domains, while assuring QoS and meeting security requirements.

For more information please check [http://62.149.240.97/](http://62.149.240.97/)
2.4 SLA@SOI description

The goal of SLA@SOI (‘Empowering the Service Economy with SLA-aware Infrastructures’) is to define, negotiate and monitor of SLAs between various layers of a service infrastructure. It establishes systematic management approach for service-oriented infrastructures on the basis of formally specified Service Level Agreements. The project will translate business level SLAs down to the infrastructure and drive the IT management according to business needs.

Its main objective is development of a comprehensive, industrial strength SLA management framework to incorporate multi-modal monitoring capabilities (e.g. post-mortem and predictive monitoring), cuts across different layers of a service-based system and the infrastructure(s) having an explicit focus on the business aspects of SLAs.

SLA@SOI provides 3 major benefits to the services provisioning:
- Predictability & Dependability
- Transparent SLA management
- Automation

For more information please check [http://sla-at-soi.eu/](http://sla-at-soi.eu/).

2.5 SOA4All description

SOA4All (‘Service Oriented Architecture for All’) maximize the impact from the new opportunities emerging in the services domain in relation with the Internet of Services. Similarly to all NESSI Strategic Projects, SOA4ALL works closely with NEXOF-RA to ensure that its developments benefits from the wider exposure that comes from contributing key elements to NEXOF, the NESSI Open Service Framework.

The outcome of SOA4All is a comprehensive and independent framework and infrastructure integrating 4 complimentary and revolutionary technical advances:

- **Web principles** and technology - underlying infrastructure for the services integration at a world wide scale
- **Web 2.0** - to structure an efficient and cost effective human-machine cooperation
- **Semantic Web** - abstract from syntax to semantics for meaningful service discovery
- **Context management** - customization of existing services for the needs of users.

The project aims to realize the Service Web of tomorrow as accessible, ubiquitous, and successful as the information-centric Web we know today. Reaching not only
academic and industrial communities related to software and services but also the European citizens will make the provision and usage of Web services as easy and comfortable as the publication or consumption of Web pages on today’s Web.

SOA4All will definitely influence the NEXOF-RA results by maximizing its project impact:

- Creating platforms for different domains: telecommunication, eCommerce, and public sector
- For different business interests: business users and consumers
- With different abilities (‘4 all’): developers, business experts, advanced and casual users
- And different roles: service consumers and providers → prosumers

SOA4All project impact refers:

- **Dynamic services at Web scale** – billions of services will be exposed and consumed in a dynamic, transparent fashion; scalability also supported through semantics
- **Service usability** – reusing Web 2.0 principles lowering the entry barriers to the service world ensuring services consumption, production and personalization to non-IT experts; the consequence will be productivity and efficiency benefits.
- **Open standard service platform** – follow the Web approach: non-proprietary platform based upon an open set of standards
- **Integration of service worlds** - amalgamation of SOA with Web utilising Web 2.0 approach will blur the machine / human distinctions enabling its interchangeable use providing significant benefits to SMEs, large corporations and end users (citizens).
- **Service adaptation to local contexts** – support services adaptation to local context: specific device used, user’s geographic location, personal preferences etc.

For more information please check [http://www.soa4all.eu/](http://www.soa4all.eu/).

### 2.6 COMPAS description

COMPAS (‘Compliance-driven Models, Languages, and Architectures for Services’) addresses the SOAs design like development times, analysis time, design time, and runtime. Business rules or composition concepts for services have been proposed, but none offers a unified approach by the compliance rules point of view (including user side and regulations). This is in part due to the problem that compliance rules are often pervasive throughout the SOA.

To address this problem, COMPAS project provide a core software framework built using the model-driven software development (MDSD) paradigm to enable companies rapidly develop, stably evolve and maintain a customized business compliance software framework.
COMPAS business compliance software framework for SOAs is used to compose business processes & services, express and validate all compliance concerns related.

COMPAS has been awarded by NESSI ETP as a NESSI Compliant project since meeting the following criteria:

Role criteria first, since COMPAS project:

- Significantly advance state of the art in the focused area of compliance to the broad sense which is of utmost importance/relevance in the context of NESSI (SRA) and NEXOF (Concept of Open Service Framework)

- Contribute to Conceptual Reference Model (including Glossary) and Reference Architecture (including Specifications) of the NESSI Open Service Framework.

This while being compliant to open source and open standards principles which are core to NESSI.

Output criteria second, since COMPAS Project has been designed to:

- Significantly contribute to the set-up of an Open Service Framework while being compliant to open source and open standards principles which are core to NESSI

- Complement the NESSI Strategic Projects undertaken work, meaning that the projects results would be made available to these projects for selection and/or adaptation.

Consortia criteria

- Since is supported by Thales (a NESSI ETP partner) and partners which are also members of various NESSI Working Groups (e.g. Service Engineering, Business Process Modelling, Trust, Security and Dependability).

For more information please check www.compas-ict.eu.
2.7 NESSI 2010 description

NESSI’s (‘Networked European Software & Services Initiative 2010 support action’) key priority since launched in September’05 was to increase the collaboration with and between the EU Member States. With the support of EU funded support actions NESSI-Soft and NESSI 2010, NESSI supported the meetings organisation between the Member States representatives active in the services domain. Nevertheless, NESSI evolves to decentralised organization closing the premises operated by partner Thales on behalf of NESSI since 2006. NESSI operations were supported financially by the partners and by NESSI 2010.

The project finished in 30th April 2010 so the NESSI strategy changed by adapting the resources at the partner level: coordination meetings will be held in different countries, to take advantage of increasing interaction with the members locally as well as meeting the national initiatives.

The six NESSI Strategic Projects supported by European or national (Spanish) funds, support NESSI 2010 action and will deliver the first keystones of NEXOF-RA, the NESSI Open Service Framework.

The NESSI 2010 project goal was to support NESSI in specific areas by focusing on:

- NESSI Strategy formulation and implementation
- NESSI Community clustering and animating through Working Groups
- Interlinking activities, mainly towards coordination towards national programs
- SME activities, mainly towards ICT1 SMEs\(^2\) involvement
- Selected NESSI awareness activities, mainly through events and dissemination activities.

Through its specific activities, the strategic impact of NESSI 2010 is oriented towards:

- NESSI Community: keeping it aware, involved and participative to the overall NESSI implementation
- ICT community at large and the potential users of IT\(^3\) services: making them aware of the services impact, potential of NEXOF and its progress etc.

NESSI 2010 had key role within NESSI’s strategy updating the overall communication and dissemination strategy and coordinating its implementation.

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1 Information and Communication Technology
2 Small and Medium Enterprise
3 Information Technology
NESSI 2010 will have an impact in terms of:

- **Scope** - to benefit the actual or future **stakeholders** involved in a service oriented model beyond the active NESSI members

- **Effectiveness** - supporting the **momentum of an existing and growing community**, the NESSI Open Service Framework delivery, coordinating inter / national programs actively involving SMEs etc.

For more information please check [http://www.nessi-europe.com/](http://www.nessi-europe.com/).

### 2.8 S-Cube description

The major research related goal of S-Cube (‘The Software Services and Systems Network’) is to address:

- **Research fragmentation** - e.g., grid computing, software engineering. Proposed solutions are not aligned with or influenced by activities in related research fields.

- **Future Challenges**: for example to build service-based systems that can self-adapt while guaranteeing the QoS. This requires changes in system’s environment or in response to un / predicted problems.

Accomplishing its objectives, S-Cube pursue long-lasting impact:

- Re-align, re-shape and integrate research agendas of key European players

- Inaugurating a Europe-wide common program of education & training for (creating a common culture)

- To establish pro-active mobility plan and enable cross fertilization (integration of research communities)

- To establish industry trust relationships via NESSI with catalytic effect in European research, industrial competitiveness and societal challenges

- Defining broader research vision and perspective

The S-Cube technical approach is:

- **Integration** (research fragmentation and isolation) to a knowledge model developed (Pan-European Distributed Service Laboratory established as a high-quality research infrastructure), providing education programs, knowledge cross-fertilization etc.

- **Joint Research** guided by S-Cube research framework taking into account cross-cutting issues like QoS, SLA compliance etc.

- **Spread Excellence** by project results dissemination, enhance the research visibility (S-Cube Web Portal, international conferences, workshops, summer schools, European Ph.D. program etc).

From an architectural perspective, thus both S-Cube and NEXOF-RA are addressing all layers of a service-based system, including infrastructure, service composition, business process management, as well as user interaction.
The knowledge model defined in S-Cube constitute of definitions of terms and their dependencies, as well as links to different research disciplines and competencies of different research communities and institutions. Similarly, in NEXOF-RA a conceptual model is developed, that describes the concepts and relationships of service-based systems. Each of these concepts is defined in the NEXOF-RA glossary.

From a terminology point of view, thus both S-Cube and NEXOF-RA aim at achieving an agreed understanding of service terminology.

3 MODALITY OF COLLABORATION

The collaboration activities have been performed in accordance with several modalities of collaboration that we have defined as more realistic and convenient for NEXOF-RA and for the projects which collaborate with.

The concrete collaboration modalities implemented are summarized hereafter:

- The exploitation of synergies and technical concertation by means of participating to the Open Construction Process and through the Invitations to contribute and Investigation Teams.
- Participation in the Architecture Board meetings
- Joint dissemination and coordination actions
- Contributions to NEXOF-RA products (requirements, glossary, patterns specification and NEXOF-RA repository)
- Contribution to standards

Following some hints about every modality are described.

3.1 Open Construction Process (OCP)

NESSI, the European Platform on Software and Services identifies NEXOF-RA like one of its main challenges by providing scalable and flexible reference architecture integrated into the NESSI landscape. Represent the first step of building a generic open platform for create and deliver applications enabling the creation of service based ecosystems where service providers and third parties easy collaborate and the Reference Architecture for the “Future of Internet”. In this line, NEXOF-RA needs to be implemented into a broad range of application domains supporting any business size by all user communities using different technologies. NEXOF-RA established strategies to speed up the dynamics of the services eco-system, to foster safety, security and well being of citizens and encouraged people to participate in its open specification process within the NEXOF-RA Community. The Community is composed by leading industries players, SMEs, Academia and users who have the same vision of a long term strategy of contributing to Europe’s competitiveness, job sustainability and quality of life.

NEXOF-RA Reference Architecture provided a common baseline and templates and collection of dynamic specifications (further evolutions as per research results or changes in the state of practice) allowing the implementation for the whole NESSI Community and other. Next figure shows the different layers of contribution and influence of NEXOF-RA.
In order to achieve “The Open Reference Architecture” NEXOF-RA has launched the Open Construction Process based on collaborative relationships, where both NEXOF-RA and the contributing parties such as industry and academia sector, go beyond their common vision to adopt common references, such as shared principles, definitions, models, architectures, standards, and processes to achieve the Open Reference Architecture. Many NESSI Strategic and Compliant projects have contributed to NEXOF-RA by participating in the Open Construction Process (OCP). The OCP is implemented by the NEXOF-RA Community, which is composed by different key actors depending on its impact.

This Open Construction Process has launched several Invitations to Contribute (ITC):

- **First Invitation to Contribute** (from July ’08 to October’08)


This call opened contributions related to the following thematic areas and related topics:

- Core Service Framework Area
  - Service Description Techniques
  - Design time service composition
  - Service Discovery
  - Interoperability of Message-Based Service Interaction
- User Interaction Area
· Declarative UI Authoring Languages
· Context Model and Universal APIs

- Infrastructure Area
  - Definition of Infrastructure Services

- Security Area
  - Dynamic identity management for SOA
  - Privacy Management in SOA

- Quality of Service Area
  - Scalable Approaches to Service Oriented Infrastructures
  - Highly Availability for Multi-Tier Architectures

➢ **Second Invitation to Contribute** (from February’09 to March’09)

Information available at [http://www.nexof-ra.eu/?q=node/491](http://www.nexof-ra.eu/?q=node/491)

This call opened contributions related to the following thematic areas and related topics:

- Core Service Framework Area
  - Runtime Service Composition

- User Interaction Area
  - Metadata for Service Front End Resources (Phase I)
  - APIs for Service Front End Resources (Phase I)

- Infrastructure Area
  - Infrastructure usage and management interfaces

- Security Area
  - Multi-level Security for SOA
  - Dynamic Security for SOA

- Quality of Service Area
  - Service Level Agreement (SLAs) and Quality of Services and QoS
  - Federated and Autonomic Management in SOA

➢ **Third Invitation to Contribute (for PoCs)** (from July’10 to September’10)

This call opened contributions related to the following thematic areas and related topics:

- **Core Service Framework Area**
  - Service Description
  - Design Time Service Composition
  - Service Discovery
  - Interoperability of Message-Based Service Interaction
  - Runtime Service Composition

- **User Interaction Area**
  - Declarative Authoring Language for User Interfaces
  - Context Model and Universal APIs
  - Metadata for Service Front End Resources
  - APIs for Service Front End Resources

- **Infrastructure Area**
  - Definition of Infrastructure Services
  - Infrastructure Usage and Management Interfaces

- **Security Area**
  - Dynamic identity management for SOA
  - Privacy Management in SOA
  - Multilevel security for SOA
  - Dynamic security in SOA

- **Quality of Service Area**
  - Scalable Approaches to Service Oriented Infrastructures
  - Highly Availability for Multi-Tier Architectures
  - Service Level Agreements (SLAs) and Quality of Service (QoS)
  - Federated and Autonomic Management in SOA

**Invitation to Contribute for Requirements** (continuously open)

Information available at http://www.nexof-ra.eu/?q=node/490

This call opened contributions related to the following topics:

- Scenarios that should be supported within the NEXOF reference architecture, and
- Requirements that should be implementable using the NEXOF reference architecture.
All the Invitations to Contribute were published through different channels: NESSI, Open Alliance for Service Front-ends (MORFEO Community), webpage of project partners, related initiatives (INES i.e.), NEXOF-RA web site, etc.

For the First and Second Invitation to Contribute, the interested people registered in NEXOF-RA web site their interest on contributing to any of the topics and afterwards sent a position paper to the contact person for every topic. Once all position papers were received, the responsible of the every topic evaluated the papers and consider those which are valuable for the topic. After this process, NEXOF-RA held some meetings with the contributors named Investigation Teams, where the papers were discussed. In these meetings, it was also established the manner how these contributions could be integrated in NEXOF-RA work.

For the Invitation to Contribute for Requirements, the interested contributors had to fill a questionnaire indicated in the web site and send it by email to the mentioned contact person.

For the Invitation to Contribute for PoCs, the interested people must register at the NEXOF-RA web site, and then fill two forms: one for describing the idea of PoC they proposed; and a second one for enumerating the collected results, conclusions, and so on. The contributions of this open call will be part of the future of NEXOF-RA since the project is finished at the time of publication.

Within the OCP, contributors joined forces, fostering partnerships with significant industrial and academic participants. The framework promoted gave visibility and impact to the contributions and these gained expertise on NEXOF and was recognized as co-authors.

3.2 Architectural Board (AB) meetings

NEXOF-RA Architecture Board includes all NESSI SP. It decides about the start of a new Open Construction Cycle. It meets about monthly through phone conference, and every trimester in a face-to-face manner.

All NESSI Strategic projects (SOA4All, RESERVOIR, SLA@SOI, Morfeo EZWEB and MASTER) have been invited by the NEXOF-RA Management Board as core partners in the creation of the Open Reference Architecture. They are also involved in most phases of the Open Architecture Specification Process and play a key role as contributors to the Open Construction Process. Besides the NESSI SP contribution to the Open Process, other NEXOF-RA related projects and initiatives have been also invited to participate to the Open Process in terms of the several Invitations to Contribute. In this sense, chapters 4 summarizes the existing collaboration activities between NEXOF-RA and not only NESSI Strategic Projects but also other related projects to NEXOF-RA.

The Architectural Boards meetings that have been hold and the main conclusions of them are listed below:
First AB Meeting, 16th -17th April 2008. The launching of this high level team where all the projects were presented and the bases for the Invitation to Contribute initiative were established.

Second AB Meeting, 27th -28th April 2008, Brussels. It has been devoted to collect the potential list of interesting topics for the first Invitation to Contribute.

Third AB Meeting, 2nd -3rd July 2008, Haifa. It has been aimed at deciding from the potential list of topics which ones will definitely open to contribute for the first Invitation to Contribute; in the next period, the OCP was extended through the Second Invitation to Contribute.

Fourth AB Meeting, 13th -14th October 2008, Brussels. This time, the Architecture Board has reviewed all position papers submitted by stakeholders in order to issue invitations to the Investigation Team.

Fifth AB Meeting, 26th -27th January 2009, Brussels. The main purpose of this meeting has been the post-discussion of the first round of Invitations to Contribute and their results, and to finalize the second call for contributions.

Sixth AB Meeting, 25 – 26 May 2009, Brussels, Belgium

Seventh AB Meeting, 22 – 23 Feb 2010, Rome Italy

3.3 Joint coordination actions
The actions considered under this modality of collaboration are basically those ones related to the share coordination of working groups or initiatives. This coordination implies the organization of meetings for these groups, definition of strategy for the groups or reporting to EC, for instance.

3.4 Joint dissemination actions
This modality of collaboration consists of joint activities with other projects aimed at disseminate NEXOF-RA, its processes, results and assessments. For that NEXOF-RA has participated in conferences, events and workshops with other projects; it has made joint presentations; joint publications; newsletters and cross-references in web sites.

3.5 Contribution to NEXOF-RA products
Several “products” produced by NEXOF-RA project along the project are object of contribution. We named products here to all the valuable results achieved in the project. Next sections describe briefly all these products. The complete set of results or products of NEXOF-RA are available at NEXOF-RA Repository at the project web site: www.nexf-ra.eu

3.5.1 NEXOF-RA Glossary
This glossary is a selection of terms that is being prepared by the NEXOF-RA project, in cooperation with NESSI related projects, and is intended to form a common glossary across the projects and beyond. It takes many of its definitions from established standards or pseudo standards. These terms concern various aspects of
the service lifecycle ranging from requirement analysis to operation. One of the inconveniences of such glossary with respect to the models that we have previously described is that the various terms are defined in isolation and the relationships between terms are not highlighted. This can easily lead to ambiguities and missing definitions. Its main advantage stands in the fact that it is much broader than the other models.

The objectives can be summarized as follows:

- Baseline for NEXOF-RA internal activities, defining a common terminology for the project.
- Common language with the NESSI strategic projects (NSPs) to make possible the integration of results
- Reference for the NEXOF community to foster external contributions beyond the NSP

It is available at [http://www.nexof-ra.eu/?q=node/187](http://www.nexof-ra.eu/?q=node/187)

### 3.5.2 NEXOF-RA Roadmap

The objective of the NEXOF-RA Roadmap is to define an evolution of the NESSI Open Framework from NEXOF-RA results, settling the necessary steps to ensure the success of its construction and growth. In this context we present this Roadmap with identified Research Challenges for the NEXOF evolution.

With this intention, the NEXOF Roadmap examines major research topics that have the potential to influence NEXOF progress and for which their relation with NEXOF concepts is analyzed:

- The service economy: where the influence of novel software tools to transform how services and business processes are delivered and organized is identified.
- Future of Internet and Internet of Services: where the coincidences between the Internet of Services vision and NEXOF is identified.
- Cloud computing: for which its influence, especially for NEXOF uptake and adoption, is analyzed.

The identified research challenges for NEXOF Evolution are grouped by the following thematic areas as main constituent parts of the Service Open Framework:

- Advanced User Service Interaction
- Service Centric systems Engineering
- Adaptive Service aware infrastructure
- Non functional Aspects

A public consultation was launched in March 2010 for allowing external people of the project to give feedback and contribute to the roadmap. The feedback could be provided through the web site electronically, or by paper questionnaire at the NESSI Projects Summit in April 2010.
3.5.3 NEXOF-RA Patterns

The mission of NEXOF-RA is to address comprehensive service-oriented software system architectures and specifications. The approach of the project is to use patterns, partitioning the domain in a series of distinct problems and identifying reusable solutions for each. The project has a parallel focus on the composition of these patterns to create coherent, consistent and interoperable instances of service-oriented software systems. The reference architecture will incorporate technology-oriented open specifications through patterns.

A navigable online version is available at the web site for allowing public visit all the available patterns till now at:

- Enterprise SOA pattern: http://www.nexof-ra.eu/?q=node/526
- IoS pattern: http://www.nexof-ra.eu/?q=node/651
- Cloud and IaaS pattern: http://www.nexof-ra.eu/?q=node/652

Several contributions have been received via project Working Groups.

3.5.4 NEXOF-RA PoCs

NEXOF-RA wants to provide guidance for implementing the proposed patterns and to demonstrate that the statements made by the patterns are true, by validating them through Proof of Concepts (PoCs). For doing so, external contributions are necessary, providing information about software artifacts which can be applied to NEXOF-RA patterns and proposing new PoCs which can be performed for validating the patterns or which can be considered important for demonstrating the validity of the whole NEXOF-RA approach. Additionally, this initiative also can support other projects in the assessment of their architectures, providing some guidelines according to the NEXOF-RA methods and experience, so they can relate their solutions to NEXOF-RA patterns and define their own PoCs with which validate their architectural solutions.

Several patterns have been defined for the Reference Architecture and, although the ideal situation is to get a validation of all the patterns defined, only a set of patterns has already been validated through PoCs.

A Call for PoCs has been recently open at the NEXOF-RA web site, inviting to contribute whoever wants to submit a Proof of Concept that validates the Reference Architecture defined by NEXOF-RA. This call will remain open after the end of the project, since it has been open practically at the end of duly period.

3.5.5 NEXOF-RA Requirements

The mission of NEXOF-RA is to address comprehensive service-oriented software system architectures and specifications. To ensure the success of the project, a close orientation to the needs of the market is needed. For that, potential NEXOF stakeholders and those putting forward the specific cases where contacted to determine what they feel to be important and what might be the priorities (i.e. must, should, may have). The result of this activity is a list of scenarios from the different
stakeholders. Those scenarios include different standpoints, interpretations, opinions, and needs. The scenarios and requirements are those considered important by the NEXOF-RA partners, who are involved in different domains, and that invest in the project. From this scenarios a set of high level requirements have been derived.

These capture of scenarios and requirements have been supported by the Open Construction Process through an open Invitation to Contribute specific for this purpose. See section 3.1.

A couple of scenarios have been contributed to this project activity from external people of the project.

3.6 Contributions to standards

More than the main results of NEXOF-RA, we stress here the importance of the standards within the Open Reference Architecture. NEXOF-RA project results have a clear impact on standards by the Open source reference implementation of next generation Service Front-End platform.

Internet users are expecting that the web will support their daily life becoming the front-end through which they will get access and mix services (either application services, content/data delivery services) which are truly useful for them, matching their needs at any moment, in a context/knowledge-aware manner.

Several standards have been identified as potential to be contributed by NEXOF-RA in cooperation with other projects. Here below a brief description of the main standardization bodies considered for contributing:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Addressed to</th>
<th>Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS-Agreement</td>
<td>Standardize terminology, concepts, overall agreement structure, agreement template with creation constraints, port types / operations for creation, expiration and monitoring of agreements (include WSDL)</td>
<td>OASIS <a href="http://www.oasis-open.org/specs/">http://www.oasis-open.org/specs/</a></td>
</tr>
<tr>
<td>WSMO-Lite</td>
<td>Lightweight implementation of WSMO (ontology based framework supporting deployment and interoperability of Semantic WS) on top of W3C</td>
<td>W3C <a href="http://www.w3.org/Consortium/contact">http://www.w3.org/Consortium/contact</a> <a href="http://www.wsmo.org/">http://www.wsmo.org/</a></td>
</tr>
<tr>
<td>Standards (WSDL 2.0 and SAWSDL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SA-REST</strong></td>
<td>Simple / open microformat for enhancing Web resources with additional semantic information used to enrich Atom, RSS and arbitrary XML</td>
<td></td>
</tr>
<tr>
<td><strong>Oasis SOA-RM</strong></td>
<td>Reference_ model (abstract framework for understanding relationships among environment entities) for SOA (paradigm for organizing / utilizing distributed capabilities under the control of different ownership domains systems; to maximize agility, scale and interoperability)</td>
<td></td>
</tr>
<tr>
<td><strong>Open Cloud Computing Interface</strong></td>
<td>API for remote management of 'Infrastructure as a Service' (IaaS) based clouds</td>
<td></td>
</tr>
<tr>
<td><strong>Open Virtualization Format</strong></td>
<td>Open, secure, portable, efficient and extensible format for the packaging and distribution of software to be run in virtual machines (OVF Package)</td>
<td></td>
</tr>
<tr>
<td><strong>BPEL</strong></td>
<td>Standardize executable language for specifying interactions (export and import information) using WS interfaces exclusively</td>
<td></td>
</tr>
<tr>
<td><strong>Service Oriented Architecture Model Language (SoaML)</strong></td>
<td>New standard for Service Modeling (December'09) with both UML profile and metamodel for services modelling to support SOA modelling; provides SOA abstraction focusing on describing the participants needs &amp; capabilities and connecting them in service value chains</td>
<td></td>
</tr>
<tr>
<td><strong>Device Description Repository Simple API</strong></td>
<td>Web content delivered to mobile devices usually benefits from being tailored to take into account factors range (screen size, markup language support and image format support); information stored in &quot;Device Description Repository&quot; (DDR – standard interface / initial core vocabulary of device properties containing information about Web-enabled devices (particularly mobile devices); Web content authors make use of repositories to adapt their content to best suit the requesting device</td>
<td></td>
</tr>
<tr>
<td><strong>Delivery Context Ontology</strong></td>
<td>Formal model of environment characteristics in which devices interact with the Web or other</td>
<td></td>
</tr>
</tbody>
</table>

W3C [http://www.w3.org/Submission/SA-REST/](http://www.w3.org/Submission/SA-REST/)


Distributed Management Task Force, Inc [http://www.dmtf.org/home](http://www.dmtf.org/home)


W3C [http://www.w3.org/Consortium/contact](http://www.w3.org/Consortium/contact)
services; includes: Device characteristics, software used to access the service and Network providing the connection among others.
4 COLLABORATION ACTIONS

According to the above modalities of collaboration identified for cooperating with other projects, this section describes all the collaboration actions performed by NEXOF-RA during the whole project life.

The main collaboration activities have been with NESSI Strategic Projects (NSP) although we have received contribution and setting up collaborations with other non NSP. The following picture resumes the links among some of these projects in terms of collaboration:

In order to offer a clearer and overall view of all the collaboration activities we have decided to create a mind map shown in the following picture.

The central node is the collaboration issue itself and it is decomposed into the different modalities of collaboration and different type of activities (if any) at lower level. Finally the activities are classified by project which collaboration was carried out.

The described collaboration activities have been performed through the different Work Packages (WP1 to WP4 for research contributions; WP9 for standardization collaborations; WP8 for PoC contributions; WP10 for requirements contributions) depending on the nature of the action. However, in order to offer this global picture to
an audience external to the project, any distinction into WPs have been done in the graphical visualization.

Figure 4 – Overall collapse collaboration map
Following pictures shows in more detail the achieved collaboration actions by category.
4.1 Contribution to NEXOF-RA Products

Joint dissemination activities

- Joint coordination tasks
- Invitations to Contribute
- Architectural Board
- Joint standardization initiatives

Contributions to NEXOF-RA "products"

- Glossary
  - Referring the glossary and extending some terms
- Roadmap
  - Sustainability plan for NESSI
- RESERVOIR and SLA@SOI
  - SLA Compliant Cloud Scalability ("Cloud Data Center") - Jun 2010
- SOA4ALL
  - Service Discovery - Jun 2010
  - Semi-Automatic Service Composition at Design Time - Jun 2010
  - SLA@SOI Negotiation functionality in the IaaS Pattern; Oct 09 / Mar 09
  - Contributions on the service discovery pattern and design time service composition patterns; Oct 09 / Mar 09
  - Assisted Composition Designer pattern
- Patterns
  - Semantic Annotation Composition pattern
  - Data mediation pattern
  - Semantic repository pattern
- SLA@SOI and RESERVOIR
  - Vertical and horizontal interface in IaaS pattern

The scenario for User Requirements: SOA Harbor (scenario S20), about a simulation of a harbor in which packages are loaded or unloaded from/into ships and trucks. Submitted by Students of the University of Oldenburg (Germany).

The scenario Software as a Service (SaaS) CRM Multi Tier Enterprise Application in the Cloud (scenario S21), describing two architectural options for a Customer Relationship Management (CRM) solution that represent two ends of a continuum: on one hand a "classical fixed allocation of computed resources", on the other hand the "scalable allocation of IaaS resources from a federated group of providers". Submitted by IBM (Italy)

Mapping of NEXOF-RA model with models of SLA@SOI, COMPAS, SOA4ALL, EzWeb, Reservoir and MASTER
4.2 Joint coordination tasks

Coordinate the "Contribution to standards" Collaborative WG. Organisation of meetings and administrative tasks, including taking care of the collaboration instruments, editing documents, and reporting to the EC.

Coordinate and contribute to the SSAI&E (Software and Service Architectures and Infrastructures) Collaboration Working Group. Key relevant NEXOF-RA members are part of S-Cube IAB.

Joint coordination tasks

Invitations to Contribute

Architectural Board

Joint standardization initiatives

Joint dissemination activities

Contributions to NEXOF-RA "products"
4.3 Joint dissemination actions
### Collaboration in NEXOF-RA

**Joint coordination tasks**
- Invitations to Contribute
- Architectural Board
- Joint standardization initiatives

**Joint dissemination activities**

<table>
<thead>
<tr>
<th>Events</th>
<th>Collaborative Workshops &amp; Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>NESSI Projects Summit, Valencia, April'09</td>
<td></td>
</tr>
<tr>
<td>Services Front End (SFE) Collaboration Working Group Workshop, UPN, Madrid, 24 June 2008</td>
<td></td>
</tr>
<tr>
<td>Service Front-End Collaboration Working Group Session, Internet of Services Collaboration meeting for FP6 &amp; FP7 projects, Brussels, September 2008</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workshops</th>
<th>Other Events</th>
</tr>
</thead>
</table>

### Contributions to NEXOF-RA “products”

- SFA-ServicesWave December 2008
- Joint Organization between NEXOF-RA and S-Cube of one Collaboration Working Group meeting

---

**SMAALL**  
Networking session about “Research challenges and contributions for NEXOF”  
ICT 2008, Lyon, November 2008

- SemanticWeek 09, Amsterdam, 22-26 June 2009

**Focussed on informing the participants about how they can take part in the development of NEXOF**  
Over 30 people attending.

- The 1st Communication & Dissemination collaboration meeting, Brussels, September'09.

**ALL organized by NESSI 2010**

**Main objectives:**
- Presentation of the NESSI communication activity and services available to the NSPs
- Presentable by each NSP of its project on communication
- Definition of the coordination level between NESSI and NSPs

**The meeting has focused on:**
- Increasing the information channel between all NSP partners, ensuring that all partners have a clear understanding of NESSI and NEXOF
- Increasing the information channel between all NSPs, ensuring that the evolution of their contributions to NEXOF is fully visible and can, therefore, also be made visible at NNESSI level and beyond.
- The creation of a use case section

**NESSI Projects Summit, Valencia, April'09**

**Open session on service wave-est workshop, Service Wave 2008, Madrid, 23-24 September 2008**

**Workshop of the Open Calls, 23-24 March 2008, Brussels Belgium 2nd Invitation to Contribute**

**SMAALL + RESERVE + SLA@SOI + S-Cube**

**Concertation Meeting hosted by the European Commission, DG Information Society, SS&A Unit, Brussels, March’08**

**As a result of the concertation meeting, the SSA&E working group was set up**

**SMAALL + RESERVE**

**e-Challenge’09, Istanbul, Oct 2009**

**Joint Organization between NEXOF-RA and S-Cube of one Collaboration Working Group meeting**
4.4 Participation in Architectural Board

- Joint coordination tasks
- Invitations to Contribute
- Joint dissemination activities
- Contributions to NEXOF-RA "products"
- Joint standardization initiatives

- Participation in all AB meetings
- Participation in the most of AB meetings
  - SOA4ALL
  - MASTER
  - SLA@SOI
  - EzWeb
  - RESERVOIR
  - S-Cube
4.5 Joint standardization initiatives
4.6 Invitations to Contribute

The figure shows which projects have contributed to all the open Invitations to Contribute to the Areas and Topics related to the Reference Architecture definition in NEXOF-RA.
The tables below show the number of papers received by Area/Topic in two already closed Invitations to Contribute.

**First Invitation to Contribute**
Through this open process, NEXOF-RA received a total of 93 Position Papers from 251 registered participants.

<table>
<thead>
<tr>
<th>AREA</th>
<th>Topic</th>
<th>Registered Participants</th>
<th>Position Papers</th>
<th>Effective Participants</th>
<th>Face-to-Face Meetings</th>
<th>Phone Conference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Service Framework</td>
<td>Service Description</td>
<td>39</td>
<td>17</td>
<td>14</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Design Time Service Composition</td>
<td>44</td>
<td>13</td>
<td>7</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Service Discovery</td>
<td>38</td>
<td>9</td>
<td>8</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Interoperability of Message-Based Service Interaction</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>User Interaction</td>
<td>Declarative Authoring Language for User Interfaces</td>
<td>10</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>
## Context Model and Universal APIs

<table>
<thead>
<tr>
<th>Infrastructure Services</th>
<th>21</th>
<th>5</th>
<th>9</th>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>30</td>
<td>11</td>
<td>13</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Dynamic identity management for SOA</td>
<td>14</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Privacy Management in SOA</td>
<td>11</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Quality of Service</td>
<td>26</td>
<td>13</td>
<td>11</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Scalable Approaches to Service Oriented Infrastructures</td>
<td>11</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Availability for Multi-Tier Architectures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total**

|                  | 251 | 93 | 82 | 11 | 36 |

### Second Invitation to Contribute

Through this open process, NEXOF-RA received a total of 41 Position Papers from 50 registered participants.
<table>
<thead>
<tr>
<th>AREA</th>
<th>Topic</th>
<th>Registered Participants</th>
<th>Position Papers</th>
<th>Effective Participants</th>
<th>Face-to-Face Meetings</th>
<th>Phone Conference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Service Framework</td>
<td>Runtime Service Composition</td>
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5 SUSTAINABILITY OF COLLABORATION

This section is in some way complementary and in accordance to the Sustainability Plan for NEXOF submitted by WP12 NEXOF Roadmap. This section tries to identify the future actions to ensure the sustainability of the collaboration between NEXOF and other projects and initiatives.

We have identified several ways of ensuring the future collaboration of other projects and initiatives with NEXOF-RA results. Below we list the envisaged dimensions:

- Keeping alive the continuous dissemination of NEXOF-RA results.
- Keeping alive the Architectural Board in cooperation with NSP
- Fostering the liaison with other communities beyond NESSI (research and industrial communities)

For achieving these foreseen actions NEXOF-RA count on the support of NESSI and the Community behind, as well as the NESSI Strategic Projects.

Following we will go into more detail about how implementing these sustainability actions.

5.1 Keeping alive the continuous dissemination of NEXOF-RA results

Once the project has finished, it is crucial to continue with the dissemination of project results in order to support the adoption and awareness of the achieved results during the project life. Otherwise we have the risk to fall into oblivion.

Thus, in cooperation with NESSI Communication team, NEXOF will be presented in the following events in short future:

- ICT Conference 2010, 27-29 September 2010 Brussels, Belgium
- Internet of Services Concertation Meeting, 19-20 October 2010, Brussels, Belgium
- ServiceWave2010, 13-15 December 2010 Ghent, Belgium
- Future Internet Assembly, 16-17 December 2010 Ghent, Belgium

These events will be a forum where NEXOF-RA can present the final results and can apply for new contributions and collaborations that will enrich the already done work. Dissemination material will be also distributed in all of these events. The management of the participation is already in progress at the time of this report.

Of course, whichever event organized by other NSPs will be also an objective for NEXOF-RA, and in case NEXOF-RA (through some of its partners) is invited to participate, the attendance will be confirmed as availability.

The project web site will be kept alive and according to the NESSI sustainability plan, the NEXOF-RA Repository could be hosted at NESSI web site to ensure it remains available in the context of a wide community such NESSI. Other links of NEXOF-RA Repository from other communities are nowadays under analysis (see section 5.3).
5.2 Keeping alive the Architectural Board in cooperation with NSP

NEXOF-RA has been leading the research coordination in NESSI, coordinating and integrating part of the NESSI Strategic and Compliant projects. In the future, this coordination will be continued by the Research Coordination committee at NESSI. This committee is already defining how to continue with this started coordination by NEXOF-RA. In this context, the Concertation Meetings organized by the European Commission will be a useful instrument for collaborating. Additional Architectural Boards meetings could be also allocated if needed.

In addition to this, although the natural focus of NESSI has been the objective 1.2 of the FP7 ICT, in last time, some NESSI Strategic or Compliant projects have been also funded under objectives 1.4 and 1.6. This means new collaboration opportunities for NEXOF-RA in short future.

5.3 Fostering the liaison with other communities beyond NESSI

Because of the origin of NEXOF-RA, this project is deeply linked with NESSI Community. In fact, it is one of the core and strategic projects supported by this Community.

NESSI Community is composed of industry and academy but it is eminently a R&D oriented community. In order to ensure the adoption of NEXOF-RA beyond the R&D community, it is essential the connection of NEXOF-RA with industrial communities.

In spite of the natural link with NESSI, NEXOF-RA must cross the limits of NESSI and its results must be known and contributed by other R&D Communities as well.

Thus the challenge is then to be known, contributed and adopted by other R&D and industrial communities.

An example of two communities that respond to these types of approaches, we have selected S-Cube and IT-Tude respectively.

IT-Tude.com ([www.it-tude.com](http://www.it-tude.com)) connects emerging ICT research with business solutions, and offers organizations the opportunity to use this new and dynamic online platform for their own outreach. The website covers the newest and most promising technology and services, Cloud and Grid Computing, Virtualization and Software as a Service (SaaS).

IT-Tude offers:

- use-cases to relate to the business needs, especially for the SME
- neutral and dependable analysis to better advise
- technology expertise to fulfill the IT side of operations
- emerging services and technologies to highlight future research
• a link and online visibility that lets organizations jump onboard

IT-Tude.com connects the content with those involved, providing further service in expanding organizations’ network while maintaining the site rich with content.

NEXOF-RA is building an associate page at IT-Tude.com to get the benefits on being present in this community. This page is a web space of NEXOF-RA project where publishing: what is NEXOF-RA, project context, ask for contributions in a wider forum, insert links to relevant documents/components of NEXOF-RA, etc. The page has a business oriented approach but also certain technical information.

S-Cube ([http://www.s-cube-network.eu/](http://www.s-cube-network.eu/)) is the European Network of Excellence in Software Services and Systems. This research community aims at become Europe as the leader in the software services revolution, being the incubator for the next wave of service technologies. Among their activities, S-Cube fosters principles, techniques and methods to foster innovation in service engineering; promote a Europe-wide education and training programme for researchers and industry; and wish to establish a trust relationship between academy and industry.

NEXOF-RA is increasing the references at S-Cube web site to be more visible and accessible from there. The new open call for PoCs is being published at this community.

Other potential community in the scope of NEXOF-RA results is the Open Alliance on Service Front-Ends ([www.sfe.morfeo-project.com](http://www.sfe.morfeo-project.com)). The ultimate goal of this initiative is work on a concrete vision shared by all its members, develops architecture and ultimately develops the final SW components. In this respect there are a lot of synergies with NEXOF-RA both as an adopter of NEXOF-RA results but also as a contributor/validator of pieces of the architecture in the service front-end layer.
6 CONCLUSION

All projects involved in the Collaboration process recognize how important is to keep the flow of information open to other European projects in order to facilitate the identification of synergies. In addition to this, the collaboration opportunities described here show clear potential to significantly increase the impact of the NEXOF-RA project. Collaboration activities among several projects can generate a more relevant impact and better performance as a whole rather than relying on outcomes at project level.

Furthermore, all projects considered by NEXOF-RA as sources for contributions and collaboration have been selected based on the degree of compatibilities and complementarities of technical work, the ambition of reaching high-level objectives and the synergies between existing partners, all of them considered important assets to make a plan become a reality.

Collaboration with other projects has been essential for the delivery of project results. Otherwise the current results could not be achieved. The definition and implementation of the Open Construction Process definitively has been the key element to conduct the most of the contributions and it contains a value itself for being reuse and applied in future similar projects or initiatives.

The definition of the highlights for sustainability of the collaboration after the project end will be supported on keeping the dissemination activities with the support of NESSI Communication, keeping the collaboration with NSPs and exploring the link with other communities beyond NESSI.
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