



Title: *D9.2.3 Exploitation Plan 3*

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Summary

The PICOS exploitation plan describes details about the activities to exploit the project results, especially in a commercial and practical context. It outlines how to bring concepts, features, best practices and further results into practice. This third and final version of the PICOS exploitation plan is a refinement of the first two versions. In order to consider a broader, market oriented perspective, we further analysed the current market situation considering aspects of competition, distribution and communication, in the field of privacy enhancing concepts/technologies.



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The PICOS Deliverable Series

These documents are all available from the project website located at <http://picos-project.eu>.

D2.1 Taxonomy	July 2008
D2.2 Categorisation of Communities	July 2008
D2.3 Contextual Framework	November 2008
D2.4 Requirements	November 2008
D3.1.2 Trust and Privacy Assurance for the Design Platform v2	January 2011
D3.2.2 Trust and Privacy Assurance for the Platform Prototype v2	January 2011
D3.3.2 Trust and Privacy Assurance for the Community Prototype v2	January 2011
D3.4.1 A summary of PICOS WP3 sub-phase 3.1 deliverables	September 2010
D4.1 Platform Architecture and Design v1	March 2009
D4.2 Platform Architecture and Design v2	September 2010



D9.2.3 Exploitation Plan 3

D5.1 Platform description document v1	October 2009
D5.2a Platform prototype 2a	May 2010
D5.2b PICOS PHASE 2 Platform Description document	November 2010
D6.1 Community Application Prototype 1	December 2010
D6.2a Community application prototype 2	April 2010
D6.2b Community application prototype	October 2010
D7.1a User Evaluation Plan	December 2009
D7.1b Trial plan for the second community prototype	October 2010
D7.2a First Community Prototype: Lab and Field Test Report	February 2010
D7.2b First Community Prototype: Field Trial Report	August 2010
D7.3 Second Community Trial Report	April 2011
D8.1 Legal, economic and technical evaluation of the first platform and community prototype	April 2010
D8.2 Legal, economic and technical evaluation of the second platform and community prototype	February 2011
D8.3 Final Evaluation Report	May 2011
D9.1 Web Presence	February 2008
D9.2.1 Exploitation Planning	May 2009
D9.2.2 Exploitation Plan 2	March 2010
D9.3.1 Dissemination Planning	May 2009
D9.3.2 Dissemination Report V2	March 2010



The PICOS Deliverable Series

Vision and Objectives of PICOS

With the emergence of services for professional and private online collaboration via the Internet, many European citizens spend work and leisure time in online communities. Users consciously leave private information; they may also leave personalized traces they are unaware of. The objective of the project is to advance the state of the art in technologies that provide privacy-enhanced identity and trust management features within complex community-supporting services that are built on Next Generation Networks and delivered by multiple communication service providers. The approach taken by the project is to research, develop, build trial and evaluate an open, privacy-respecting, trust-enabling platform that supports the provision of community services by mobile communication service providers.

The following PICOS materials are available from the project website <http://www.picos-project.eu>.

Planned PICOS documentation

- Slide presentations, press releases, and further public documents that outline the project objectives, approach, and expected results;
- PICOS global work plan providing an excerpt of the contract with the European Commission.

PICOS results

- *PICOS Foundation* for the technical work in PICOS is built by the categorization of communities, a common taxonomy, requirements, and a contextual framework for the PICOS platform research and development;
- *PICOS Platform Architecture and Design* provides the basis of the PICOS identity management platform;
- *PICOS Platform Prototype* demonstrates the provision of state-of-the-art privacy and trust technology to leisure and business communities;
- *Community Application Prototype* is built and used to validate the concepts of the platform architecture and design and their acceptability by covering scenarios of private and professional communities;
- *PICOS Trials* validate the acceptability of the PICOS concepts and approach chosen from the end-user point of view;
- *PICOS Evaluations* assess the prototypes from a technical, legal and social-economic perspective and result in conclusions and policy recommendations;
- *PICOS-related scientific publications* produced within the scope of the project.



Table of Contents

1	Introduction.....	7
2	Objectives.....	7
3	Exploitable Results.....	8
4	Strategy & Context.....	9
4.1	<i>Market</i>	9
4.1.1	Targeted Audiences.....	9
4.1.2	Market Size and Structure.....	10
4.1.3	Trends.....	10
4.2	<i>Competition</i>	11
4.3	<i>Distribution</i>	13
4.4	<i>Communication</i>	13
5	Activities.....	14
5.1	<i>Standardisation</i>	14
5.2	<i>Atos Origin</i>	16
5.2.1	Industrial Perspective for Exploitation.....	17
5.2.2	Exploitation Considering National and European Technological Platforms.....	18
5.3	<i>Deutsche Telekom AG (DTAG)</i>	19
5.4	<i>Hewlett-Packard (HP)</i>	21
5.5	<i>IT-Objects (ITO)</i>	23
5.6	<i>Masarykova Univerzita Brno (MU)</i>	25
5.7	<i>Leibniz Institute of Marine Sciences (IfM-Geomar)</i>	26
6	Achievements & Impacts.....	27
	References.....	29



List of acronyms

<i>CD</i>	<i>Committee Draft</i>
<i>CISO</i>	<i>Chief Information Security Officer</i>
<i>CMS</i>	<i>Communication and Media Solutions</i>
<i>EAA</i>	<i>European Anglers Alliance</i>
<i>ERP</i>	<i>Enterprise Resource Planning</i>
<i>NFC</i>	<i>Near Field Communication</i>
<i>SRA</i>	<i>Strategic Research Agenda</i>
<i>STA</i>	<i>Sociedad Anonima Española</i>
<i>UUP</i>	<i>Unified User Profile</i>
<i>WP</i>	<i>Work Package</i>

1 Introduction

The results developed in PICOS should reflect and address the previously gathered requirements of mobile communities. In order to improve community related products and services with regard to privacy and trust and thereby transfer the results of PICOS into practice, exploitation is one essential part of the project (Figure 1).

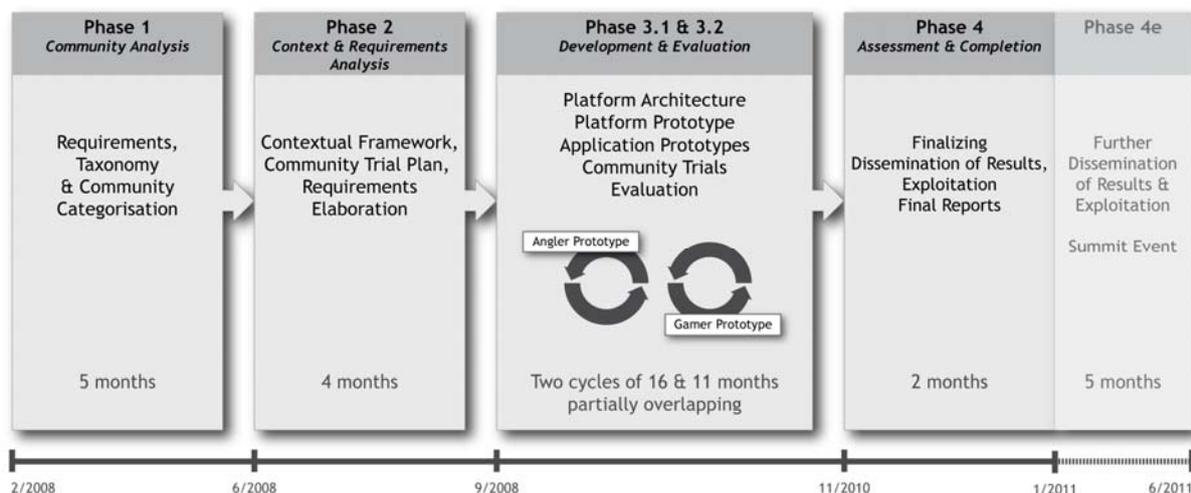


Figure 1: Exploitation & Dissemination in the context of the PICOS project phases

As this is the third and last version of the PICOS Exploitation Plan, builds upon and refines the previous versions, and outlines in detail the exploitation strategy as well as activities. At first the objectives of our exploitation activities are described (section 2), followed by a highlighting of the results of PICOS which we exploit (section 3). Based on this, the detailed strategy description is part of section 4, which outlines how exploitation was conducted and in which context, while section 5 introduces exploitation scenarios and activities by our partners from practice, including a detailed description on joint standardisation activities. As a final conclusion, section 6 highlights the main achievements and impacts of PICOS with regard to exploitation.

2 Objectives

One of the main goals for our activities related to exploitation in PICOS is to support social community software and services in practice, with special regard to aspects such as privacy, trust, identity management and also marketing/advertising. The goal of our exploitation activities is to provide a foundation for the application of the PICOS results in a practical context. This includes the integration of knowledge and best practices as well as the usage of developed technologies for services in practice. The objectives of Exploitation are closely connected with those of the dissemination (see



D9.3.3). While dissemination ensures the distribution of PICOS results in research and practice, exploitation aims at their application and further development.

This means that PICOS allowed especially the involved practical partners, to *understand and evaluate possibilities of extending or enhancing* their products and services with regard to privacy and identity management. It also allows a basis for the integration and usage of PICOS developments regarding trust, privacy and identity management aspects in existing products and services and to develop new ones upon this basis. The different backgrounds of the practical partners who participate in PICOS (ranging from a mobile operator to IT service providers) were intended to ensure that the results of PICOS have an impact at different levels of community related services. This will help to improve privacy and trust on these different levels, for instance, on the levels of a telecommunications provider as well as on the level of a community- or IT-service provider, considering technical, conceptual, organisational and other relevant aspects.

In order to emphasize the relation of the PICOS work to practice the structure of this exploitation plan was revised, in particular with regard to the description of our exploitation strategy. The respective section 4 conveys a broader perspective on the audiences we target (market), the (commercial) context in which our research is positioned and the way we achieve distribution and communication of our results.

3 Exploitable Results

Throughout the lifetime of PICOS, numerous results were achieved and assets were created. Such results range from the gathering of community requirements at the beginning of the project, to the development of privacy enhancing concepts and their implementation in the PICOS prototypes. Some of them may directly affect the development of commercial community related products and services, while others may do it indirectly.

For instance, exploitation activities include our unique set of concepts and their practical application, such as Partial identities, Location Blurring, Privacy Policies/Privacy Manager and the Privacy Advisor. These concepts are part of our exploitation activities as a part of the PICOS architecture. The architecture itself can be exploited as a blueprint for other researchers and industry projects (see section 5.1 for further details) and serve as a basis for providers of social community related service to develop new services and future business models. As a further result the developed approach on targeted advertising can be integrated in existing or new social community services and it can also be an integral part for future business models of communities. The architecture and concepts, which are implemented as features in the PICOS platform prototypes and in the community application prototypes, demonstrate the technical feasibility of our solutions. These implementations can be used as tools to promote PICOS in commercial contexts and help as a foundation for the transfer of PICOS concepts to other communities and platforms (e.g. PICOSlight; see sections 5.4, 5.5).

Not least, experiences we made and knowledge we gained with regard to the design of the community architecture, their implementation and assurance, as well as experiences and knowledge with regard to user trials and usability can be exploited. They can support decision making and the design, development, testing and evaluation of social community related services.



4 Strategy & Context

The strategy and the plans for exploitation activities have been refined throughout the project lifetime. With the progressing development of the PICOS concepts and along the implementation of the PICOS community platform and client applications, the efforts for exploitation became more concrete. Before we will outline the individual and joint plans for exploitation by particular PICOS partners in section 5, the section at hand describes the underlying strategy and the context in which exploitation takes place, based on the targeted market, related activities in research and practice (competition), distribution and communication of our results and the consideration of current and future trends.

This structure is considering a practice and market oriented perspective, as one of our goals in PICOS has always been to sustainably impact practice, even without developing end-user products.

4.1 *Market*

4.1.1 *Targeted Audiences*

The results and developments PICOS elaborated are no end-user “products” or “services”, but contributions to research and practice. These contributions can provide a benefit to different audiences in these fields and they are a foundation for the development of privacy enhanced social community services and related products. With regard to concerted exploitation activities we target on one hand existing (mobile) communities (e.g. angling community) and community related services and products on the other hand. Our targeted audiences are the providers of such communities and community services but also their users. As a complementation, we additionally target researchers in science and practice, within our dissemination activities, in order to further evolve the PICOS results and findings. All these different audiences we target have different and sometimes diverging needs and interests, with respect to privacy, trust and identity management. Hence, the related activities conducted by PICOS, need to involve all of these key players to a certain degree.

In consequence, the targeting of existing (mobile) communities is conducted on different levels. Through the integration of the IFM Geomar institute in PICOS, which acted as an intermediary to an existing angling community, we planned to achieve the integration of concrete PICOS concepts into the related angling community. In fact, IFM Geomar is currently developing a dedicated community platform for anglers (Anglersbase) which extends the services offered by the previously existing Fishbase platform and other angling communities. An additional collaboration between PICOS partners ITO and IFM-Geomar furthermore led to the PICOSlight application, a version of the PICOS community application for anglers, based on the Android mobile operating system. By this collaboration between existing communities, as mentioned above, and commercial companies, we want to ensure that our concepts find their way to the end-users (see section 5.7). With regard to community services, further exploitation scenarios and plans emerge for our industrial partners. They use results, experiences and knowledge from PICOS to enhance their products and integrate privacy enhanced functionalities into them (see section 5).

However, the previously mentioned involvement of all key players in such activities does not only comprise to make PICOS concepts technically available for them. It is further important that a certain awareness with all the involved parties is ensured. Therefore it was a part of our exploitation strategy



right from the beginning that dissemination activities, such as the publication of research papers or presentations at conferences and trade fairs, as a part of our dissemination activities, complement the exploitation to reach the respective audiences in practice and research. This counts in particular for the end-users. Increasing their awareness and demand for privacy enhanced community services, is an important factor to achieve a sustainable integration of such services in social communities.

4.1.2 Market Size and Structure

Social Communities represent a large and fast growing market. The numbers of users are increasing continuously as well as the time spent on social network sites. For instance, according to a study from *Nielsen* more than 20 percent of all time spent online in 2010 was spent on social networking sites¹. The users are distributed among numerous different communities. Prominent examples are Facebook, Qzone, Habbo, LinkedIn and Foursquare. The economic relevance of social networks is underlined by huge investments in the recent years and increasing ad spending. For example, the worldwide spending on social networks in 2011 is forecasted to reach almost \$6 billion². The importance of this market is also underlined by the increasing integration of social networking features into other services and applications (e.g. Facebook's "Like Button", Social media features on Amazon, etc.) and some of them, such as the *Facebook Connect* and *Instant Personalisation* service allow connecting via a community to other services such as online retailers, content portals, etc. Thereby social community features are more and more integrated into people's daily lives, increasingly shaping the online user experience. This convergence between pure social networking sites and other web sites (e.g. shops, content portals, news sites, company/brand sites) is accompanied by a convergence between online social networks (e.g. Facebook) and mobile social networks (e.g. Foursquare). From the point of view of companies and advertisers this makes social networks a highly attractive field for various forms of marketing (e.g. viral marketing).

The users originate from varying socio-demographic and cultural backgrounds and different groups of interest. Besides the prominent examples of social networks from Europe and the US, Asia has become an emerging market for such services in the recent past (e.g. Qzone). Further, as an integration of community features into non-community services grows (e.g. on shop websites) additional user groups are affected, which otherwise might not necessarily be members of social community services (e.g. web-shop users).

The aspects of convergence mentioned before, increase the amount of personal data about individuals and their behaviour which is processed and used in the context of social networks. Consequently the relevance of privacy enhancing tools is increasing as well, to enable users to control and manage their personal information.

4.1.3 Trends

The social community market has seen a number of emerging trends, which should be mentioned at this point. Such trends might "offer" new application scenarios for PICOS concepts and can remark an

¹ http://blog.nielsen.com/nielsenwire/online_mobile/social-media-accounts-for-22-percent-of-time-online/

² c.f.: http://www.researchandmarkets.com/product/f686e6/worldwide_social_network_ad_spending_2011_outlook



important perspective for further research and follow-up projects. Among the trends which should be highlighted in this context, is the (still) increasing mobility of communities and especially the increasing convergence between online and mobile services (seamless mobility), as indicated in the previous section. More and more community related services will be seamlessly available from different (mobile) devices (PC, TV, Notebook/Netbook, Mobile Phone, Tablets, etc.). This will also imply a closer convergence between different mobile services related to social communities. Also, the mentioned convergence between social communities and other third party services can also be regarded as a trend, which will continue in the future. It will allow third party service providers, to use data from social community based data, to personalise and improve their services.

Based on this, the integration of advertising into Social Communities (as well as advertising on third party sites based on social community data) and the development and adoption of new forms of marketing and advertising can be regarded as a current trend. As many existing communities have business models based on advertising, the successful realization of such activities could decide upon their fate.

Not least, a vanishing distinction between the roles of the key players in the domain of social communities can be regarded as another trend. While new players such as Google and Apple are meanwhile competing with classical Telecommunications operators, the roles of these operators have changed as well. They provide more than just voice, text and broadband communication services. They can generally act as enablers for more complex services (e.g. cloud services), embed their core services in new devices and eco systems (e.g. iPad, Kindle, Connected TV) and aggregate services to improve the convenience of end users. When it comes to mobile communities, the mobile operators take a particular role, as they are mediator between community service providers and end users, when providing the technical platform on which community services are being realized. This intermediary role, can provide new opportunities, e.g. as shown in the PICOS advertising approach (see D4.2 and (Kahl, et al., 2011)).

4.2 Competition

PICOS is not a usual market player, in the sense of a commercial company, as we provide research contributions instead of end user products or services. However, our goal is to provide a kind of added value to the domain of social communities and in particular to the users of such communities, with regard to privacy and trust. Hence, we are in a certain competition to others (from research and practice) who provide contributions in the same field. Being aware of these existing contributions from previous and ongoing work in research and practice and taking these contributions into account, is an important foundation for our work.

With regard to online/mobile social communities, they are well present in current research, as summarised in (Kahl, et al., 2010). Various aspects on (mobile) social networks and privacy and trust are discussed intensively in literature, e.g. by (Chew, et al., 2008), (Adu-Oppong, et al., 2008), (Hiltz, Passerini, 2007) and (Preibusch, et al., 2007). The focus is usually on online social networks, not considering the specific aspects of mobile social networking services. Particular issues of mobile communities are discussed e.g. in (Görlach, et al., 2004), where a study on concerns in social communities is presented and (Sadeh, et al., 2009), which include privacy, trust and security aspects in the context of location-based services. Such works also partially contain some proposed solutions, like



e.g. privacy policies and concepts to control location disclosure. The work by (Sadeh, et al., 2009) is also focused on improving privacy awareness, by giving users feedback on their behaviour. With regard to practical solutions research work has also been done by research projects such as PRIME³, PrimeLife⁴, PEPERS⁵ and DAIDALOS⁶. However, the work within these projects was merely focused on different aspects. E.g., PRIME focused on privacy-respecting identity management, but not in the context of (mobile) social networks, while PrimeLife is working on privacy in communities, but not with regard to a specific application domain. PEPERS researched a mobile peer-to-peer security infrastructure with the focus on decentralised trust and identity management, considering individual stakeholders (e.g., journalists) and centrally managed employees, instead of communities. Also DAIDALOS concentrates on the single user and not on communities with regard to privacy-friendly ubiquitous services.

With regard to practice, some social networks have integrated more tools to enhance users' privacy meanwhile. E.g. Facebook nowadays provides a number of options to control the degree of personal information which is shared with others (including other users, search engines, Facebook applications and third parties) in a fine-grained manner. Also the German competitor of Facebook, StudiVZ, introduced similar but less fine-grained mechanisms. Besides these efforts of existing social networks, new communities which focus on the aspect of privacy friendly social networking have been introduced as well, but with only minor impact regarding the end-users involvement so far (e.g. "Clique"⁷ based on research by PrimeLife, Diaspora⁸). The PICOS approach however shows how to integrate privacy enhancing concepts as part of a holistic approach to improve privacy and trust in social communities.

Regarding work in relation to the advertising approach, there are a few publications that focus on aspects of marketing and advertising with regard to social networks. While some rather focus on general aspects, such as business models (Hoegg, et al., 2006, Palmer, Koenig-Lewis, 2009), many focus on the application of viral marketing in the context of communities (e.g., (Leskovec, et al., 2007, Kempe, et al., 2003, Hartline, et al., 2008, Subramani, Rajagopalan, 2003)). (Kahl, Albers, 2010) is concerned with a deeper integration of marketing into the communication processes within social networks and provides the basis for the advertising concept described in this paper. Activities related to advertising in practice include targeting opportunities on Facebook, where ads are placed according to an advertisers' target profile. However, this form of targeting does not strongly consider context and communication information. Further integration of advertising is provided by mobile social networks Foursquare and Loopt, which offer location based ads and reward users for visiting ("checking in") at certain locations.

Against this background, PICOS work can provide some competitive advantages, as we showed how to integrate privacy enhancing tools in a social community architecture on a holistic level, while retaining the opportunities for the community provider as well as for third party advertisers, to conduct

³ www.prime-project.eu

⁴ www.primelife.eu

⁵ www.pepers.org

⁶ www.ist-daidalos.org

⁷ <http://clique.primelife.eu/>

⁸ <https://joindiaspora.com/>



advertising campaigns and exploit the personal information of users to provide them with relevant targeted ads. However, the value for community providers to integrate privacy enhancing concepts within their communities beyond what they are legally obliged to do, will of course strongly depend on the users demand and appreciation for such concepts. As long as there is no real (commercial) benefit obvious for community providers, they will have hardly any motivation to integrate such concepts.

4.3 Distribution

From the users' point of view, "distribution" means accessibility to products and services. Hence, the question for PICOS is how to make our results accessible to the public and for our targeted audiences. Accessibility is therefore one of the key elements with regard to the PICOS concepts. In this regard a research project like PICOS is always facing the challenge, that we cannot directly distribute our results as "products" to end-users. Instead, we aim to reach accessibility on different levels. Our dissemination and exploitation activities are about to ensure, that the knowledge elaborated in PICOS is the foundation for further research, in research papers, presentations at conferences, fairs, events and in collaboration with partners from practice and further projects. With regard to presentations at conferences and workshops, we distribute the knowledge to the research community, allowing an exchange with other researchers and practitioners.

To support the consideration of PICOS concepts for actual commercial services/products (e.g. existing social networks), we integrated a number of commercial partners within the PICOS consortium, representing different fields of related business activities, we utilized commercially oriented forums like the Telco 2.0 and Trust in Digital Life initiatives as well as the Mobile World Congress and further fairs and events, and we fostered the collaboration with the exemplary angler community. We were also active in a first workshop and follow-up activities as a part of the "EU Competitiveness on the Web" initiative. Additionally we are strongly engaged in the work on industrial standardisation (see section 5.1). Moreover, the industrial partners involved in PICOS have different plans for further commercialising and exploiting the results from PICOS and making them accessible for end users (see section 5).

4.4 Communication

Besides the conceptual quality of the PICOS results, also the awareness for these results by the different stakeholders in research and practice (as mentioned in the beginning) is of high relevance. In consequence, the results as well as the activities which lead to these results need to be communicated in an adequate manner. In this regard, communication strongly complements the aspect of distribution.

Such communicative work is mainly subject of the dissemination work, as a further part of WP9. During the lifetime of PICOS the website represented an important instrument for the communication, with continuous updates on project activities, as well as numerous presentations at different events and articles for research publications and press (see Deliverables 9.3.1, 9.3.2 and 9.3.3 for further



information)⁹. The website served as a central point of contact for all interests considering PICOS. These communication activities focused on other researchers and also on end-users.

With regards to practice, further communication of the PICOS results, is done by the industrial partners of PICOS. Within their companies, they spread and make use of PICOS results, in order to enable or improve community related services as described before. By contributing their experiences and knowledge from PICOS in other contexts and projects, they could also influence co-workers, decision makers and business partners. Communication in this context also took place on industry related events and initiatives as partially described in the previous section and in some of the following sections (see e.g. 5.2, 5.4).

Besides community related services, also existing communities are part of our exploitation activities. This comprises at first the communities we closely worked with in our project: anglers and gamers. But, it is not limited to these communities. As described in the current dissemination report, various opportunities (e.g. Facebook page, Android based prototype for anglers, EU initiated exchange meeting involving social networks and researchers) were used to communicate PICOS results among these stakeholders.

5 Activities

Taking the broader exploitation strategy into account, which we outlined in the previous section, the section at hand covers concrete activities to achieve exploitation of PICOS results in a practice related context. These activities, related to our commercial partners, aim to use PICOS results for the development or improvement of products and services, for the education of decision makers and for the underpinning of strategic decisions. According to the different business backgrounds of the PICOS partners the exploitation activities affect the practice of privacy and identity management as well as advertising aspects on different levels.

The section starts with an overview of some joint exploitation related activities, before the individual plans of partners are described.

5.1 *Standardisation*

In 2009 the PICOS project has established a liaison with the ISO/IEC JTC1/SC27/WG5 Standardization Committee on Biometrics, Identity Management and Privacy. The JTC1 (Information technology) - SC27 (IT Security techniques) - WG5 (Identity management and privacy technologies) is responsible for development and maintenance of standards and guidelines addressing security aspects of identity management, biometrics and privacy.

The WG5 is currently working on approximately a dozen of documents. For the merit of the work of the PICOS project the most relevant working item is the draft of the ISO/IEC 29101 titled 'Privacy reference architecture' and the draft of the ISO/IEC 29100 titled 'Privacy Framework'. So far the

⁹ See also: <http://www.picos-project.eu/Dissemination.169.0.html>



PICOS project has contributed three times with its comments related to the drafts of the ISO/IEC 29101 and 29100. In November 2009 the PICOS contributed with 11 comments, of which the majority was accepted.

In April 2010 one major contribution was submitted (it was assigned the identification number N8072). The comment/contribution included example architecture for privacy enhanced community services. The example architecture is based on the PICOS architecture, i.e. on the work done within the WP4. The example architecture for privacy enhanced community services derives from the PICOS deliverable D4.1 (Architecture v1). It is a high level and abstract architecture allowing implementations in many different domains and environments. The PICOS architecture as described in D4.1 has been significantly simplified to adapt better the purpose and style of the draft of the standard. Many elements were grouped together to form logical modules. On the high level of abstractness the move from D4.1 to D4.2 (Architecture v2) does not play an important role and the simplified architecture remains fully compatible with the PICOS deliverable D4.2 released in September 2010. In April 2010 before the WG5 meeting in Melaka the draft of the ISO/IEC 29101 was in the 5th WD (working draft). During the meeting in Melaka the PICOS comment/contribution with the example architecture for privacy enhanced community services was accepted and the example architecture was included in Annex A.3. The submitted text was slightly modified by the editor of the project 29101 and it currently covers two and a half of pages. During the meeting of the WG5 in Melaka it was decided to proceed with the draft of the 29101 Privacy reference architecture into the 1st CD (Committee Draft) phase. In June 2010 the first CD (Committee Draft) of ISO 29101 was made available.

In summer 2010 PICOS also contributed with a short statement to the SC 27 Platinum Book. The platinum book has been produced to celebrate the twentieth-birthday of ISO/ IEC JTC 1 / SC27, the sub-committee responsible for information and IT security standards. Included in the book are many articles written by experts working in SC27, as well the current and past officers of SC27. Also included are statements and letters from liaison organizations that work with SC27 as well as some of the National Standard Bodies that are members of SC27. The PICOS contribution can be found on page 176. The Platinum book is available for download from the SC27 web page now.

In the fall 2010 the meeting of the ISO JTC 1/SC 27/WG5 was held in Berlin. PICOS contributed to drafts of 29100 and 29101 with almost 50 comments. In Berlin it was decided to form an ad-hoc subgroup of WG5 to improve certain parts of the ISO/IEC 29101 draft. The PICOS liaison officer together with some other members of the PICOS standardization team became members of the subgroup. The first telephone conference was organized at the end of October 2010 and it was followed by two telephone conferences in December 2010 and January 2011. The subgroup is focusing on the clarification of the draft of the standard and forming of the privacy reference technical architecture. In early February 2011 the output of the subgroup has already been in a stable state and the 4th draft of the technical architecture will be submitted as a comment/contribution of the Estonian national body.

In Berlin it was agreed to extend the example architectures in the annex of the 29101 (including the PICOS contribution -- the example architecture for community services in Annex A.3). The work on this Annex is still in progress. The work on the draft of ISO/IEC 29101 will not finish together with the end of the PICOS project but the PICOS architecture will continue to influence the draft of the



standard. The work towards a standardised reference architecture for privacy enhanced social communities will continue.

5.2 *Atos Origin*

Atos Origin delivers solutions for Business Risk Mitigation, Security Strategy and Compliance, Identity and Access Management, Security Infrastructure and Managed Security Services. Atos Information Security Solutions is an end-to-end approach to business risk and information security, which address the full threat landscape from technology security, people and processes, security operations, security strategy, policies, procedures and governance. PICOS is placed inside of Atos Origin Security Technical Advisory proposition (part of the portfolio of the Global Key Offering for Identity and Access management)¹⁰. This proposition leverages Atos Origin's experience and expertise in security architecture to facilitate the adoption of design principles and technology that streamline the management and daily operation of information security controls.

The Security Technical Advisory offering applies Atos Origin's experience in IT integration and operations to CISO's (Chief Information Security Officer) challenges related to:

- Assessment of the existing Security Architecture
- Development of a Business case for the required security infrastructure solution
- Definition of a security infrastructure design, leveraging the four architectural principles described above
- Infrastructure Project Management

It is expected that PICOS results will contribute to the following objectives of the global STA solution portfolio:

- Address customer business risks and reduce costs (e.g. by reducing sources of possible complaints by online and mobile communities services users) incurred through security breaches and their subsequent recovery
- Improve the offering of privacy and trust enhancing technologies applied to different contexts and constellations of virtual communities
- Providing consistent user experience, usability and tangible perception of security mechanisms and tools for end-users
- Consistent approach to design of built-in privacy and identity management across open platforms and middleware solutions for building collaborative systems between business and private stakeholders

Atos Origin is pushing to utilise the security, trust and privacy enhancing technologies of PICOS in the custom solutions for its customers, to offer efficient and streamlined security and dependability assurance mechanisms in the development of IT systems for Atos customers. Atos Origin expects to strengthen with PICOS results its offering of streamlined security, identity management and privacy enhancing mechanisms for the development of customer-oriented projects in the core business lines of

¹⁰ http://www.atosorigin.com/en-us/services/solutions/identity_security_risk_management/default.htm



the company. Atos indicates below some of the main lines where exploitation opportunities will be explored.

5.2.1 *Industrial Perspective for Exploitation*

The Atos Origin group has a significant activity and specific economic weight in the mobile software and services industry in Europe, as does specifically Spanish Atos Origin S.A.E.¹¹ (PICOS project partner). Thus, Atos Worldline¹² commercialises a mobile services platform, Worldline Padda, which could benefit from results of PICOS as it could integrate design principles, components and tools for enhancement of identity management, trust and privacy of its users. Beyond this, Atos Worldline is also carrying out dissemination of solutions for near-field communications (NFC) for mobile applications, enhancing tangibility and trustworthiness of user experience in mobile social networks. Obvious synergies were explored for collaboration with PICOS and researchers of both teams met at the W3C Event on Social Networks in Barcelona in 2009.

Similarly, Atos Origin S.A.E is providing its own mobile platform solutions for advanced Internet services to Spain's largest mobile operator, Telefónica Móviles (Movistar), and could take a similar approach at a national level. Tempos21¹³, a Spanish mobile services company, is also part of the Atos Origin group and collaboration is already envisaged to explore potential synergies once PICOS results. As further internal exploitation, Atos has been introducing PICOS as an asset within other Atos transfer lines. PICOS was presented to the units Atos Consulting (banking and telecom areas) and Technological Solutions, as well to the Head of Business, Development and Innovation from Atos Origin corporate to assess its future exploitation viability. Additionally Atos has been pushing to include PICOS to the portfolio of the Global Key Offering for IAM. In particular, Atos is interested in highlighting the concept "Privacy Context Awareness" also derived from PICOS project. In fact context-aware computing has been identified as key technological trend¹⁴ in Atos innovation radars. The PICOS work on partial identities and the on-line community manager on mobile devices developed by Atos Origin has been included in an internal offer of Atos Origin to an important Atos customer in Germany.

Formal liaisons with two other Atos Origin-coordinated FP7 projects were established along the project lifetime. These were built on established relationships and exchanged information (i.e. projects surveys, public deliverables mutually exchanged, and ad-hoc sessions) in order to explore and offer application areas for respective and even combined project results with additional added value for our potential customers. These contacts aimed at applying PICOS solutions (mainly PICOS concepts and architectural solutions) to their specific needs and developments. More specifically:

- My-eDirector 2012¹⁵ and ComeIN¹⁶: synergies for exploitation of platforms, approaches and eventually implementation solutions.

¹¹ Sociedad Anonima Española

¹² <http://www.atosworldline.com/select/1/Home.html>

¹³ <http://www.tempos21.com>

¹⁴ <http://lookout.atosconsulting.com/step-trends/technological/>.

¹⁵ <http://www.mydirector2012.eu/>

¹⁶ <http://www.comein-project.eu>



- Project MVIA¹⁷: explore privacy needs in infotainment services for intelligent vehicles, for example: social networking-like service to share travel information with friends or subscription to personalized infoalerts.
- Project TELMA¹⁸ and project GALA¹⁹: participation, reputation and trust mechanisms on social networks.
- Project GoMyLife²⁰ and project SARACEN²¹: views on architectural solutions for social networks.

Last but not least, PICOS was included in one proposal for the FI-ICT-2011-1.7. The proposal became project FI-WARE22, the core platform of the PPP Future of Internet, and PICOS concepts and architecture are being considered within the Security, Privacy and Trust work of FI-WARE, where Atos is participating.

5.2.2 Exploitation Considering National and European Technological Platforms

In the area of Privacy challenges like the implementation of privacy at design level, user centricity and user friendliness for transparency and privacy-enhancing technologies, pseudonymisation and anonymisation, mobile-based and web-based privacy-enhanced services, control of private data exchange between services, private data traceability, accountability, privacy risk management and finally awareness building and training of different users are all areas where mutual benefit can be expected (also for exploitation) between PICOS and initiatives and partners of technological platforms where Atos Origin plays a prominent role.

The leadership of Atos Research & Innovation of the NESSI European Technological Platform²³ in the Software & Services and Trust, Security & Dependability (where Atos Research & Innovation has already co-authored a whitepaper on Privacy geared at defining NESSI's new SRA, taking into account knowledge derived from PICOS) represents also an excellent opportunity for exploitation of results. In particular, NESSI is an excellent platform for an industrial platform like Atos, to contact the key players in the industry to formalise agreements for exploitation in a context where potential partners are familiar with the idiosyncrasy of research and development projects results. Atos Origin also plays a prominent role in the Spanish technological platform eSec²⁴.

Moreover, Atos Origin also participates in the Spanish eMov technological platform²⁵ and its European Counterpart eMobility²⁶ both of which focus in their Strategic Research Agendas on aspects

¹⁷ <http://www.mvia.es/index.php?lang=en>

¹⁸ <http://www.telma-project.eu/>

¹⁹ <http://www.elios.dibe.unige.it/gala/>

²⁰ <http://www.gomylife-project.eu/>

²¹ <http://www.saracen-p2p.eu/content/project-main-goal>

²² <http://www.fi-ware.eu/>, <http://www.fi-ppp.eu/projects/fi-ware/>

²³ <http://www.nessi-europe.com>

²⁴ <http://www.idi.aetic.es/esec/>

²⁵ <http://www.idi.aetic.es/emov/>

²⁶ http://www.emobility.eu.org/about_us.html



such as security, trust, privacy, threats on mobility and business models all of which are relevant for PICOS and where collaboration with platform partners could lead to identify future exploitation opportunities.

5.3 *Deutsche Telekom AG (DTAG)*

The PICOS project gives DTAG new insights into privacy and identity management issues especially in the context of emerging social communities. DTAG, in their role as a mobile communication operator also intends to incorporate PICOS approaches and concepts within existing products and services in the mobile market. In addition PICOS results may be integrated or applied to further product developments. The overall goal of DTAG is to enhance the privacy for customers on the mobile operators' level. This may complement privacy enhancing efforts on services, provided by other parties e.g. service providers.

DTAG sees benefits from the PICOS participation especially in the following areas:

- **User to user interaction**

At the moment, the main focus of privacy enhancing techniques is related to user data exchange between the mobile operator and 3rd parties, where the user has to give his consent so that the mobile operator is allowed to deliver the data to enable the 3rd party to provide a service. With the results of the PRIME project, DTAG was able to implement a significant enhancement in his network to control and monitor such data flow by the user. Nowadays, (mobile) community applications are emerging and the control and monitoring capabilities need to be enhanced so that also the data flow between users is under the user's control. With PICOS, we gained substantial knowledge to enhance privacy here. Applications to support users in the context of community features are already on the horizon.

- **Usability**

With the PRIME results and the DTAG Privacy Gateway development, we have found out, that the usability from customer perspective is very important. The privacy topic is rather complex and normal users are usually not aware of all the details and do not fully understand all privacy related aspects. They just want to use a service and they abort the service usage, if they are forced to agree on something, that they do not understand immediately. The results from usability work, e.g. the concept of a privacy advisor and how to explain complex facts, is therefore very important for DTAG's business and will be incorporated in future product development.

- **Enabling services**

External applications and services more and more integrate with mobile operator network elements to ease data flow and to support more advanced services to the customer. The privacy aspects therefore become more important and research results will be reflected in further product developments.

- **New business models**

The advancement of new business models for mobile operators like advertising, co-operations with partners, new billing models etc. is ongoing and needs to be accompanied by enhanced



privacy solutions. The angler community and the gamer prototypes represent good examples for private communities that demonstrate many new facets that could be applied to existing or new products.

- **Mobile terminal clients**

The PICOS application prototypes are based on a client server architecture with applications running on mobile terminals. The main reason for selecting this architecture in contrast to a web browser based access was to reduce the network data traffic and the latency. The goal was achieved by processing the data on the client side and to cache data where appropriate. This kind of architecture has advantages (e.g. low data traffic) but also disadvantages (e.g. portability of client application) which need to be considered in the design and implementation of the application. The prototypes give valuable insight in the specific client development and show potential for optimization. Especially the configuration of privacy policies with the mobile application and the secure transfer to the server side gives us new ideas on how to integrate such functionality to other services. We plan to extend the DTAG Privacy Gateway by a mobile application to ease the setup and administration of customer's privacy settings and to make the personal data traffic more transparent to our customers.

- **Architecture**

The architecture of a service/community agnostic platform and dedicated mobile terminal application with a common toolbox layer, as developed in PICOS, demonstrates the flexibility and reduced the time-to-market for new applications. This architecture is a solid fundament for future implementations and will be adopted in the DTAG Privacy Gateway and connected services and serves as a blue print for new systems.

- **Demonstrator**

The privacy protecting and privacy enhancing topics are often difficult to explain and to make aware of for people who are not deeply involved in them, like marketing people or upper management. The demonstration of such concepts by using real working applications in realistic scenarios help to make such concepts easily understandable and to trigger initiatives to integrate such privacy enhancing techniques also to other existing or new services, because the relevant stakeholder can figure out the benefits which they will gain from. The PICOS prototypes could be used for several internal presentations to address privacy related topics.

Based on the results of the predecessor project PRIME, DTAG was able to build a new system, called Privacy Gateway, to enhance the privacy of our customers by enabling them to control their personal data when dealing with services which are offered by external partners. With PICOS, we are able to extend the scenarios to customer to customer communication - typical for communities. Here Deutsche Telekom has already products and services in place and is currently developing new versions. Consequently, the PICOS results, especially the prototypes, helps DTAG to demonstrate privacy features and concepts in real world scenarios and to elaborate, together with marketing and security people, concepts which can afterwards be integrated in our products. The focus lies on location based services on mobile phones. Thinkable are also privacy enhancements in our existing community applications, network address phonebook and multimedia content sharing services and various mobile client applications which are currently more and more emerging.



5.4 Hewlett-Packard (HP)

Hewlett Packard Company is participating to the PICOS project through 2 entities: HPF and HPL. Hence, the value and results of the PICOS work will be subject to further exploitation in two very complementary directions.

HPF, through its Communication and Media Solutions (CMS) Business Unit is in charge of developing and delivering communication infrastructures and applications for Telecom Service Providers. In that perspective, the PICOS project gives HPF leading knowledge and insights on privacy, trust and identity management domains as they relate to user to user communication within community services. As a result of our participation in the PICOS project and our development activities on the server side of the PICOS prototype implementation, HP's CMS business group expects to be able to leverage the acquired knowledge in the following areas, as we evolve our business to address the emerging mobile application space:

- Location-based services: CMS has an installed base of network-based location servers (designed for mobile networks), but the exploitation of user or device location information, by the network operator or by their application partners, raises significant privacy issues. Location information is one of the unique personal attributes that mobile networks hold, but as the results of the PICOS user trials have shown, users are extremely sensitive about location information (even more so that other personal or dynamic information such as presence information, recent service history, contact lists, etc) – not just the use of their current location, but also the tracking of their location over a period of time. We expect to see more consumer demand for tools that allow users to blur their current location and to control who, and which applications, can get access to current or past location information, as users become more aware of the dangers of sharing that information in an uncontrolled way. This would be a natural extension of CMS's existing location server portfolio.
- Sharing of subscriber data across business boundaries or within a partner ecosystem: Telecom Service Providers recognize the value of the subscriber data that they hold within their networks, and they are increasingly adopting solutions such as the HP/CMS Unified User Profile (UUP) solution in order to expose the data, in a controlled way, to 3rd party application developers and content providers. Their goal is to monetize the unique subscriber-related information which they hold within the network. For the 3rd party partners, they see value in leveraging location information, presence information, service usage history information, device capability information, user profile and preference information etc., to offer more personalized services to users and to target categories of users (e.g. for services that embed advertising). The sharing of this user-related information across business boundaries raises many privacy issues, and users increasingly expect to have control of what data is shared, under what conditions, to which 3rd-party companies – whether application developers, content providers, advertisers, etc. While there are few standards in this area today, we expect that solutions such as UUP will need to include tools that give users more control of “their data”, even if this data is collected and managed by the Service Provider.
- Mobile social networking: Many of the emerging mobile social networking applications are designed as standalone silos, where each application defining its own mechanisms for user



registration, user profile management, privacy settings, data sharing policies (both sharing between users and with partner application, content and advertisement companies) and data management policies. Many people in the industry recognize that more standards, regulation and awareness creation are required in those areas, and within HP/CMS, we see an increasing role for Telecom Service Providers if/when the industry decides to harmonise those aspects of mobile social networking. By migrating the responsibility of those functions and policies to a central authority, it will be easier for end users to ensure that their data is managed in a consistent way across the plethora of mobile social networking sites that they use. Whether or not the social networking sites are willing to move in that direction remains to be seen.

However, the exploitation of new technology such as PICOS also needs to be evaluated through a business and commercial perspective. Two aspects are of prime importance:

- Interest and awareness at the level of community service users. During our PICOS trials we have seen that not all end users were educated on the potential issues, and more, on the possibility to solve these issues. In our opinion, awareness on privacy and identity management has probably not yet reached a level where the various players in the community services value chain will need to bring solutions to these problems because of end users demand.
- Evaluation of the business case for “privacy and identity management services” deployment. Looking into this direction raises several problems:
 - Who are the players in the community services value chain who will be able to monetize investments in this area? (Telcos, community service providers, specialized third parties?)
 - What is the level of standardization and of standards adoption that will allow the deployment of such services at a scale large enough to support a viable business?
 - What will be the working business model(s) towards end-users?

Service providers, technology providers and communication infrastructure providers need to see the demand in order to start investing in privacy and identity management solutions. In a fully deregulated market, the need to develop the consumer awareness on this topic is a key factor for incubation. Hence, dissemination of the PICOS knowledge is of great importance, not only the findings, but also highlighting the issues. Vulgarization media, community services forums, consumer conferences are good places for growing awareness.

In order to demonstrate the PICOS client portability, HPF has developed a PICOS client application prototype based on the Palm WebOS operating system (Figure 2). This prototype includes some of the PICOS features, and allows users to manage e.g. presence status and private sites. The WebOS application is a good example to show how the PICOS concepts can be ported to other mobile platforms and how the improved usability these platforms offer can be leveraged²⁷.

²⁷ Further examples in this context are the operating systems Android and iOS.

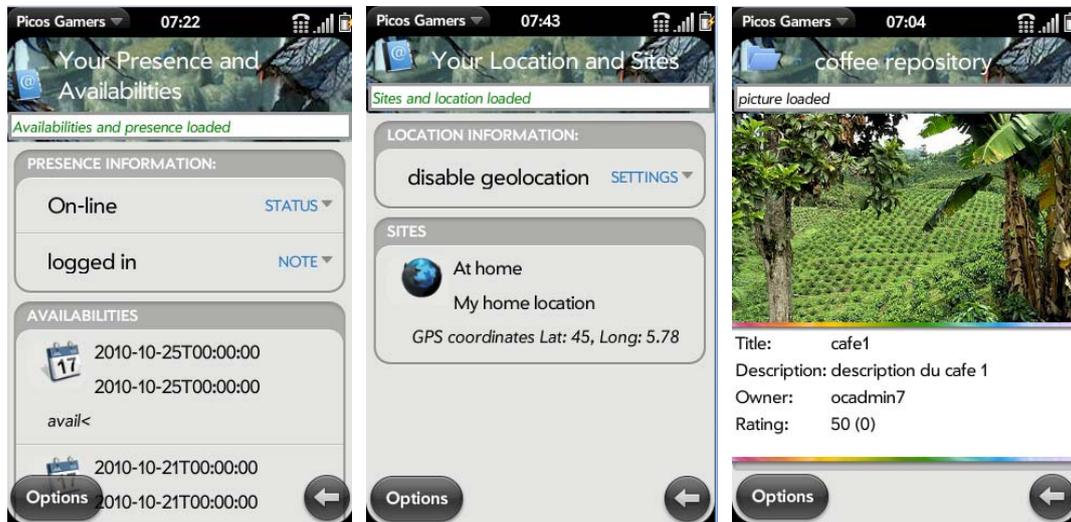


Figure 2: Implementation of PICOS concepts with a WebOS client prototype

HPL, with a more forward looking mission, will use the knowledge gained from the PICOS project to:

- inform the choices it will make about future research activities, their directions and approaches, particularly in information security
- brief HP businesses on how best to ensure their products and services can make use of various privacy-enhancing technologies to meet the emerging informational needs of their customers, and of their customers' customers
- brief HP's internal Privacy Office on the project's findings and how these may be incorporated into future developments of HP's internal privacy policies, practices and processes
- brief senior company management about the impact of privacy considerations and the potential use of relevant IP that is available to HP from PICOS in determining future investment choices

HPL actively participated in the PRIMcluster initiative and its meeting in Vienna, in September 2010, to present PICOS work and discuss aspects of community-oriented privacy problems and research project contributions to the solution of these. HPL furthermore participated in the PICOS work on standardisation (see section 5.1), together with partners MU and GUF and further events to distribute and communicate PICOS concepts internally and externally for future business opportunities.

5.5 IT-Objects (ITO)

ITO has developed its own PICOS server and PICOS client within an internal project, based on the PICOS architecture. The project and the two compatible components are called "PICOSlight". They yet offer less functionality than the prototypes developed in the PICOS project, but will be enhanced step-by-step.

One motivation for the PICOSlight project is the proof-of-concept of the PICOS concepts on different technology stacks. ITO wanted to clench the chances of green-field development and to build upon the

experiences of the PICOS project. The central design principle for both client and server has been complexity reduction. Furthermore new developments in the field of programming on server side, on (mobile) client side and regarding the communication between client and server have been taken into account. For the implementation of the community platform the Java EE 6 technology is used with the web service stack JAX-WS and EJB3/JPA2 for business logic and persistence. The server is currently deployed on a Glassfish v3 app server with MySQL as data source. A client was implemented using Android (the Google extended Android API and KSOAP for web service interaction) as mobile client technology. Therewith ITO has factored in the development in the market of mobile operation systems. The client has been built with a special focus on usability aspects, because the results of the trials and tests of PICOS WP 7 underline the experiences of ITO regarding the importance of usability. Even though, the first version of the client did not completely fit the usability requirements. For this a second version with a substantial improved user interface was implemented. For the transfer layer first SOAP was used. But then the project team switched from SOAP to RESTful web services to reduce the overhead of the Web Service Technology.

A few weeks ago the development of a second mobile client and the development of an online interface were started. The second mobile client will be an iPhone client as a response to the increasing sales success of Apple. The implementation team of the online interface uses HTML5. This subproject serves as a specific proof-of-concept, because from the point of view of ITO HTML5 perhaps opens the chance for a platform independent PICOS client.

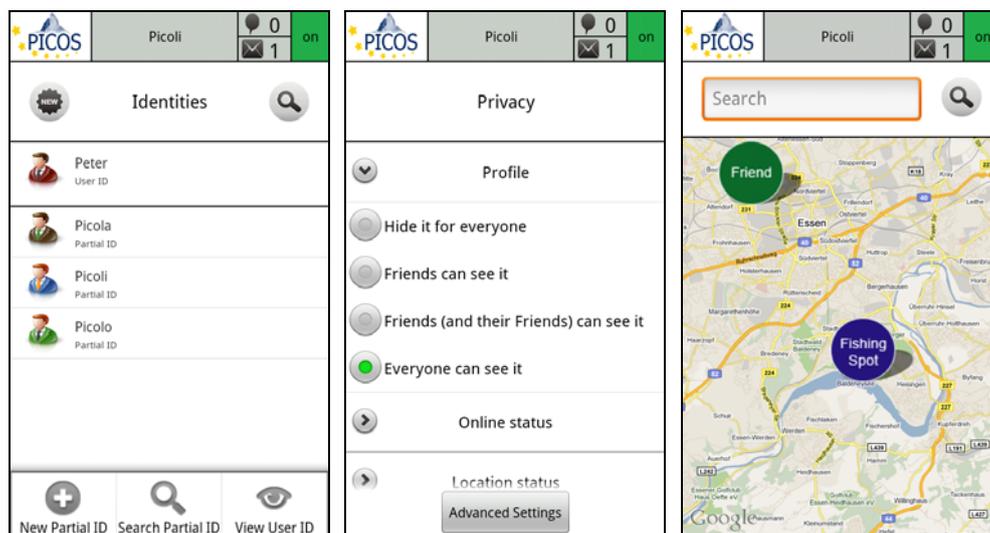


Figure 3: Managing (partial) identities and privacy in the PICOSlight Prototype

The second – more essential – motivation of ITO to perform the PICOSlight project is the development of components for productive use: a company needs a sufficient return on investment. For this reason ITO wants to integrate the PICOSlight components in various systems in different domains.



One domain is angling and the respective angler's communities, a domain which was also exemplary focused in PICOS. Beside other occasions PICOSlight will be presented at the 6th World Recreational Fishing Conference 2011²⁸ in Berlin, an important conference in the domain with a very high impact. Moreover, the dissemination of PICOS will be performed in a close collaboration with IFM Geomar. Please see for further information the corresponding chapter of this deliverable.

A second domain is the campus management at universities. ITO has developed an information system called Campus Lounge, which is a frontend of the different application systems of a university. On server side Campus Lounge contains a web portal which uses web services for the communication with the different application systems. Mobile clients for Android, iPhone, etc. were developed to enable the students to interact with the application systems via their mobile devices, for example to get an overview of their courses, to register for an examination or to have a look at the menu of the refectory and to rate the various dishes. With the PICOSlight components Campus Lounge facilitates the various communities of a university to communicate in a private, secure and trustworthy environment. Examples for such communities are the participants of a course, the participants of a study path or the members of faculty. Regarding the application systems ITO up to now especially concentrates on components of the ERP system HIS. At the moment the University of Duisburg-Essen which is a partner of the HIS company for the development of the new HIS in One version, discusses with the HIS company whether Campus Lounge could be a (standard) add-on of the HIS system.

A third domain for which ITO tries to utilise PICOS concepts and components are the horsemen. ITO especially discusses an integration of PICOSlight with the provider "Reiterportal24.de", an online portal for horsemen.

A fourth domain for which PICOS concepts and components could be of interest from the point of view of ITO, are hunters. At present ITO evaluates with some hunters what differences exist between the requirements of hunters and the requirements of anglers in order to evaluate the possible usefulness of PICOS concepts for this community.

Last but not least ITO thinks that for communities in the health domain the PICOS concepts and components should be very useful. More and more people try to retrieve information of an illness they or a member of their family got. Regarding this retrieval and the exchange of information the PICOS concepts are of special interest. Because of the special requirements of this domain (e.g. regarding privacy and trust) ITO tries to find out whether there are partners and budgets for a corresponding research project.

5.6 *Masarykova Univerzita Brno (MU)*

We were particularly active in the continuous standardisation activities, PICOS was involved, partially in collaboration with other PICOS partners, such as HPL and GUF. In March 2010 we contributed to the draft of ISO 29101. In the ISO/IEC JTC 1/SC 27/WG5 meetings, PICOS was represented by Zdenek Riha, the PICOS liaison officer. PICOS contributions were discussed and considered for the ISO 29101 draft. The simplified PICOS architecture is now a part of the informative annex of the ISO 29101 draft (see section 5.1 for more details). The PICOS consortium meanwhile decided to provide a continuous reviewing update to the standard draft, in order to sustainably influence its development.

²⁸ <http://www.worldrefish.org/>



5.7 *Leibniz Institute of Marine Sciences (IfM-Geomar)*

The PICOS partner IFM-GEOMAR was the representative of the Angling community in PICOS which was one of the exemplary target communities in PICOS and in the related user trials. Together with the trial users from the angling community, important new concepts on enhanced privacy, trust and data management were developed in PICOS and translated into online and mobile applications. Because of the close cooperation with the angling community in the PICOS project, most of the developed PICOS concepts can fit straight into existing online and mobile angling communities and would certainly provide an improvement in regard to the user's control over their data. IFM-GEOMAR has a close contact to the angling community from both, the professional and the recreational point of view. Thus, IFM-GEOMAR will initiate and support the dissemination activities related to the angling communities, even beyond the official termination of the PICOS project.

Dissemination and exploitation activities within the PICOS project's lifetime were²⁹:

- The presentation of the PICOS concepts in the World Angler Conference in Florida, 2008, which was an important milestone in the requirements gathering period;
- The close contact to the EAA (European Anglers Alliance, Brussels) resulted in their support in disseminating the PICOS project concepts related to the angler community;
- A number of angler journals supported the dissemination of the PICOS ideas, specifically in the beginning of the project;

Ongoing dissemination and exploitation activities and activities beyond the project's lifetime include:

- The demonstration of the PICOS angler prototype to the public at the occasion of the IFIP SEC 2011 conference (see also Deliverable D9.3.3)
- The presentation of spin-off activities, such as an advanced mobile version of the PICOS application for android operating system, PICOSlight for angler communities. The PICOSlight application was developed in close cooperation of the PICOS partner ITO and IFM-GEOMAR and tailored for Anglers needs. The result will be an application which was developed in a user-centric approach and which will be available for all smart phones which are based on the Android OS. This application will be presented as well at the PICOS summit at the IFIP SEC 2011 and moreover to a large angler audience in the 6th World Recreational Fishing Conference (August 2011, Berlin, oral talk accepted) and promoted together with the privacy concepts of PICOS for angler communities. It is planned to publish a similar version for the iPhone OS and IFM-GEOMAR will continue to support any further development of these mobile applications.
- In order to raise awareness for the PICOS results and the added value for online angling communities, guidelines for the implementation of the PICOS concepts specifically tailored to online communities will be developed (as a leaflet) and disseminated to appropriate online angler communities in several European countries. In that context, we will also communicate our results on the requirements of anglers, concerning LBS services. We will suggest the implementation of LBS services such as targeted advertising (i.e. Angler can register for a service, under consideration of the privacy concepts of PICOS, which sends notifications when e.g. the angler is in vacations, making him aware where he can find fishing opportunities and about a close tackle

²⁹ For more information on dissemination activities see also deliverable D9.3.3 (Dissemination Report)



shop where he can find the special equipment for this watercourse). This could be considered as a business model for online angling communities (exploitation).

- On the long term scale it was a goal of IFM-GEOMAR to encourage angler to allow FishBase to use their catch records for an improved biodiversity research. The PICOS concepts, if applied in online angler communities and their attached functionalities for mobile phones, allows the user to fine tune the set of data he allows to be used from FishBase, such as blurring the exact location of the catch and dissemination of data under a pseudonym which does not allow to track back to "a real person in life", (e.g. from public authorities) i.e. where and who has caught the fish. These options which enhance the trust of the user into their data management in an online environment are expected to facilitate the upload of data to the FishWatcher (the facility for anglers in FishBase) from communities which are applying the PICOS concepts.

Further activities which exploit the PICOS results include the proposal for a new research project in the area of location sensing and social networks.

6 Achievements & Impacts

Complementing and refining the first two exploitation plans of PICOS (D9.2.1 and D9.2.2³⁰), the previous sections of this third plan provided a detailed overview on how different results were exploited within the project. This concluding section of the Exploitation Plan provides a summarising outline of the main achievements and highlights our main impacts, regarding in particular the exploitation of the results described in section 3. As this is the final Exploitation Plan of the PICOS project, this section is dedicated to the impacts PICOS has achieved so far but it also serves as an outlook on how PICOS can and will have a sustainable impact in the future.

The following can be regarded as the main achievements of PICOS with regard to exploitation:

- **Involvement of industrial partners**
Throughout the project lifetime the industrial partners who participated in PICOS were involved not only in the project work, but also in exploitation planning and exploitation activities. This involvement in collaboration with research partners was the foundation for our successful exploitation activities and resulting impacts in practice (e.g. Anglersbase (see 5.7), PICOSlight (see 5.5), Privacy Gateway (see 5.3)).
- **Engagement in standardisation**
PICOS continuously contributed to the drafts of the 'Privacy reference architecture' and the draft of the 'Privacy Framework'. Based on this ongoing effort, we aim to influence industrial standards for privacy enhanced social communities and related services. One of the remarkable impacts on this so far is especially the inclusion of the exemplary privacy reference architecture based on the PICOS architecture in the draft.

³⁰ Both Deliverables are available from <http://www.picos-project.eu/Public-Deliverables.29.0.html>



- **Representations at industry related events**

We utilised a number of reputable industry events to showcase our work and especially our prototypes³¹. These included foremost the Mobile World Congress 2010, as well as the DroidCon conference and events at Atos Origin, Hewlett-Packard, Deutsche Telekom AG, OTTO Group and others. With this we underlined how privacy and identity management related concepts can be integrated in community applications. This is also a basis for the creation of awareness for PICOS with decision makers and management representatives.

- **Close collaborations**

The close collaboration with the Angler community supported the development of the PICOS prototypes and the application of PICOS concepts beyond the scope of the project into existing environments such as Anglersbase/Fishbase. Additional exchange with the gamers community and the exchange with other parties from practice (see e.g. 4.4) was another key factor, to ensure a consideration of PICOS concepts in practice. These efforts will be continued and refined in current and future activities.

- **Technical exploitation**

PICOS concepts provide the basis for the enhancement of products and services in practice. Products such as the Privacy Gateway can be mentioned here as well as mobile communications solution as provided by Atos and HP. The portability of PICOS concepts to the Android and WebOS operating systems indicate further opportunities for future services and features. Not least, besides the actual privacy concepts we provided a foundation for future business models, based on an advanced advertising approach, which considers the characteristics of social communities as well as privacy related aspects.

³¹ For more information on these activities see also deliverable D9.3.3 (Dissemination Report)



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D9.2.3 Exploitation Plan 3

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