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# SOCIETIES

## FINAL STANDARDIZATION PLAN D9.3

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### *Abstract*

This document highlights the achievements for SOCIETIES in pursuing interoperability goals through standards and documents SOCIETIES' efforts during the project lifetime. This document will also manifest how SOCIETIES' approach had to be flexible and adaptive in order to follow an extremely dynamic technological environment such as the one that blends pervasive computing, Social and Web technologies. This area has been pushed by an unprecedented innovation factor by the widest diffusion of the impressive capabilities of commercial Smartphones.

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## **Executive summary**

This document draws the conclusions of SOCIETIES' standardization plan. When dealing with dynamic creation of community and integration of pervasive enablers it gets critical to refer to standards as much as possible in order to maximize interoperability and portability.

SOCIETIES has contributed to standards in various forms: monitoring initiatives, sharing views and use cases, actively contributing and implementing already existing standards when applicable. Being SOCIETIES a precursor of concepts of Social Pervasive computing it has not been always possible to refer to already consolidated standards initiatives.

The lifecycle of a standard recommendation track, which may fit project's needs, is rarely aligned with its timeline. Some initiatives incubated by SOCIETIES will finally start very close or even after the project conclusion. Nevertheless we consider them an outstanding result and we will try to keep on contributing in the future.

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# 1 Introduction

SOCIETIES has finally studied and prototyped over the concepts of integrated Community Interaction Space by extending pervasive systems beyond the individual to dynamic communities of users. Based on the strong endorsement of the architecture over Social Networking information sources most of the standardization efforts have been directed towards this area.

When talking about Social experience of Pervasive Applications it is crucial to be able to retrieve from Social Networking backend the necessary information to understand at run time the relationship of interacting users in order to let the system behave accordingly.

Nowadays Social Networking applications are still lacking of interoperable interfaces and project such as SOCIETIES have to push standardization efforts in this area.

Besides Social Networking, other areas have been focused: device API, Web based mobile front ends, proximity based discovery mechanisms and messaging technologies.

## 1.1 Structure of the document

The document is structured in three main sections:

1. Progress status over standardization targets
2. Interoperability driven standardization strategy
3. Highlight of the main results and next steps

In the first one we provide a status update of the list targeted standard bodies identified as compelling by an initial screening. For each of them a summary of the achievements has been indicated including where the initiative did not finally grow up as initially expected.

In the second one we do a mapping between SOCIETIES's most critical interoperability points and where we tried to contribute or endorse on the standards area.

Finally we describe the major achievements whether they were initially planned or not.

## 2 Progress status over standardization targets

### 2.1 Achievements over planned and revised standardization objectives and plan

The following table recaps the main targets as they were identified in D9.1. Besides the description of the scope for each initiative, the table briefly describes the achievement of the groups whether or not SOCIETIES have had a concretely active role or just a monitoring or observer one. For each entry the reference partners have tried to implement on behalf of SOCIETIES. As said some cases SOCIETIES will mainly take existing specifications as inputs, in other cases SOCIETIES is planning to actively contribute to the standard.

	<b>Targeted Standardisation bodies and groups</b>	<b>Description of technology to be contributed to the specific working group</b>	<b>Scope and motivation of SOCIETIES contribution</b>	<b>Achievements</b>
1	W3C Social Web Incubator Group	The group aims to a definition of Social Web terminology, an analysis of the Identity problem space, profiles, privacy, activity	SOCIETIES defined its architecture based on the best practices produced by this group.	The group has completed its mission by producing a report and suggesting best practices for interoperable Social architectures. SOCIETIES has taken its final report as starting point for defining its architecture. [Http://www.w3.org/2005/Incubator/socialweb/wiki/FinalReport]
2	W3C Context Awareness and Personalization Working Group	n.a.	This group was aiming at defining extensible modular ontologies for personal preferences, device capabilities and environmental conditions.	The group did not finally find the sufficient consensus to take off. Context is very dependent to application and services and it's quite difficult to define it formally once to fit the extremely heterogeneous requirements.
3	W3C Device API Working group	The group is defining standard APIs for device functionalities access from mobile Web applications.	SOCIETIES has finally targeted Web based clients. The Device API Working Group is actually targeting the specification of the following APIs: camera, capture, generic sensor, messaging, volume level, network etc.	This group's activity has finally converged towards System level APIs. SOCIETIES has been trying to comply as much as possible to standard device APIs also by means of Phonegap. Telecom Italia has been prototyping over HTML5 based platform such as Firefox OS and Ubuntu phone. .

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4	W3C Geolocation API	The group is defining standard APIs for accessing location information (geolocation coordinates) from device	Most of the location based services, especially Web based are now referring to Geolocation APIs as they are widely implemented over several cross-vendo and Os mobile devices.	This group finally produced a recommendation, which is widely implemented at the time of writing. SOCIETIES is of course taking it as a reference for location based services on device where applicable.
5	W3C WebID	The group is defining standard mechanism to implement a distributed Identity mechanisms ecosystem on the Web	A WebID is a way to uniquely identify a person, company, organization, or other agent using a URI One direct use of this concept is the protocol known as foaf+ssl that is now being worked on in the WebID Incubator Group at the W3C.	The group has been collecting use cases and requirement from initiatives trying to specify a global identity architecture to point to persons or objects on the web. Web ID initiative is now being endorsed by Payment APIs specification.
6	W3C Federated Social Web	The group is defining architectural guidelines to set up open and distributed Social Networking environments on the Web	The Federated Social Web Group's deliverables will primarily be a set of user stories with associated test-cases that build the core functionality of a federated social web, and the overall technical architecture for a federated social web should be investigated. One input for this architecture will be OStatus, which is an architecture combining Pubsubhubbub, WebFinger, ActivityStreams, and PortableContacts. However, many different kinds of architectures will also be used as inputs into the discussion, such as SMOB (RDFa and SPARQL) and XMPP-based architectures. The Federated Social Web Incubator Group will also strive to help mature the specifications that allow web developers to implement federated social web capabilities. These deliverables will apply to both	Telecom Italia, NEC, HWU and PTIN participated to the Federated Social Web Summit in Berlin, presenting the Societies approach. The work of this group is the continuation of the above Social Web Incubator group and is now converging to the new-born W3C Social WG which has been recently kicked off and where SOCIETIES is going to play an active role.

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			social web-sites ran from the server-side but hopefully also to client-side environments such as desktop and mobile browsers.	
7	W3C Web Real-Time Communications Working Group	The group is defining standard API to implement real time communications in browsers based on WRC protocol defined by IETF	The group is targeting Web API for encoding and other processing of those media streams; API functions for establishing direct peer-to-peer connections, including firewall/NAT traversal; API functions for decoding and processing (including echo cancelling, stream synchronization and a number of other functions) of those streams at the incoming end and Delivery to the user of those media streams via local screens and audio output devices (partially covered with HTML5)	This is an on going activity. It is aimed at defining APIs to enable real time peer to peer (voice, video) communications via Web Browser. This work as been monitored constantly albeit SOCIETIES finally decided to steer towards XMPP based solution being presence and messaging the strong requirements SOCIETIES decided to rely over a much mature technology and standard.
8	OMA Mobile Social Networking Work Item	The group is defining guidelines for interoperable Mobile Social Network (MSN) clients	This Work Item aims at allowing large-scale deployments and interoperability of Mobile Social Network(MSN) Clients and MSN Servers in a timely manner, further guaranteeing social network federation so that users can easily communicate with users on other SNs and migrate their data. In particular, this Work Item intends specifying a new MSN Enabler, by identifying a coherent subset of functionalities specific to MSN that can be rapidly specified as a core specification.	Telecom Italia is leading this activity in OMA, part of the work has been driving Open Social APIs towards a wider consensus up to the point where it has been decided to submit them to W3C. By leveraging on SOCIETIES' use cases and finding the group achieved OMA SNeW V1.0.
9	Standards for Machine to Machine Communications.	Further information about the group at the following	The Technical Committee's overall objective is creating open standards for m2m communications to foster the	NEC is active in this group and the standardization work carried out here can be relevant to SOCIETIES research activities in the area of context and

	<b>Targeted Standardisation bodies and groups</b>	<b>Description of technology to be contributed to the specific working group</b>	<b>Scope and motivation of SOCIETIES contribution</b>	<b>Achievements</b>
		<p>URL  <a href="http://www.etsi.org/Website/Technologies/M2M.aspx">http://www.etsi.org/Website/Technologies/M2M.aspx</a></p>	<p>creation of a future network of objects and services so that already existing and rapidly growing m2m businesses based on vertical applications using a multitude of technical solutions and disperse standards can be turned to interoperable m2m services and networked businesses.</p>	<p>pervasiveness. NEC initiated discussions also on Social Network there and identified work topics within ESTI M2M which are relevant for Societies. Based on this NEC started active contributions and continued in the Framework of oneM2M, when ETSI M2M became part of oneM2M (see below)</p>
10	SOA over XMPP	<p>Define guidelines for implementing a SOA over XMPP, in a lightweight and more XMPP-friendly alternative to XEP-0072 (SOAP over XMPP)</p>	<p>SOCIETIES tried to leverage the principles of SOA and the advantages of using XMPP as a messaging bus by establishing a parallelism between XMPP services and generic data services</p>	<p>SOCIETIES has produced a report analysing the use of XMPP as a message bus for exposing generic data services in an XMPP-friendly way</p>
11	Authorization for access to service resources	<p>Authorization of users of a third party service to access a particular service installation files and possible other resources</p>	<p>SOCIETIES reviewed some possibilities of standardizing the used concepts.</p>	<p>Applicable standards identified (see below).</p>
12	Community Micro-agreements	<p>Community Micro-agreement format and non-repudiation of the agreements by means of</p>	<p>SOCIETIES reviewed some possibilities of standardizing the used concepts.</p>	<p>Applicable standards identified (see below).</p>

	<b>Targeted Standardisation bodies and groups</b>	<b>Description of technology to be contributed to the specific working group</b>	<b>Scope and motivation of SOCIETIES contribution</b>	<b>Achievements</b>
		digital signatures.		
13	W3C Social Business community Group	Social business community building blocks	Align Business community related SOCIETIES scenarios and platform features to W3C approach	SOCIETIES partners have been involved in the group while it produced a whitepaper and its concepts were adapted to SOCIETIES platform and services
14	oneM2M Partnership Project ETSI M2M	M2M technologies, services and use-cases	The next release of oneM2M's specification will more focus on enabling technologies and services. Geofencing has recently been established as working item. NEC is contributing the SOCIETIES findings to this activity	NEC has submitted geofencing related use cases and requirements to the oneM2M Global Partnership Project (e.g. use case on "Leveraging Broadcasting/Multicasting Capabilities of Underlying Networks" in oneM2M-TR-0001-UseCase, published in <a href="http://www.onem2m.org/library/oneM2M-TR-0001-UseCase-V0_0_5.doc">http://www.onem2m.org/library/oneM2M-TR-0001-UseCase-V0_0_5.doc</a> )  NEC will continue the effort to settle SOCIETIES project topics within oneM2M and will actively contributing there.
15	Home Gateway Initiative	Home Gateway Technologies and Services	NEC considers the deployment of the SOCIETIES Co-Browsing service enabler in home gateways (HGWs) as a promising exploitation option	NEC presented the technology to the HGI in a talk, a demonstrator and in working group discussions. HGI's Service Providers emphasized that the Co-Browser offers an efficient way to handle any difficulties which the user has with configuring/using the Smart Home system.
16	3GPP / (Broadband Forum)	technologies for mobile networks beyond 3G	Scope is to introduce the support of 3rd party services interworking with 3GPP (e.g. to enable Geofencing for IoT applications). Intention is to feed experiences made in made in and requirements identified in SOCIETIES into this activity. This is a plan for the time beyond the project end.	NEC has initiated a new work item in 3GPP: "Service Exposure and Enablement Support (SEES)". There further contributions are planned.

## 2.2 W3C Social Working groups [1]

SOCIETIES's point of view and positioning has been brought to Opensocial&W3C Joint Workshop about "The future of business", which was held in San Francisco (CA, USA) on 2013, August 8th and 9th.

W3C is the place where Web standards are developed while Opensocial on the other side is taking on the view of distributed network architecture, with focus on mobile applications and their use of network resources. Even if the project did not have the possibility to actively participate in writing down standards specification in W3C, with activities such as writing down RFCs, taking the project views in terms of efficient use of Web Technologies is a relevant result.

As a matter of fact the contribution of the workshop has been critical for the creation of the groups described above.

The workshop also gave us the possibility to meet people and get feedbacks from a group of the most active web experts in the web technologies panorama.

A specific discussion panel gave us the possibility to bring together our positioning towards W3C, a set of coherent views from several EU projects (e.g. SOCIETIES for the front end, eCousin for the networking aspects) and Open Mobile Alliance's Federated Social Network Enabler (named SNEW, for Social Network Web). Telecom Italia and other partners are taking on the standardisation activity in OMA and this technology has been included in SOCIETIES and eCousin's use cases.

This workshop paved the road to kicking off the groups described in the following paragraphs

Given the success of the workshop above and the consensus critical mass generated, W3C has immediately planned to kick-off standardization paths in the area.

The W3C Social Web Working Group is aimed at defining and standardizing a data format for transferring Social information between different Social based applications.

It is intended that the format will be based over Activity Streams and JSON in order to maximize the interoperability with already existing Web applications.

The Social Web Working Group will also develop the specification of APIs for simplifying the process of embedding Social information in Web Applications.

At the time of writing Telecom Italia (with IBM and others) have just endorsed the submission of OPEN SOCIAL specifications which means the group is formally starting to work on it in the coming months [<http://opensocial.github.io/spec/w3c/statement.html>].

It will also recommend a protocol to enable the federation of status updates and profile information across different social applications.

This standard "package" will be addressed towards different areas and use cases:

- Enterprise Social Business: for creating tools to develop next generation collaborative business processes
- Cross-Organization Ad-hoc Federation: to provide tools to seamlessly implement cross organizations federation
- User control of personal data: for being able to decouple personal data from applications or services.

In parallel to the above the W3C Social Interest group will be the public "counterpart". It will collect more use cases from different initiatives and projects (also outside the W3C membership boundaries) and work in coordination with other standard bodies for the achievement of a common standardization ground for Social related applications.

The concept of Federation includes the creation of distributed and decentralized social software. The forum is intended to include businesses, users, designers, developers, equipment manufacturers, social platform

vendors, browser vendors, network operators, advertising, and other relevant participants in the value chains that require social software such as the OpenSocial API.

Among the foreseen deliverables the group aims at producing a Social Architecture Report, a Use-case and Requirements Report and a set of Social Vocabularies leveraging on various existing standards such as ActivityStreams and RDF.

SOCIETIES use case has been addressed to both the above and will be formally published in the groups' records and reports, at the time of writing

## 2.3 W3C Social Business community Group [6]

Telecom Italia and SETCCE are members of the W3C Social business activity group that have been involved in the group while it formed the whitepaper titled "A CTO's Guide to Social Business". First draft of this whitepaper has been published on 30<sup>th</sup> of July 2012. (see also [http://www.w3.org/community/socbizcg/wiki/File:SBCG\\_White\\_Paper\\_1.doc](http://www.w3.org/community/socbizcg/wiki/File:SBCG_White_Paper_1.doc)). In scope of this whitepaper the W3C social business community group has covered an overview of social concepts applied to business environments explaining what social business is and how it is different from a business oriented Facebook. The building blocks of social business start from two points of origin: i.) on one hand there are a wide variety of consumer driven technologies and patterns that foster collaboration and new approaches to engaging the user and communities; ii) on the other hand there are a broad set of technologies, standards, and services that drive existing line of business applications and systems. The concepts within the W3C business community group have been synchronized with SOCIETIES: both initiatives heavily build upon community management based on social graphs analysis, activity streams or feeds, seamless embedding of gadgets, integration of mobile and smart phone technologies, instant messaging and trust as a basic enabler for community management. There is overlap between social business community group sample use-case called "Business Process Visibility" and SOCIETIES enterprise scenarios relating to socially aware networking (using socially aware goggles) and business community meetings and negotiation scenarios (based on socially aware collaborative table). SOCIETIES has adapted ideas from W3C's white paper's main concepts and has applied them to platform and scenario implementations. For example SOCIETIES community micro-agreements are trust enablers that relate to business-oriented communities. In addition to these a number enterprise and business oriented 3<sup>rd</sup> Party services have been implemented within SOCIETIES (such as Socially Aware Goggles, Crowd Tasking for business communities, Relevance and others)

## 2.4 OMA Social Network Web (SNeW) Enabler [8]

The Open Mobile Alliance (OMA) delivers open specifications for creating interoperable Mobile based services. OMA's specifications support billions of new and existing fixed and mobile terminals across a variety of mobile networks. Driven by the global demand for mobile data services, the member companies of the Open Mobile Alliance support the adoption of new and enhanced information, communication and entertainment solutions.

OMA SNEW Enabler references OpenSocial specifications as part of the OMA SNeW V1.0. These specifications allow mobile operators to offer users an enhanced, "federated" social networking experience. This work somehow complements W3C efforts with a clear focus on mobile. Being SOCIETIES focused on pervasiveness and social, this specific OMA effort seemed to be an important target to be pursued, Telecom Italia, while leading the initiative within OMA took the chance to bring the architectural and applicative knowledge developed in SOCIETIES as a fundamental input for the first version of the specification, There is an immense amount of data that has resulted from the popularity of online social networks, everything a user posts, likes, comments on and more is a piece of data whose ownership is definitely a right of the user, and the right includes the capability of deleting, transferring or even selling to/from online Service Providers. Managing it all is not easy, producing specific guidelines is even harder and foster the motivations for Social Networking providers to adhere to the guidelines quite challenging. Mobile access to online social networks (OSN) suffered from incomplete support for several elements of the mobile service environment and SOCIETIES concepts and applications have demonstrated the need of isolating identities and personal data from services in order to unblock further future innovations.

## 2.5 SOA over XMPP [10]

The principles of Service-Oriented Architecture (SOA) argue for the design of systems composed of reusable coarse-grained software components, which consume and provide services in a service ecosystem. Despite being commonly mentioned in an enterprise context, these are very present in the web - most web applications expose some of their data via APIs, which are then used by other web and mobile applications. The proliferation of user-owned connected devices has brought value to mobile application developers, which can make use of locally-available sensors and capabilities and send their information to the web, centralizing the data flows. A more distributed approach would have device capabilities offered directly on the network as services hosted by the user, as the one adopted in SOCIETIES. These pervasive user-hosted services could be made discoverable and available over a public federated service infrastructure. The infrastructure would provide transport over an Identity layer, where endpoints are addressed by identities instead of network identifiers, and on top of which services can be exposed remotely to be consumed by trusted friends or anonymous users, if the user so wishes.

The possibility of implementing a distributed social SOA over Extensible Messaging and Presence Protocol (XMPP) was studied in SOCIETIES. It differs from traditional SOA because it attempts to counter relative centralization of the web, in favour of a fully distributed service ecosystem where each peer can behave both as service consumer and provider. However these peers require a discovery and routing infrastructure and an identity layer so that the social and privacy aspects are properly addressed.

XMPP is an IETF protocol which has open extensions, dubbed XMPP Extension Protocols (XEPs), which are supervised by the XMPP Standards Foundation (XSF). It is a bi-directional XML messaging protocol, originally aimed for IM, built directly on top of TCP, which can provide an extensible messaging infrastructure, with built-in federation mechanism, supporting endpoint authentication, resolution and presence, message routing, asynchronous messaging and some degree of reliability. In recent years XMPP has been adapted for other applications than IM, such as VoIP and microblogging. More recently it has proposed to be used for sensor control. Also, it can be used as a lightweight approach to MOM, representing a more interoperable alternative, which dodges technological lock-ins of proprietary systems. However, unlike a typical enterprise MOM, it does not provide transaction management and is likely less scalable.

As REST re-used the HTTP verbs and enabled a minimalist alternative to SOAP, in SOCIETIES we tried to re-use the rich functionality set of XMPP for a similar goal. Compared to XEP-0072, which defines SOAP over XMPP, the SOCIETIES approach wins in a number of evaluation criteria. First, as recommended in the XMPP Extension design guidelines, it re-uses existing extensions relevant for the use case, namely Service Discovery and Publish Subscribe. Second, it makes use of XMPP's pre-existing support for asynchronous messaging and Publish-Subscribe while XEP-0072 leaves interaction patterns for the business logic layer, blindly executing them using XMPP IQs or Messages. Finally, the resulting wire-protocol is more compact and *XMPP-like*.

The most relevant issue identified relies in a mismatch between XMPP and SOCIETIES. SOCIETIES defines that users host services themselves, forming a distributed social service ecosystem, drawing from the pervasive-social vision and supported by the adopted privacy architecture. On the other hand, the XSF argues preference for keeping XMPP clients (read *user-side software*) as simple as possible, having services provided by XMPP components. While XMPP doesn't restrict the ability for clients to behave as service providers - IQ queries get routed to them just as it happens for components - there are underlying client-server assumptions in a number of XEPs. Most relevantly, the mechanisms defined in Service Discovery and Entity Capabilities extensions don't establish a difference in feature announcement when the client is advertising capability to consume a service versus providing it: clients are always assumed to be consumers and servers/components the providers. The compromise solution found within SOCIETIES was to treat XMPP components as if they were user-owned, despite lacking the rich identity features that XMPP clients have. Moreover, it forced us to drop the presence-based service advertisement that had been idealized within the project, which would propagate service availability changes across their contact network, enabling a reactive service discovery environment.

The full analysis will be published and reported to the XSF together with recommendations to address the identified issues in the direction the XSF thinks best suits the future of XMPP.

## **2.6 Authorization for access to service resources [11]**

The SOCIETIES project introduced a specific authorization of users of third party services. This feature is used when services are installed and available later at runtime if the installed services require additional resources supplied by the service provider. The authorization is transparent to the service users. The concept is based on digital signatures, created with a certificate that may be either mapped to one of the service provider identities, or anonymous. The standard ISO/IEC 20009 (Anonymous entity authentication) could be used to improve or extend the authentication and authorization procedure. Especially interesting part of the standard is ISO/IEC 20009-2:2013 that could be used to enable multiple or all CIS members to allow sharing of particular services or giving access to service resources.

## **2.7 Community Micro-agreements [12]**

Before a third party service is consumed in SOCIETIES, or when a new member joins a CIS, an agreement is negotiated, i.e., service level agreement (SLA) in case of service, or membership agreement in case of CIS membership. The agreement is digitally signed by both parties and they both receive the final agreement with included signatures that provide non-repudiation. The relevant standards that could be used include ISO/IEC 27037 (Information technology - Security techniques - Guidelines for identification, collection, acquisition, and preservation of digital evidence) and ISO/IEC 13888 (Information technology - Security techniques - Non-repudiation). Furthermore, the project faced difficulties when choosing a machine readable language for the agreements. While most existing SLA languages are XML based and suitable for implementation within the SOCIETIES micro-agreements infrastructure, there is little practical usage of any of those languages and most providers still insist on using only long and human readable text.

This issue has been pointed out also in one of the presentations at the 9<sup>th</sup> ETSI Security Workshop in Sophia Antipolis (France) on January 15<sup>th</sup> and 16<sup>th</sup> 2014. During the workshop, several standards for various areas of information security were presented and briefly discussed. Some of the security related concepts in the SOCIETIES project were associated to relevant existing standards and suggested standardization efforts. Most of the interested participants agreed about the benefit to use a standard machine readable language that could be used to present users a common, standard and short summary of an agreement instead of long unappealing text. However, there seems to be no initiative on part of ETSI to promote a specific solution of this issue.

## **2.8 OneM2M Global Partnership Project [14]**

End of 2008 ETSI has installed the ETSI TC M2M Communications, a so called Technical Committee on Machine-to-Machine Communications (M2M), which was responsible to coordinate standardisation activities in the area of M2M communications and to define an architecture.

In the meantime the seven worldwide Telecom Standards Development Organizations (SDOs) –among them ETSI- launched a new global partnership to harmonize standardisation activities around M2M, to avoid multiple diverging M2M standards and to ensure growth of an industrial ecosystem around M2M.

The purpose and goal of this new organization, called oneM2M Global Partnership Project, is to develop technical specifications which address the need for a common M2M Service Layer that can be readily embedded within various hardware and software, and relied upon to connect the myriad of devices in the field with M2M application servers worldwide.

A critical objective of oneM2M is to attract and actively involve organizations from M2M-related business domains such as: telematics and intelligent transportation, healthcare, utilities, industrial automation, smart homes, etc.

With oneM2M the same approach was taken like with 3GPP which had its nucleus in ETSI GSM. The ETSI activities in M2M were transferred to oneM2M, as it happened to M2M activities of the other SDOs. The global scope of oneM2M makes an exploitation activity very relevant for the impact of the project. NEC had been already very active in ETSI M2M and is now continuing its intensive effort in OneM2M. A member of NEC Laboratories Europe's team, which is also performing the SOCIETIES activities, became vice-chair of the working group on requirements.

While the actual work in the partnership is focussing on core aspects of M2M, the next release will more focus on enabling technologies and services. NEC is supporting an activity which established geofencing as working item for the next release.

NEC has submitted geofencing related use cases and requirements to the oneM2M Global Partnership Project. (e.g. use case on "Leveraging Broadcasting/Multicasting Capabilities of Underlying Networks" in oneM2M-TR-0001-UseCase, published in [http://www.onem2m.org/library/oneM2M-TR-0001-UseCase-V0\\_0\\_5.doc](http://www.onem2m.org/library/oneM2M-TR-0001-UseCase-V0_0_5.doc))

## 2.9 The 3rd Generation Partnership Project (3GPP) [16]

The 3rd Generation Partnership Project (3GPP) was created in December 1998 by the signing of the "The 3rd Generation Partnership Project Agreement". It united six (now seven) telecommunications standard development organizations (SDOs) with the objective to constantly evolve technologies for mobile networks through generations of commercial cellular / mobile systems. Since the completion of the first LTE and the Evolved Packet Core specifications, 3GPP has become the focal point for mobile systems beyond 3G.

To support 3rd party interworking with 3GPP (e.g. to enable Geofencing for IoT applications) NEC has initiated a new work item in 3GPP: "Service Exposure and Enablement Support (SEES)"

This work item allows 3rd parties to interact with the 3GPP System to use 3GPP functions to provide 3rd party services to their customers. Since M2M services and other Application services often have the same or similar requirements on the 3GPP System these are addressed jointly in this work item.

NEC as a communication and computing company is heavily interested in preparing next generations of communication networks to seamlessly support such services. NEC considers this as another step towards the vision of converged networks and services. Findings of Societies in the area of Social Networking Services in general and in our case specifically Geofencing will play a significant role of NECs engagement in this new work item.

## 2.10 The Home Gateway Initiative (HGI) [15]

The Home Gateway Initiative (HGI), was founded in 2004 by major Broadband Service Providers (BSPs), and has since been joined by leading manufacturers of digital home devices, chips, and software. HGI's initial role was to specify requirements and test plans for Home Gateways (HGWs) that support Quality of Service and the rollout of triple-play broadband services. That work established the key functional requirements needed to support managed services in the home, and it continues to provide an invaluable reference for the industry. The scope has since expanded to cover the entire spectrum of requirements for devices and service support in the digital home.

NEC is a Member of the Board of Directors (since Q1 2012), vice-chair of the Smart Home Task Force (technical working group), and member of the Marketing and of the Business Working Groups.

NEC is active in *Connecting Homes*, which covers the infrastructure requirements for delivering telecoms and internet services in the home, and in *Enabling Services*. Enabling Services has moved beyond triple-play to encompass a delivery framework for Smart Home services. This architecture includes support for a standard, general-purpose software execution environment in the HGW (for third party applications), API definitions, device abstraction, and interfacing with Cloud based platforms. Generic and Use case specific technologies are now investigated and their usability for Home Gateway Market evaluated.

NEC considers the deployment of the SOCIETIES Co-Browsing service enabler in home gateways (HGWs) as a promising exploitation option. The technology has therefore been presented to the HGI in a talk, a

demonstrator and in working group discussions. HGI's Service Providers have emphasized throughout the Use Cases discussions for Smart Home technologies that user acceptance of new functionality is critical, and the Co-Browser offers an efficient way to (remotely) handle any difficulties, which the user has with configuring/using the Smart Home system. A remote-access tool (which includes the possibility of using Co-Browsing) is included in the use case analysis.

### 3 Results: interoperability driven standardization strategy

Standards are, by definition, built to maximize interoperability. In this document we demonstrate how SOCIETIES has been active in being as standard as possible and in this paragraph we perform a mapping between the initiatives described above and the actual architectural targets where they have been implemented.

This section aims at presenting the links between the interoperability architecture defined in T3.3 of the project and the standardisation strategy presented above. The figure 1 shows the Interoperability Architecture defined at the beginning of the project. Several Point of Interoperability (POI) have been identified as the key elements of the architecture where the standardisation have occurred.

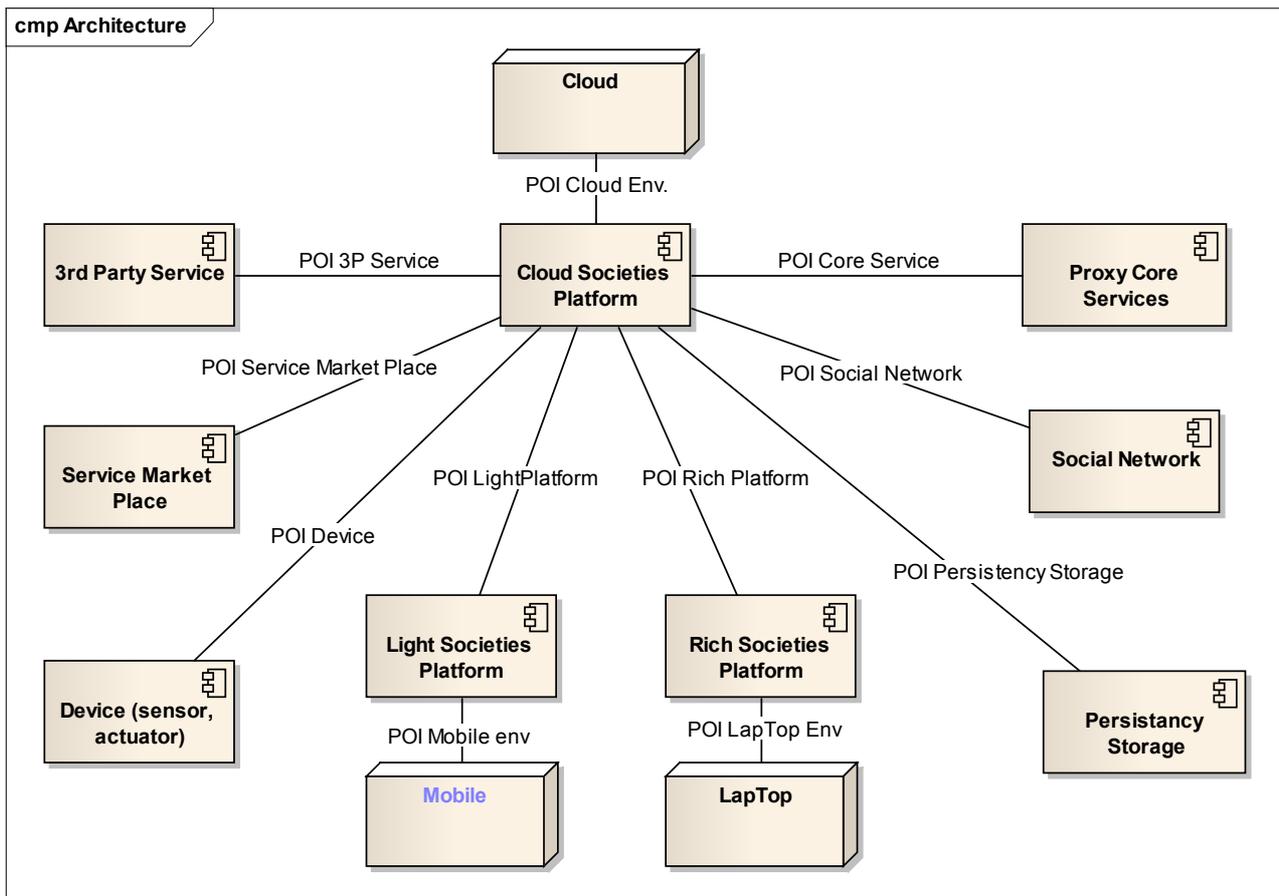


Figure 1. Interoperability Architecture of SOCIETIES platform

The following table demonstrates the links between the Societies POIs and the standardization activities described earlier in this document.

Standardisation Activities	SOCIETIES Point of Interoperability
W3C Federated Social Web	POI Rich Platform and the communication between the distributed XMPP Servers.
W3C WebID	POI Light Platform
Open Social	POI Light Platform POI Mobile Environment.
W3C Social Web Working Group	POI Social Network
OMA Social Network Web	POI Social Network

	POI Mobile Environment.
OA over XMPP	POI Light Platform POI Mobile Env.
Community Micro-agreements	POI 3P Service
ISO/IEC 20009 (Anonymous entity authentication)	POI 3P Service
W3C Social Business community Group	POI 3P Service
OneM2M Global Partnership Project	POI Device
3GPP	POI Mobile Environment.
The Home Gateway Initiative	POI Device
W3C standardization suite	POI Rich Platform

**Table 1: Standards and POIs implementing them**

## 4 Conclusions and next steps

Besides the highlights above, this document shows how SOCIETIES has been active during these years in pursuing and creating standardization opportunities. Some of them are becoming concrete now that we are close to the end of the project, nevertheless SOCIETIES consortium by its partners will try to keep on contributing and give a continuation to SOCIETIES concepts. This will be done individually by partners but also finding an endorsement on collaboration channels (see D9.4) and by further evolving SOCIETIES concepts in future research initiatives.

The deliverable aims at demonstrating that SOCIETIES have looked at everything was available and applicable over the years in the area of Social Standards, and have undertaken all the available and applicable recommendations without falling into the temptation of just augmenting fragmentation by using ad-hoc short paths.

SOCIETIES managed to interoperate and make use Online Social Networks instead of creating another one; this has been possible thanks to the considerable efforts towards the standardization community (documented in this deliverable) and has to be considered a successful and innovative approach.