COSMOS

Cultivate resilient smart Objects for Sustainable city applicatiOnS

Grant Agreement Nº 609043

D8.3.2 Dissemination Plan and Activities (Year 2)

WP8: Exploitation, Dissemination, Roadmap and Standardisation

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www.iot-cosmos.eu

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Table of Acronyms

Acronym	Meaning
ACM	Association for Computing Machinery
API	Application Programming Interface
ARM	Architecture Reference Model
CBR	Case Based Reasoning
CEP	Complex Event Processing
D	Deliverable
DKMS	Distributed Knowledge and Media Systems
DoW	Description of Work
EU	European Union
FIA	Future Internet Assembly
GSMA	Groupe Speciale Mobile Association
ICPS	International Conference Proceedings Series
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineering
IERC	European Research Cluster on the Internet of Things
IoT	Internet of Things
IPR	Intellectual Property Rights
ML	Machine Learning
M2M	Machine to Machine
PCI	Panhellenic Conference on Informatics
ROI	Return On Investment
RSS	Rich Site Summary
SME	Small and Medium Enterprise

SQL	Simple Query Language
URL	Uniform Resource Locator
WP	Work Package

Executive Summary

Deliverable D8.3.2 “Dissemination Plan and Activities” aims to highlight the strategy and necessary actions needed to reach the target audiences of COSMOS. To this end, the relevant target groups of the project are identified in terms of the scientific community, business and public bodies’ organisations, but also towards the general public. During Y2 we also targeted developer communities in the technical domains COSMOS project is involved in.

A number of available dissemination channels are analysed and investigated, our involvement in them is described in addition to the potential effects and corrective actions that need to be taken are presented.

Major events and venues in which COSMOS had been present are identified and all the performed activities, within the first two years of the project, are described. These include the participation in 11 major events (4 in Y1 and 7 in Y2) and the identification of 5 upcoming ones for which concrete plans have been drafted for the project to be present. Thus, COSMOS has been very active in the relevant domain, focusing on high visibility events and preparing also the plan for Y3. The project has also been active in the preparation of promotional material that has been used in its participation in the various activities.

During Y2, COSMOS presence in social networks has been significantly increased. Specifically, in COSMOS LinkedIn group we have created discussions following the publication of relevant articles from COSMOS experts regarding their respective domains. To this end, we have also identified relevant LinkedIn groups per technical topic of COSMOS (5.1.3.2). Moreover, we have created a Facebook page and a Twitter account through which the aforementioned LinkedIn Pulse posts are further disseminated. In order to increase the visibility of the posts, we implemented an automated sharing process as part of a whole Social Network Strategy (2.1) that is introduced, based on keywords and hashtag analysis (5.1.3.3). We also use the social networks in order to announce our participation in major events or the release of interesting documents (deliverables, scientific publications etc.) in our website. The number of scientific publications has been increased during Y2 of the project and this trend is expected to remain in the upcoming months.

Collaboration actions have been also taken during Y2 (CityPulse EU project) and potential candidate projects for future collaboration have been identified (COMPOSE EU project). Training material to be used during the dissemination activities has also been prepared and consists mainly of demonstration videos from the various tools.

1 Introduction

The aim of Task 8.3 is to make all the necessary actions to disseminate and promote the results of COSMOS as well as the project itself, through various channels. In order to accomplish this goal, we have to identify, define, organize and coordinate certain activities and subsequently to perform them.

All partners in the consortium contribute to the creation of an agreed dissemination plan identifying clear routes for the dissemination of the project results. Also, all partners are involved in the dissemination activities related to their work.

The work covers the diffusion of information from the project to its diverse target groups, which encompass the relevant domains, industry sectors, research and developer communities, and end users.

The main items to be disseminated and therefore to be included in the dissemination plan and reports are mainly those arising from the activities of the program.

Dissemination work focuses on web presence and the design and production of project promotional material such as factsheets, brochures, bookmarks, presentation templates, project presentations and website content. Moreover, the project is involved in social media networks, such as LinkedIn, Facebook and Twitter. The dissemination and promotion of the project also contain the publication of scientific papers, the presentation of the project at key stakeholder events and, in the final stages, the production of more novel tools to highlight key results.

We perceive the dissemination in two respects:

- dissemination for the project as a whole (for example project workshop, demo, exhibition, clustering etc.);
- dissemination of particular innovative results (paper publications, conference attendance etc.).

Based on the COSMOS consortium experience, it is expected that dissemination as a whole will create large impact and critical mass for the project. Therefore, besides the noticeable and high-quality paper and article publications, COSMOS also intends to give tangible efforts for the whole project dissemination.

The document is structured as follows:

- Chapter 2 gives an overview of the strategy followed for the dissemination of the COSMOS project results.
- Chapter 3 identifies the different results of the project that are disseminated and classifies them according to their nature.
- In Chapter 4 the different target groups towards which we disseminate the COSMOS project results are identified. A description of each of them is given as well as a number of hints on how to approach them.
- Chapter 5 describes the different channels through which the COSMOS project results are disseminated as well as performed activities during this period or planned ones for the upcoming months.
- Finally Chapter 6 concludes the document.

2 Dissemination Strategy

In a general approach, each partner will be responsible for disseminating the project results based on the channels and backgrounds available to them. The academic side will be targeting specific and high impact publication at scientific conferences, journals and other scientific forums, while industry will focus on workshops, information days and internal and external client meetings. In order to achieve an effective dissemination, an integrated approach will be necessary, combining templates, guidelines and approval processes on one side with a communication platform, publications, event participation and release plans on the other. The consortium will participate collaboratively at international events to present the project achievements.

As a first step, in order to properly disseminate our work, we should identify which aspects will be covered.

- "What": We have to identify the products, "what" we want to communicate
- "Who": The audience. To "whom" we are going to tell it, "who" is interested on our results
- "How", "Where" and "When": Channels through which we are going to disseminate our products
- "Why": The aim. What do we want to achieve with every dissemination action.

The dissemination is split into dissemination to the scientific community, where the focus is on transferring knowledge and tools into the scientific domain, so that they can be used in complementary research fields, and dissemination to the commercial community (Investors, Technology providers, Users, Consultants etc.), where the focus is on informing potential clients on the COSMOS capabilities. We will build interest in the project to complement the exploitation plan, garner feedback from the market and identify potential partners and users.

Scientific dissemination will include an emphasis on conferences, scientific workshops, academic papers and scientific magazines (online and in printed form). The main points include the approach taken, the results gained, the innovation and processes. The intention is to spread knowledge of the project and to foster feedback on complementary approaches.

Commercial dissemination will focus on typically shorter and more generic communication items (web coverage, flyers, press releases, whitepapers, exhibition stands, magazines and websites focused on software developers etc.). The key points revolve around what COSMOS will be able to do, what benefits it will confer, the conditions under which it can be used and how and when users can be involved. The main intention is to prepare the market, identify potential collaborators and users and to gather feedback.

More specifically, regarding web coverage, a newly implemented Social Networks Strategy (section 2.1) is applied, in order to benefit from social media networks interconnection in terms of widening the audience of the project.

2.1 Social Networks Strategy

With relation to COSMOS social network presence, during Y1 this activity remained in a basic state, creating groups and publishing periodically a number of updates. However during Y2 a more focused strategy was implemented, trying to combine and exploit the capabilities of the available media. To this end, the overall strategy followed appears in Figure 1. The key

assumption is to offer to potential audiences small, attractive LinkedIn Pulse posts, related to selected COSMOS topics, technical or otherwise, that are easy to read (maximum 1 page length). These posts should cross-reference material available in the COSMOS website, in the form of deliverables, papers etc., that may provide more details for the respective COSMOS topic to an interested user. Following, the post links are shared via a number of channels (COSMOS Facebook page [36], Twitter account etc.) but in order to reach wider external audiences, they should also be forwarded to key groups interested in the specific topic, that typically include thousands of members. Finally, demographics of the action may be gathered and analysed with relation to a number of factors, such as reached audience sizes, types, location etc. In the following chapters we present aspects of this strategy, such as identified groups and performed activities following this process.

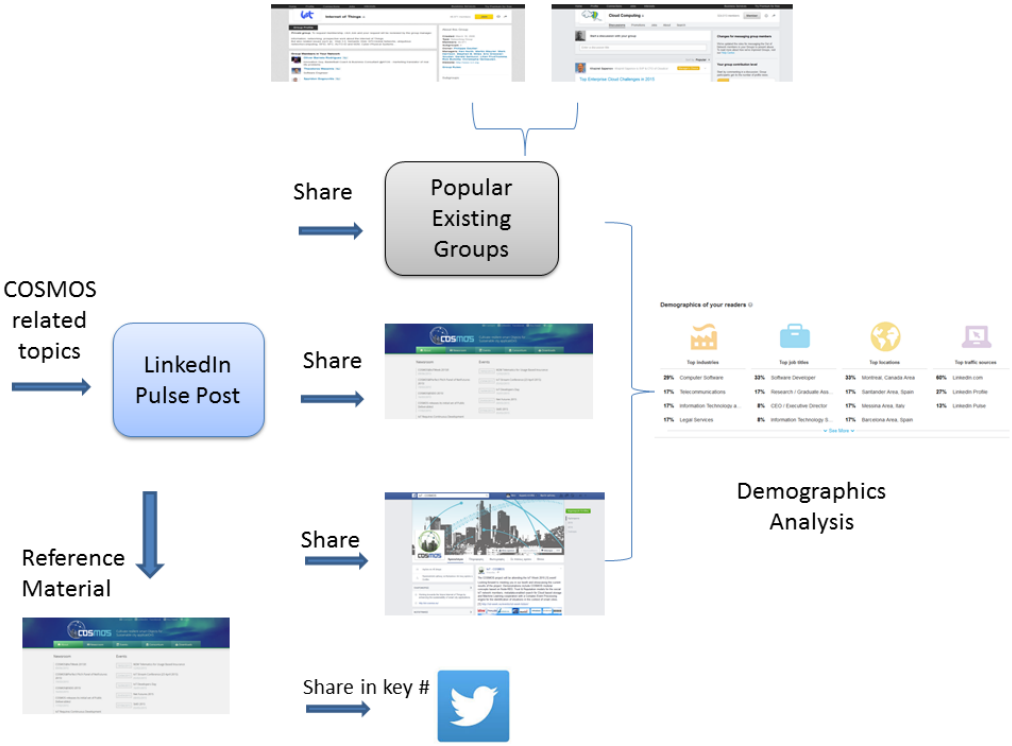


Figure 1: Social Networks Combined strategy design

In order to automate this process of sharing between different channels, we also implemented an automation process that appears in Figure 2. According to this, the manual steps are the entry point for COSMOS members, which is the creation and posting of a LinkedIn Pulse article. This article is then added by the web site admin as an announcement in the Newsroom category, which feeds into the RSS notifications. Except for such articles, general events and news of the project are published through the Newsroom category in the website. The following steps of the process are fully automated. To this end, we have created a Node-Red flow, that subscribes to the web site's RSS feed but has been coded in order to filter the notifications. This is necessary in order to separate the normal general feeds from the Pulse related ones, but also insert the appropriate hashtags that will make it more visible. Thus initially we separate RSS feeds based on their key words (e.g. COSMOS) and tweet in the COSMOS account the ones derived from the project. In this process, and based on the contained keywords, we may program the flow to insert separate hashtags or mention key followers of a given keyword (see respective analysis in section 5.1.3.3). Furthermore, based on the person that makes the publication on the website, we may mention the according

company's twitter account (e.g. a post created by IBM will have the #IBM tag), given that these will be more related to the specific company but will also attract visibility from its followers or members.

The processed message is then automatically published in the COSMOS Twitter account, enriched with hashtags that increase its visibility (like #iot etc.). By the use of the online service IFTTT.com, accounts on different channels can then be linked (again automatically) and forward the information of the tweet to a variety of channels, like the COSMOS Facebook page and LinkedIn. For the latter, there is currently a restriction for publishing automatically to groups from the LinkedIn API. Thus such operations are not supported also by relevant services like IFTTT. For this reason we have created a LinkedIn profile for COSMOS, to which the tweets are redirected and then manually shared to the COSMOS LinkedIn group. Finally consideration must be given for the publication date of the original news, so that there are no duplicate tweets. Twitter's duplication avoidance mechanisms only work for a given period. Thus if the Node-Red server is restarted, duplicate messages may appear from previous news. In order to avoid that we have applied conditions taking under consideration the publication date of the original news item.

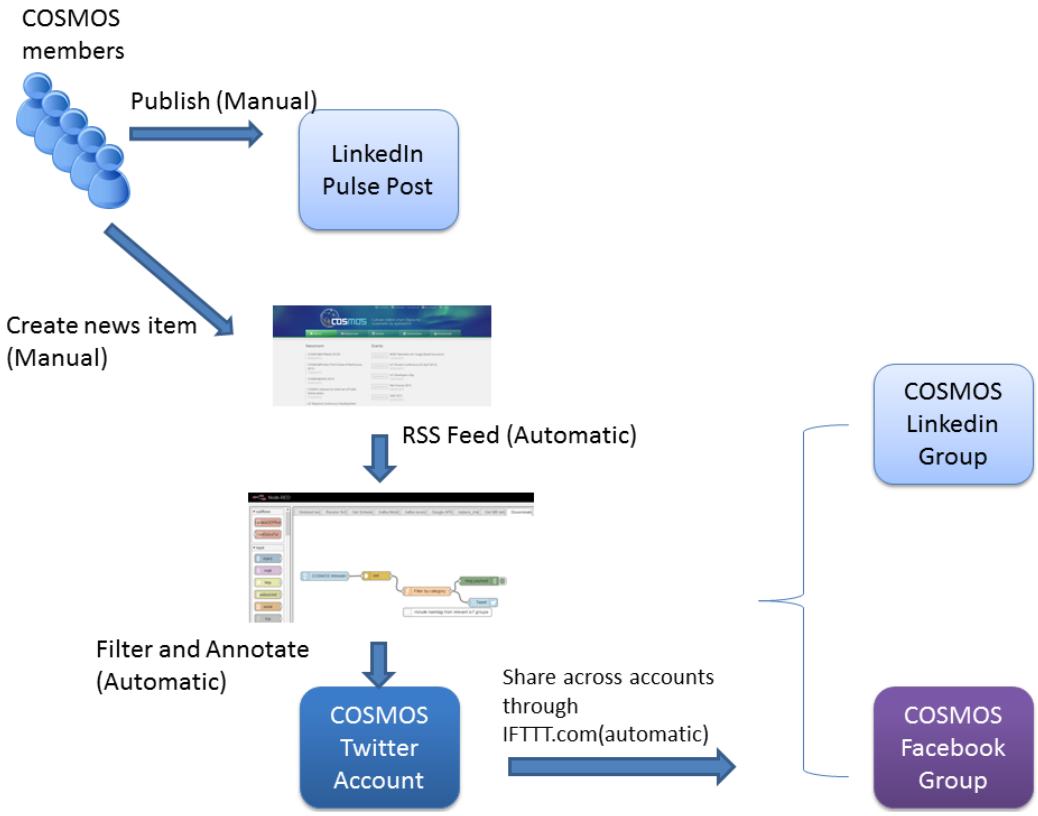


Figure 2: Social Networks combined strategy automation

3 COSMOS Results for Dissemination

The COSMOS project will produce different types of results that will be potential subjects to wider dissemination. The following sections list the identified relevant products for dissemination. They will be derived from the major project results and innovations. Some of the innovations have already been identified and are listed below, together with the concrete results and approaches:

- Things are able to learn based on others' experiences.
- Situational knowledge acquisition and analysis mechanisms make things aware of conditions and events affecting their behaviour.
- Adaptive selection approaches facilitate the management of the uncertainty and volatility introduced due to real-world dynamics.
- Decentralised management mechanisms in IoT based systems allow applications to exploit an increasing amount of interconnected things.
- Socially-enriched coordination considers the role and participation scheme of things in and across networks.
- Management decisions and run-time adaptability are based on things security, trust, administration, location, relationships, information and contextual properties.
- Integrated security and privacy in the IoT domain is developed.
- Extended complex event processing and social media technologies extract only the valuable knowledge from the information flows.
- Workload-optimised data object stores facilitate efficient storage by exploring the interplay between storage and analytics on networks of data objects.

Concrete results that are or will be available with relation to the aforementioned innovations include:

- Semantic models, based on which Things capabilities and properties can be interlinked.
- Case Based Reasoning (CBR) approaches for identifying concrete solutions to given problems that the Things are called to handle.
- Social mechanisms for discovering and evaluating Things and their quality of information.
- Prediction Models for identifying critical parameters in Things management, conclusions extraction and Things awareness.
- Dedicated Hardware boards for integrating security aspects in IoT.
- Enablement of information disclosure levels through the Privelets concept.
- Cloud based Object Storage incorporation, enabling per case specialised data processing, metadata search and manipulation through the application of the Storlets concept.

The aforementioned results have been specified furthermore during Y2 as following:

- We defined a domain specific ontology to semantically describe smart homes and their sensors.
- We introduced and implemented the concept of Experience Sharing between Things in both reactive and proactive manner, following events detection achieved using lightweight CEP techniques.

- We created a Trust & Reputation model based on complex social characteristics of Things, like Popularity, Trust, Reputation, Dependability and Reliability, which are used to measure the quality of intra Things communication.
- We built a framework under which Things, and therefore their users, can communicate with each other in a trustworthy way, keeping their real identity secret and their private data safe.
- We extended Secor open source tool to support saving IoT data, in Parquet format, in OpenStack Swift Object storage, also enabling tagging objects with metadata and uploading the metadata to Swift.
- We applied Apache Spark SQL methods and Spark Machine Learning algorithms in historical data stored in the Cloud Storage, in order to generate critical thresholds that can be used to make decisions on real time IoT data streams.

4 Target Groups

An essential step in order to develop a proper marketing strategy of our work is the identification of target groups. By identifying correctly these groups, we can devise promotional plans for each target group separately. Also, by collecting feedback from these groups, we can improve our work and the project itself.

Therefore, our aim is to disseminate COSMOS results among relevant stakeholders. We could say that the target groups, in order to build awareness and interest in the project, are categorised in the following three categories:

- Scientific Community;
- Business/Industry Community;
- General Public Community;

After this categorisation, in the following sections, we will present different strategies concerning target groups separately and how to approach each group in order to promote our work and the COSMOS project.

4.1 Scientific Community

The COSMOS project addresses many topics from different technological areas. Therefore, scientific and research communities may be highly interested in the results that we are going to have. We will not list all relevant working groups or research areas in detail here as this is not possible. Generally, the dissemination strategy in research and in scientific communities is anyway quite similar in the different research domains. In this section we have identified some of the research communities of interest for COSMOS. They will be approached through the attendance and presentation of COSMOS to major events (organised by the communities themselves or other organisations) and publication of project results in specialised journals and conferences.

In addition to the scientific conferences, we will also present our work and seek feedback in trade shows such as IoT Week, the Future Internet Assembly and similar commercial events.

We also plan to organise workshops and other public events, including demo sessions, tutorials, presentations and lectures.

Finally, as mentioned before, some standardisation bodies can also be considered as a meeting place of the scientific communities and therefore an interesting forum to disseminate the COSMOS project results.

4.2 Business/Industry Community

Different kinds of companies may be interested in the COSMOS results, depending on the different roles they may play within the COSMOS value chain and on the different fields of application, in relation to the COSMOS Exploitation Strategy.

The main industrial organisations that are of interest to disseminate COSMOS results are the potential users of the COSMOS technologies. They can mainly be classified in the Use Case scenarios sectors, which are those whose business is related to:

- Smart Cities Technologies and Platforms. Potential users of COSMOS technologies are companies already active in this domain, from SMEs to big organisations with thousands of employees.
- Smart Cities public facilities and administrations must be approached as potential end-users and customers of COSMOS.
- Application Developer Communities that may exploit data coming freely from Smart Cities environments and combine them with one or more COSMOS components functionalities in order to provide an added value application.

The COSMOS consortium has drafted a first version of the Market Analysis [18] and of the exploitation strategy [19]. The way COSMOS partners approach these organisations varies depending on their nature and goes hand in hand with the participation in relevant fora, as identified in Section 5.4. For example, the Polis Annual Conference is an excellent opportunity for addressing Smart Cities authorities.

SMEs represent a group of particular interest and special emphasis must be given on contacting them. These entities are expected to mostly be interested in individual components that can be easily integrated in their respective products.

COSMOS will disseminate its results towards the industry through different kinds of events, but mainly through exhibitions and communication activities as identified in Section 5.4.

The work developed during this second period has been presented to different international organizations and communities so as to present the functionalities and interactions that enable COSMOS with regards IoT deployments and smart cities.

Dissemination at research international events has been combined with industry oriented events. COSMOS outputs have been delivered to:

- IEEE IoT Scenarios Community, COSMOS has exposed to the IEEE Community the benefits and preliminary results of using the solution developed in the project for solving problems derived from urban mobility in cities through a smart transport solution.
- IERC large scale pilots group. COSMOS has contributed to IERC document where large scale deployments are presented. The document covers deeply the main advantages, barriers and opportunities that COSMOS and other projects belonging to the same domain are facing.
- SmartCities Day. This event is part of Smart Innovation week. The event is an industry oriented for a where main stakeholders of smart cities, IoT and M2M communications are present. There smart transportation proposal was presented and the session was shared with other mobility key partners as Tom Tom.

The large community of stakeholders behind these groups has facilitated the introduction of COSMOS solution to a wider audience. Moreover, plan for third period covers extend this kind of activities, presenting COSMOS solution not only to research community but also to industrial, SME companies and cities innovation decision makers.

4.3 Developer Communities

Cloud Storage & Analytics communities (OpenStack, Apache Spark)

IBM has been active in several open source communities in the context of work in COSMOS, including OpenStack Swift, Apache Spark and Pinterest Secor. IBM has emphasized the ability of these frameworks to work well together in order to build end-to-end solutions.

In the context of our work in OpenStack Swift, IBM developed the storlets framework, which allows computation to run close to objects on the object store. In April 2015, the IBM work on storlets was released to open source [24], [25], and subsequently IBM has led discussions in the OpenStack community regarding integrating some of the work upstream. Note that this work was partially funded by the COSMOS project.

Contributions were made in order to allow Apache Spark data to be stored in OpenStack Swift. In addition, in order to build the COSMOS data mapper, IBM extended Pinterest Secor [26] with the ability to support OpenStack Swift targets. This work has been made open source and is in the process of being reviewed by the Secor community for inclusion as part of the Secor release [27].

Furthermore, we expect to participate in the Apache Spark Summit, in October 2015, with a demo from the COSMOS work in the area. The possibility to include demo videos from the event in relevant community web sites (e.g. [29]).

Bluemix community

The demo for the Madrid Traffic use case was shown to a team in IBM who is interested in getting it to run as a BlueMix IoT use case. This incorporation is expected to increase visibility of the COSMOS solution and we will closely monitor this.

Node-Red communities

Node-RED is an extremely useful flow-based programming tool that is being widely used in COSMOS, thus according communities are considered of specific interest.

The following table contains the targeted developer communities and their links:

Community Name	Link
OpenStack	https://www.openstack.org/community/
Apache Spark	http://spark.apache.org/community.html
Bluemix	https://console.ng.bluemix.net/solutions/iot
Node-Red	http://flows.nodered.org/

4.4 General Public Community

The general public is considered a target group mainly for evoking possible interest in the general aspects of the COSMOS project and more specifically in the general concepts of the use case scenarios. The dissemination channels targeting the general public will mainly be mass media through e.g. press releases or relevant activities such as the Researcher's Night event identified in Section 5.4.1.4. The project web site will also constitute a channel to approach the general public. Moreover, public radio shows from EMT will enable COSMOS dissemination to this community.

5 Dissemination Channels and Performed Activities

In this chapter we will report, analyse and offer a general description of the methods and tools used and will be used again in the future, so that the results of the COSMOS project will get known world-wide and we will try to suggest other ways and methods by which we will be able to approach and inform the public that is interested in this innovative platform about our work.

5.1 Website and Social Networks

A first attempt to make our project known was to build the official website [2], through which every possibly interested person can be informed about our business, and to facilitate the worldwide dissemination of information to specific groups (the public, companies and research communities).

Apart from general information on the project description, the people involved and working on it, the objectives and progress of the project, we will publish other information related to our work that might be interesting for visitors.

Currently the website (Figure 3) contains information about the deliverables, various events, our project and more generally the IoT domain. This way, we keep all interested parties informed about any change in our work.

So far, links to social networks (LinkedIn) are supported and there is an RSS feed functionality.

We must ensure that we collect statistics on traffic to the website, through google analytics for example, so that we can see the exact number of visitors, their origin, how many times was the site visited via search engines (google, yahoo) and how many visitors have downloaded our documents. Furthermore, we may also evaluate our participation in various events following the increase in the website activity following a specific dissemination action.

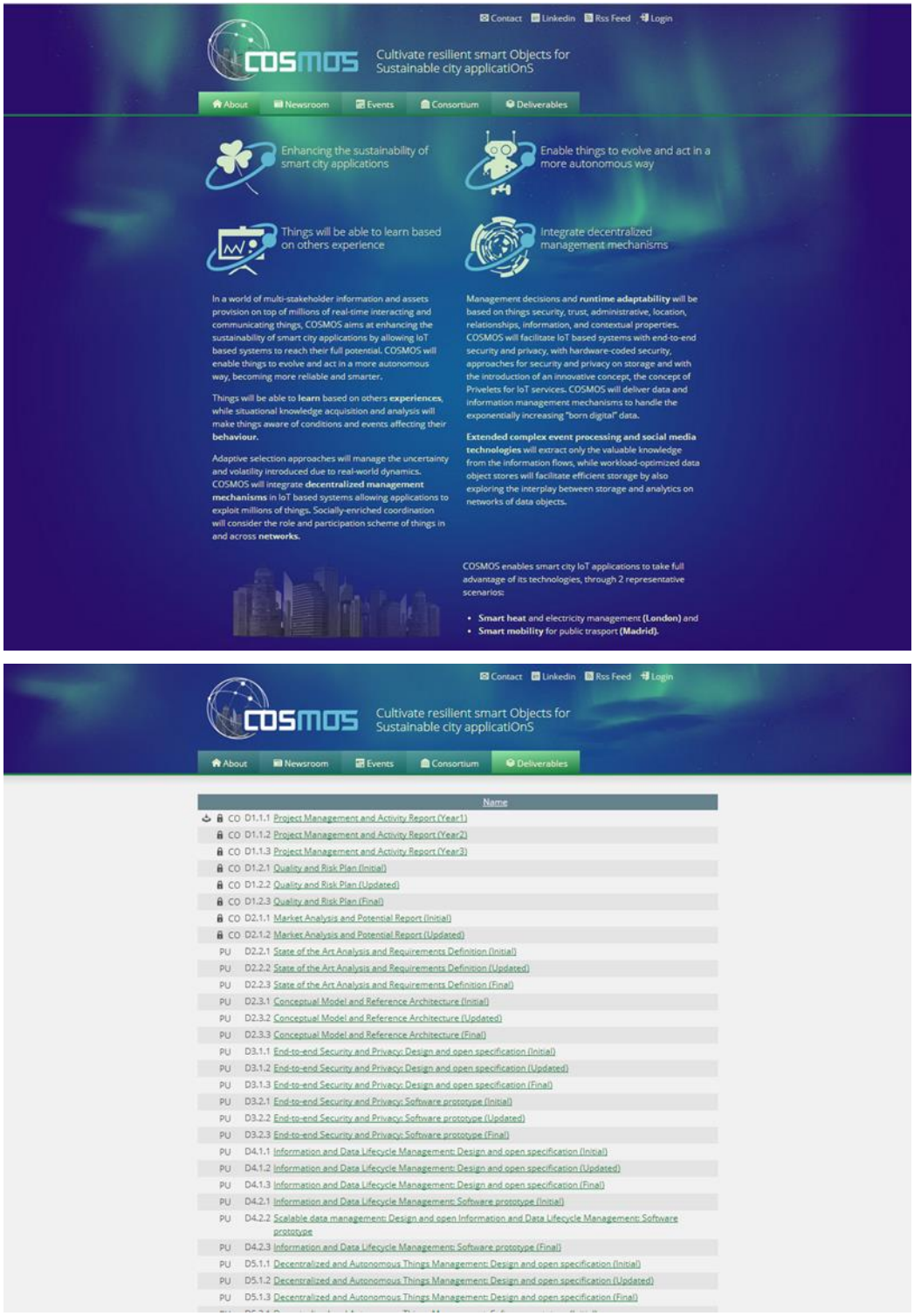


Figure 3: COSMOS Website Screenshots

5.1.1. Website Statistics

The Web portal created for COSMOS has received 4493 users since the creation of it in the beginning of April.

Figure 4 shows that our website has increased its visibility in Y2 (156 users in Y1, see section 5.1.1 of D8.3.1 [47]) and moreover it had many visitors during important milestones like our

initial LinkedIn Pulse post or our participation in major events (Net Futures 2015, IoT Week 2015).

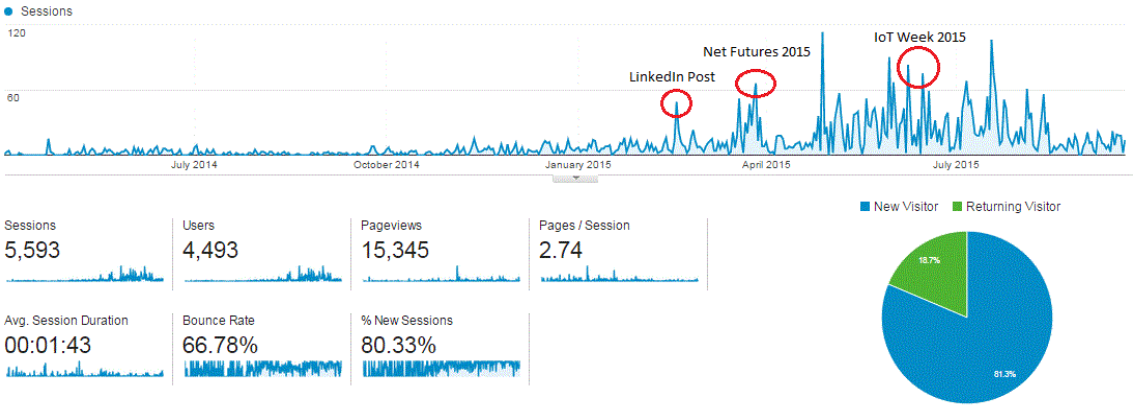


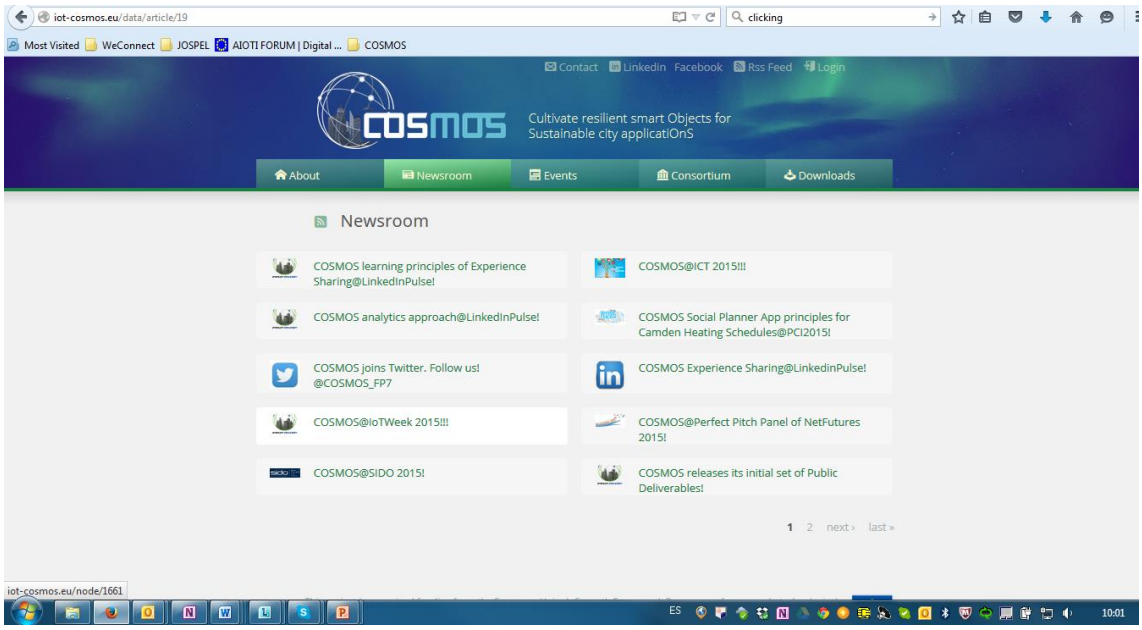
Figure 4: Web Site Statistics

5.1.2. Website Material

5.1.2.1. News Items Maintenance

The project website has been updated periodically with the material generated by the project. This includes:

- Attendance to events – The website reflects all the events where COSMOS project has been presented. The events were announced in advance so as to allow visitors to know where to find the project.
- Public research activities – The website also includes notes to the events where COSMOS research activities have been presented.
- Public Deliverables and dissemination material – The project have updated the slidesets that have been used in the different events.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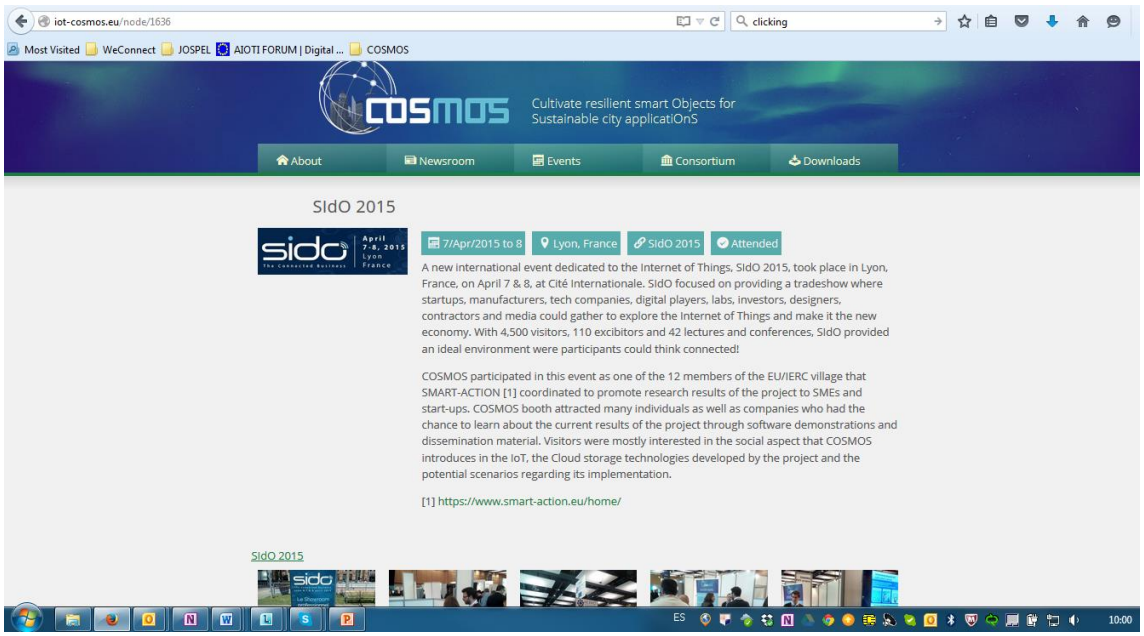
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A new international event dedicated to the Internet of Things, SIdO 2015, took place in Lyon, France, on April 7 & 8, at Cité Internationale. SIdO focused on providing a tradeshow where startups, manufacturers, tech companies, digital players, labs, investors, designers, contractors and media could gather to explore the Internet of Things and make it the new economy. With 4,500 visitors, 110 excibitors and 42 lectures and conferences, SIdO provided an ideal environment were participants could think connected!
COSMOS participated in this event as one of the 12 members of the EU/IERC village that SMART-ACTION [1] coordinated to promote research results of the project to SMEs and start-ups. COSMOS booth attracted many individuals as well as companies who had the chance to learn about the current results of the project through software demonstrations and dissemination material. Visitors were mostly interested in the social aspect that COSMOS introduces in the IoT, the Cloud storage technologies developed by the project and the potential scenarios regarding its implementation.
[1] https://www.smart-action.eu/home/
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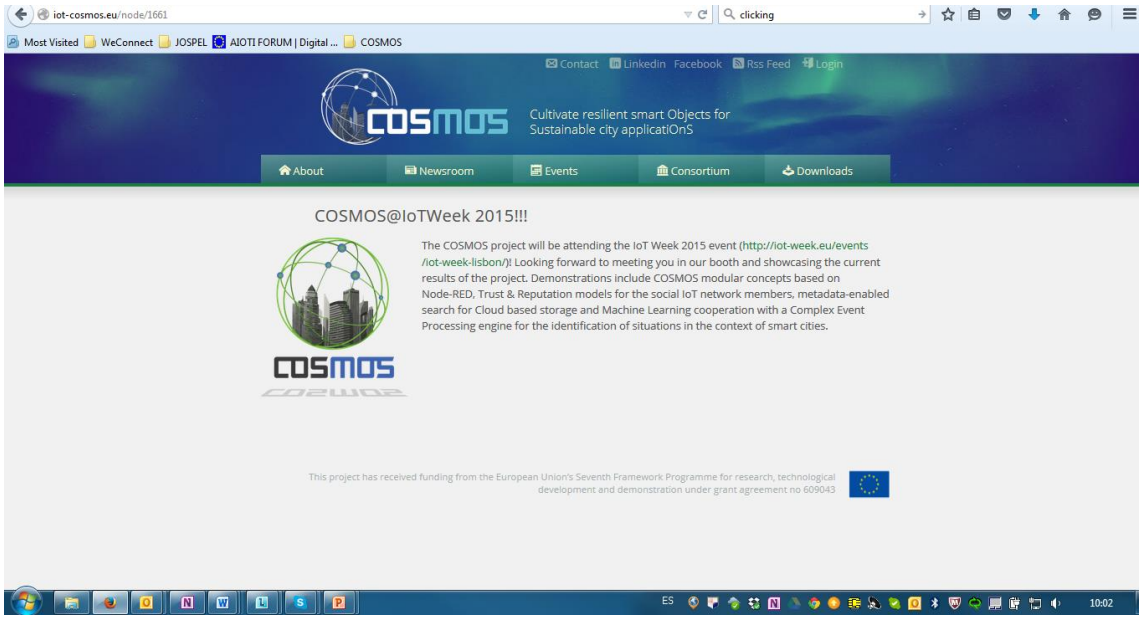
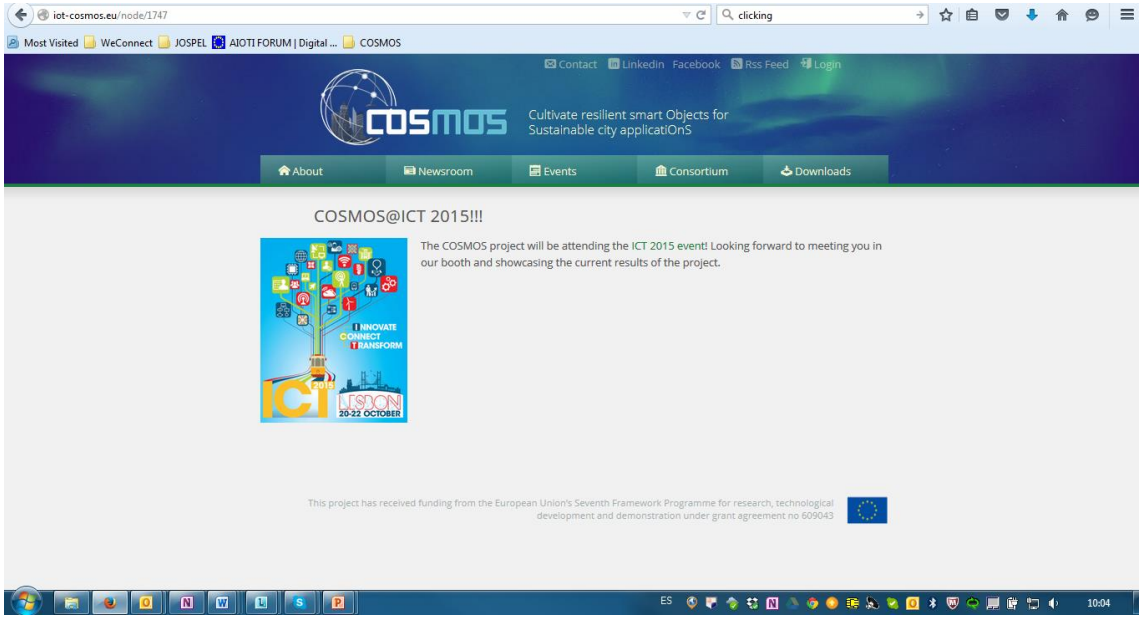
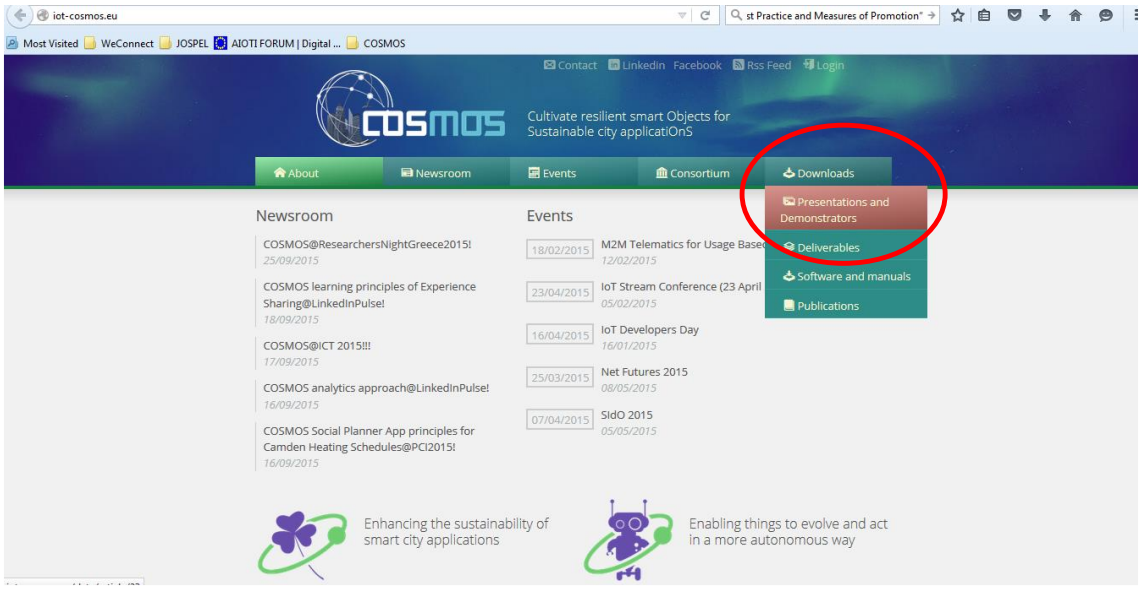




5.1.2.2. Marketing Material on Website

The different material that have been used in dissemination activities have been uploaded to the website. Under the section highlighted in the following figure the material that does not imply any conflict is available.



Moreover, the content that is not directly downloadable, such us posts on LinkedIn, are also linked directly from the project website.

5.1.3. Social Networks Presence

A group for COSMOS in LinkedIn has been created [1]. It has 67 members up to now. The Community has profiles from the ICT and the IoT world. In order to enrich the content of the group and raise awareness, we have created discussions following the publication of relevant articles from COSMOS members in a periodic and per topic manner. A COSMOS Facebook page has been created where, among others, we announce our participation in scientific conferences (Figure 5) and upload photos from major events (Figure 6).

Figure 5: COSMOS Facebook page Timeline

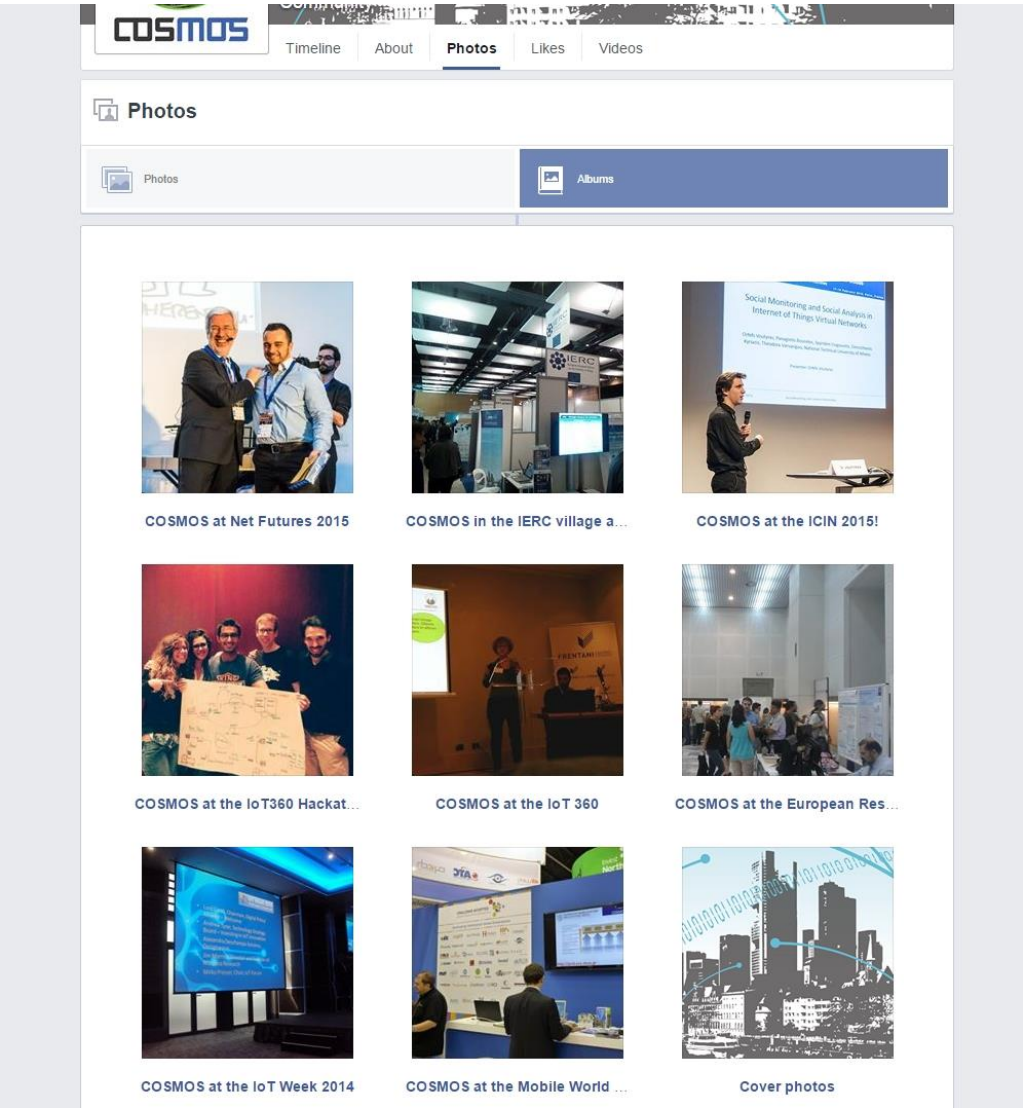


Figure 6: COSMOS Facebook page Photos

5.1.3.1. Regular Announcements before major Activities/Actions

Our social network channels were also used regularly before our attendance in major events, in order to announce our participation and highlight the key aspects around which the demonstrations would revolve. These announcements were performed via the website, Facebook and LinkedIn groups.

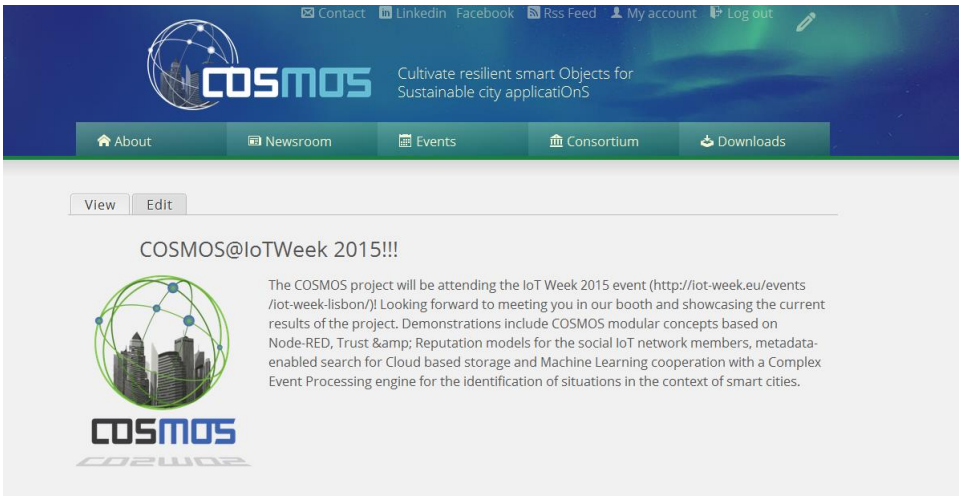


Figure 7: Event announcement participation via the COSMOS web site

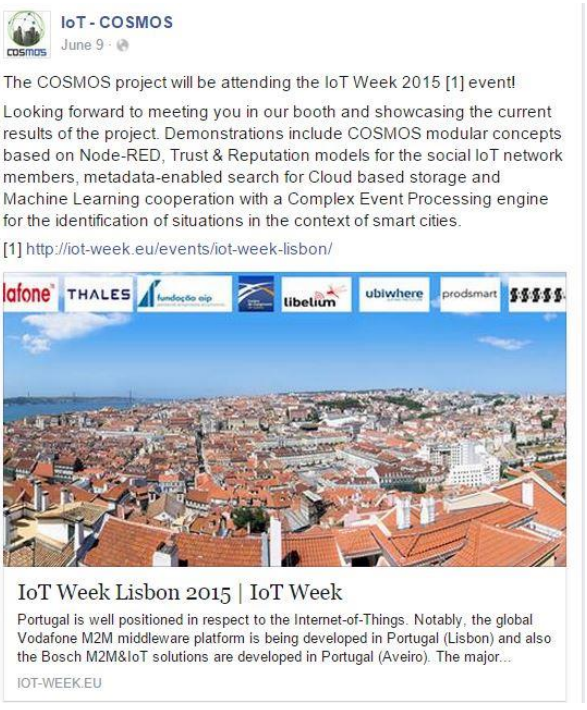


Figure 8: Event announcement participation via the COSMOS Facebook page

Figure 9: Event announcement participation via the COSMOS LinkedIn group

5.1.3.2. Specialized Target Groups

As identified in the strategy, relevant groups of interest may aid in the increased visibility of a COSMOS related post, especially on LinkedIn that is more popular in the corporate networking domain. In order to aid this process, we have identified relevant groups listed in Table 1. While the group size was one of the key aspects for selection, an aspect that is worth noting is the scope of the group. Given that in many cases group rules consider posts like the COSMOS related ones as marketing posts (e.g. the IoT group), there may be limitations either to the category in which they are posted (e.g. ads versus discussions) or to the overall visibility within the group. Thus for example, the OpenStack Forum is more open to generic publications than the pure OpenStack group and even though it is considerably smaller may be more efficient for COSMOS.

Table 1: Identified Key Social Groups/Communities for COSMOS related topics

Medium	Group Name	Group Size	Link
LinkedIn	Cloud Computing	327,295	http://www.linkedin.com/groups/Cloud-Computing-61513/about
LinkedIn	IoT	53,577	http://www.linkedin.com/groups/Internet-Things-73311/about
LinkedIn	SMART CITIES and CITY 2.0	11,839	https://www.linkedin.com/grp/home?gid=1891608
LinkedIn	Artificial Intelligence Applications	5,621	https://www.linkedin.com/grp/home?gid=1802969&trk=my_groups-tile-flipgrp
LinkedIn	Applied Artificial intelligence	10,273	https://www.linkedin.com/grp/home?gid=127447
LinkedIn	Apache Spark	9,300	https://www.linkedin.com/groups?home=&gid=7403611&trk=hp-feed-group-name
LinkedIn	OpenStack Forum	6,278	https://www.linkedin.com/grp/home?gid=6533393
LinkedIn	OpenStac	37,271	https://www.linkedin.com/groups?gid=3239106

	k		
LinkedIn	Security	259,569	https://www.linkedin.com/groups?gid=38412&

5.1.3.3. Hashtag Selection & Relationships Identification

As part of the strategy, the need to combine and enrich a Twitter post with more hashtags exists. However given the limitations in tweet sizes, the selection of which tags to add becomes critical. Thus the process that is suggested for selecting the proper tags can be summarized in the following steps:

1) Identification of the right tags from a variety of linguistic possibilities with relation to the same technical topic
2) Identification of related tags and influencers to the selected one, for co-mentioning

For step 1, when it comes to identifying which similar tags may be used for a concept, the analysis from Ritetag ([33]) may be used. This is helpful especially to identify which tags are overused (red), thus any publication may be lost in the plethora of posts, or not popular enough (blue). The optimal situation is when the tag appears in green, thus indicating a balance in popularity. With regard to the variety of available terms, for example for the work in WP6, that can be mentioned either with #machinelearning or #analytics, the second option is much more favourable (Figure 10). This is more clearly depicted in the detailed statistics of each tag (Figure 11). Also between #iot and #internetofthings, the first term prevails.

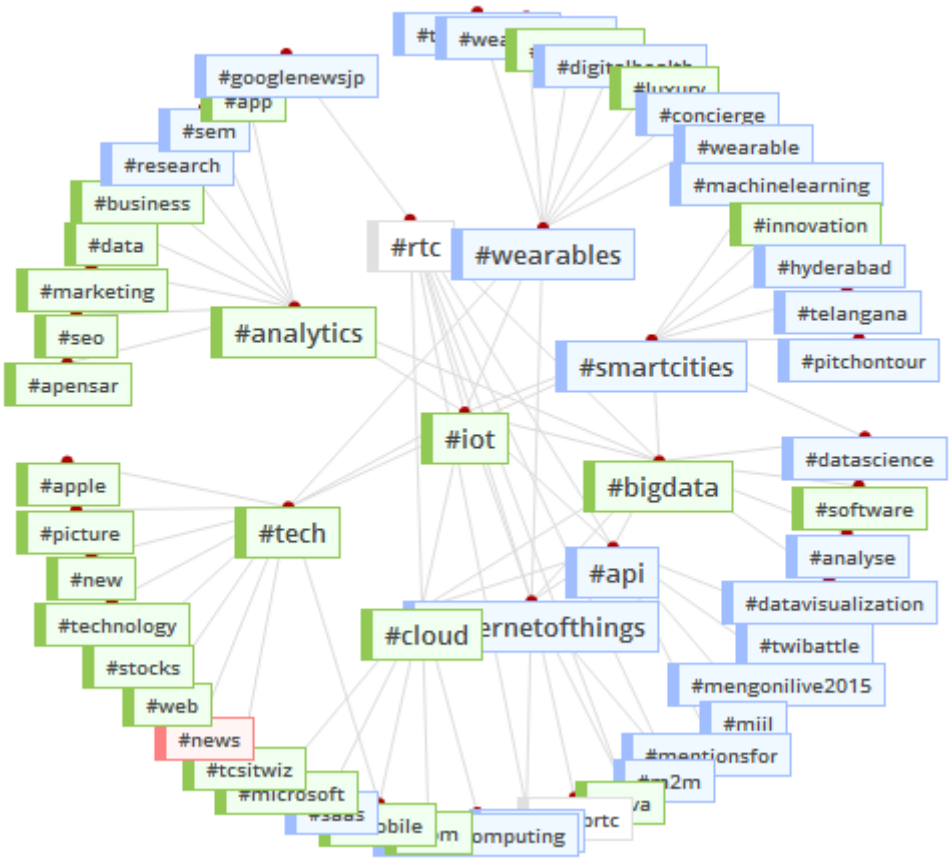


Figure 10: Ritetag analysis of related concepts and tag popularity

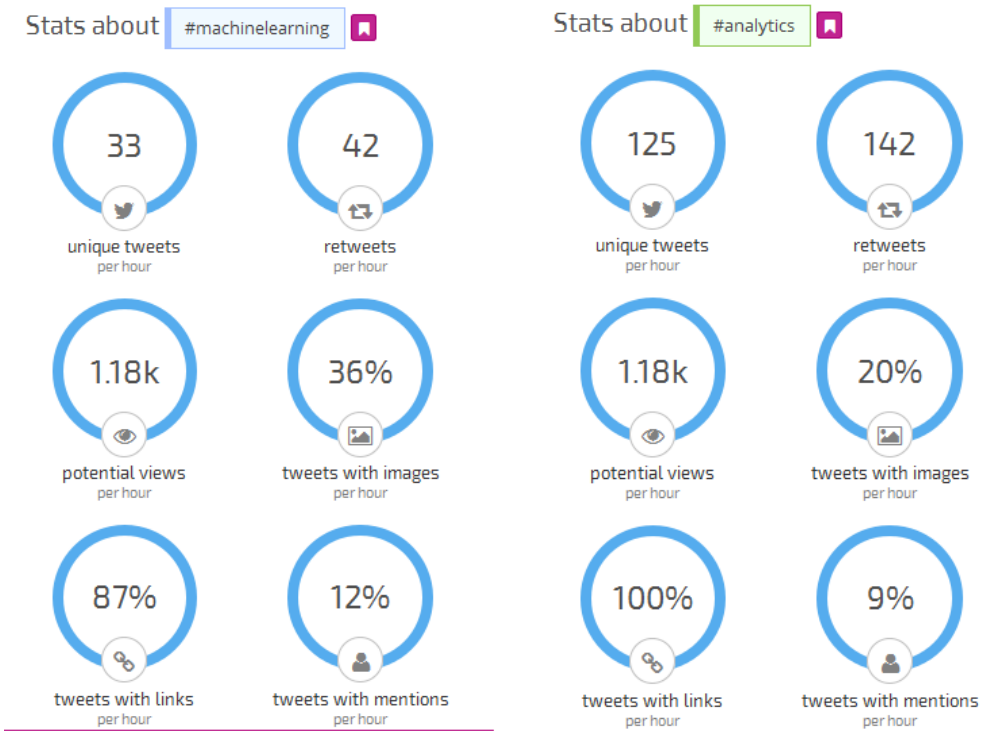


Figure 11: Ritetag statistics comparison of #machinelearning and #analytics

For the second step, in order to identify related hashtags, inputs from step 1 provide the indicative ones (e.g. #IoT) and then the online service of hashtagify.me [22] may be used to indicate relations to other hashtags and influencers (Figure 12, Figure 13). The use of this action is to include all related hashtags per case in the automation process of Figure 2, and thus increase the visibility of the tweets. Furthermore, through this analysis, influencers with relation to this hashtag may also be identified, that if mentioned in the tweets and reply to them, can increase visibility since they are appealing to many followers. An example of such an analysis appears in Figure 12, where the related tags to #IoT are displayed. According to this, highly correlated tags include BigData and InternetOfThings tags. Top influencer for this tag is Intel, followed by CloudExpo and Goldman Sachs. The latter is mainly due to reports issued by the company on the topic ([23]). Thus referencing these reports may aid in the visibility of COSMOS related topics.

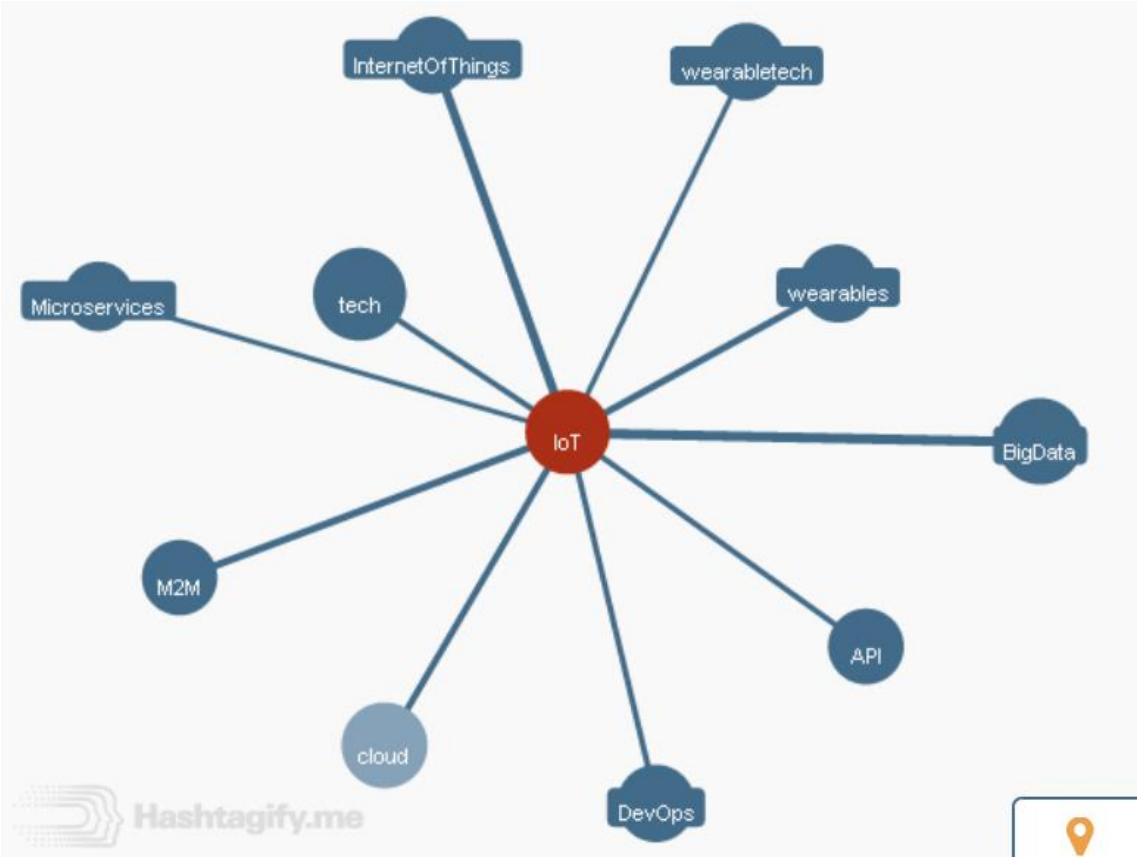


Figure 12: Hashtagify.me analysis of correlated tags to #IoT

For the case of the #Nodered tag (Figure 14), the most important relationships are with the #IoT tag and the #Bluemix tag. For the latter, specifically the dissemination action including the Bluemix platform is expected to significantly raise the visibility of COSMOS, thus the addition of these tags in any announcement should be pursued. A similar analysis may be performed before each announcement of the COSMOS project for the according related topics.

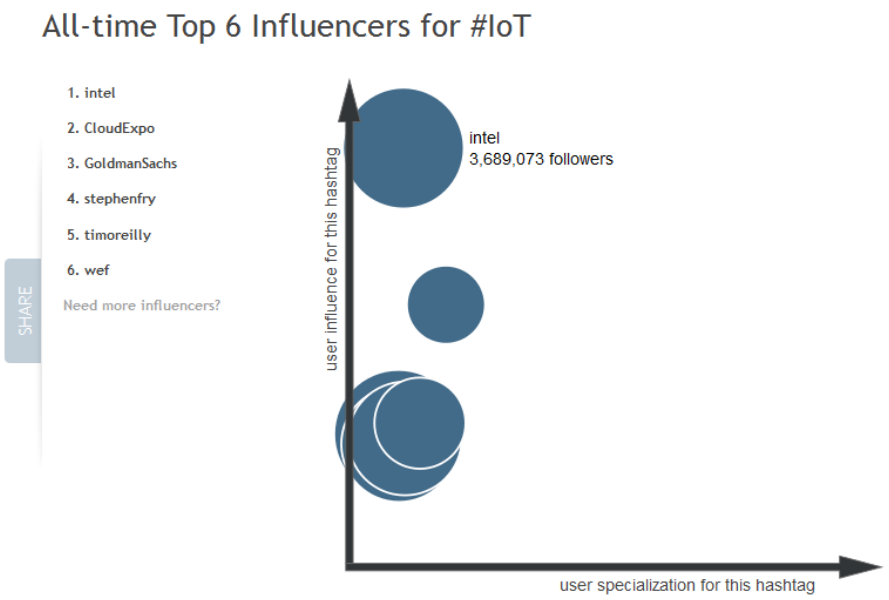


Figure 13: Hastagify.me analysis for top influencers regarding #IoT

Figure 14: Hashtagify.me analysis for #Nodered

This process may be applied for every case of specialized topic of the COSMOS related message categories. For example, in the Cloud storage case it is evident from Figure 15 that we should use the #cloud, since it prevails in terms of statistics. The same applies for the usage of the #socialmedia tag over the #LinkedIn tag.

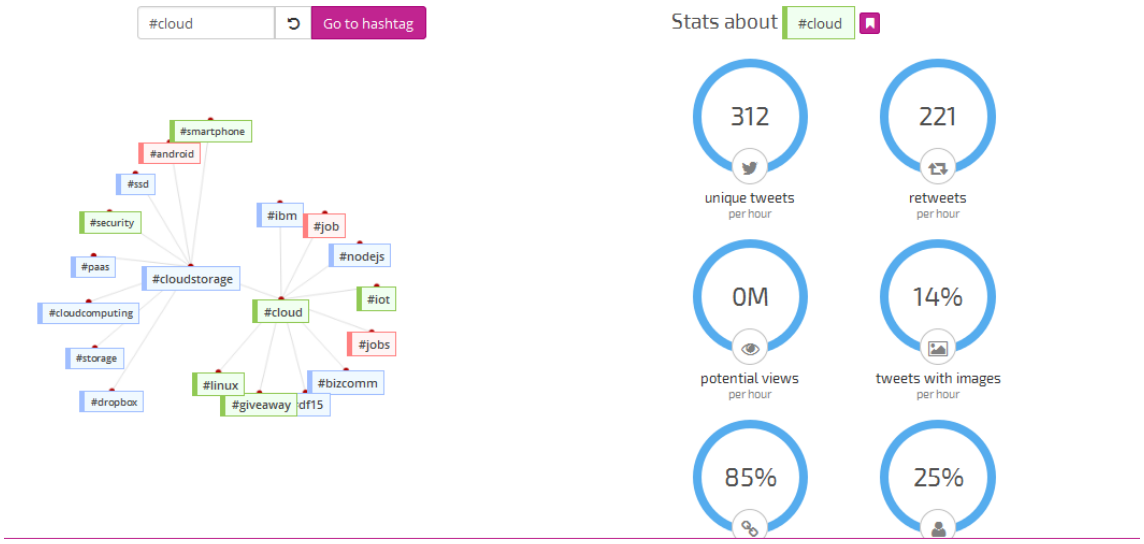


Figure 15: Cloud vs CloudStorage tag analysis

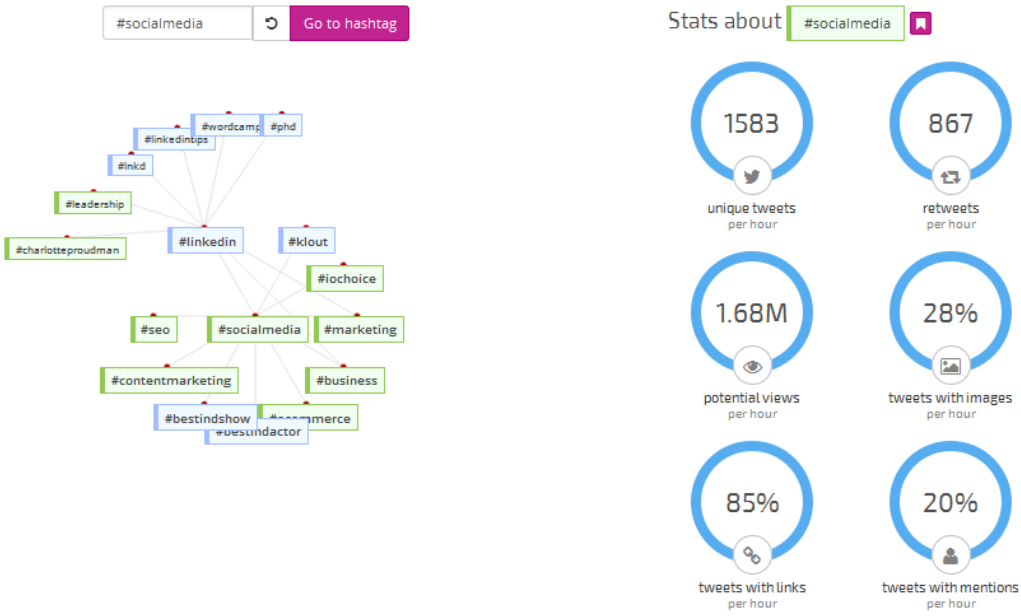


Figure 16: LinkedIn vs Social Media tag analysis

Based on the aforementioned analysis, the following mapping (Table 2) is applied on the Node-Red flow used to create the automated COSMOS tweets. For the groups sharing case, this cannot be performed automatically for LinkedIn, since it is not foreseen by its API. Thus manual sharing on a group level must be performed, based on the identified groups of Table 1. The string conventions we use for identifying each part in a COSMOS announcement is the following:

COSMOS <Topic>@ <Venue>

Venue may be any kind of event, medium, channel etc. The "COSMOS" keyword is necessary to separate the feeds since we also distribute through the website events and news from the general IoT community. Thus the ones starting with "COSMOS" are the ones generated from the project itself.

Table 2: Mapping of announcement keywords to related hashtags and LinkedIn groups according to the analysis

Keyword in COSMOS website announcement	Included hashtags in COSMOS tweets	Forwarded to Groups (IFTTT configuration)
COSMOS	#iot	Default
Pulse	#LinkedInPulse, #SocialMedia	Default
201	Announcement String section from @ to end	Default
Analytics or machine learning or Spark	#analytics	Default+Apache Spark group
Partner name	@Partner_name	Default
Storage or Openstack or Swift	#cloud	Default+Cloud Computing group, Openstack Forum
Planner or Experience Sharing	#artificialintelligence	Default+Applied AI+ AI applications
Security or encryption	#security	Default+Security
Node-Red	#nodered	Default
Madrid	#smartcities	Default+ SMART CITIES and CITY 2.0
Camden or Taipei	#smarthomes	Default

5.1.3.4. Specialized Publications in LinkedInPulse

According to the Social Networks strategy presented in 2.1, the project has created a series of LinkedIn Pulse posts, focusing on specific aspects per case. Necessary cross-references to the project's web site, deliverables or scientific publications have been included in order to guide readers towards more information sources. Following, the posts created so far are mentioned.

5.1.3.4.1. COSMOS Social Pack LinkedIn Pulse Post

The initial published post relates to a generic article (Figure 17) regarding the relation of the COSMOS social aspects to generic learning theories and introductory concepts used within the project. Relevant links were provided towards COSMOS research papers, deliverables and the website. The post was also shared to a relevant IoT group, however given that from the demographics (Figure 18) we identified that we could boost its visibility to more administrative and city authorities groups, we shared it also through a relevant open group regarding smart

cities (Smart Cities and City 2.0, 12,000 members, https://www.linkedin.com/grp/home?gid=1891608). What is critical in this case is that the used groups are also open to publications, since in many cases posts are limited by the group owners. The post has received 171 vies, 12 likes and 3 shares to date (July 2015). From the demographics it can be concluded that an extensive geographic area was reached, including many locations not involving COSMOS partners (60%), and the main expertise affected was Computer software and development. What is more, significantly high are percentages related to manufacturing (39%), indicative again of the reach to wider audiences, external to the project.

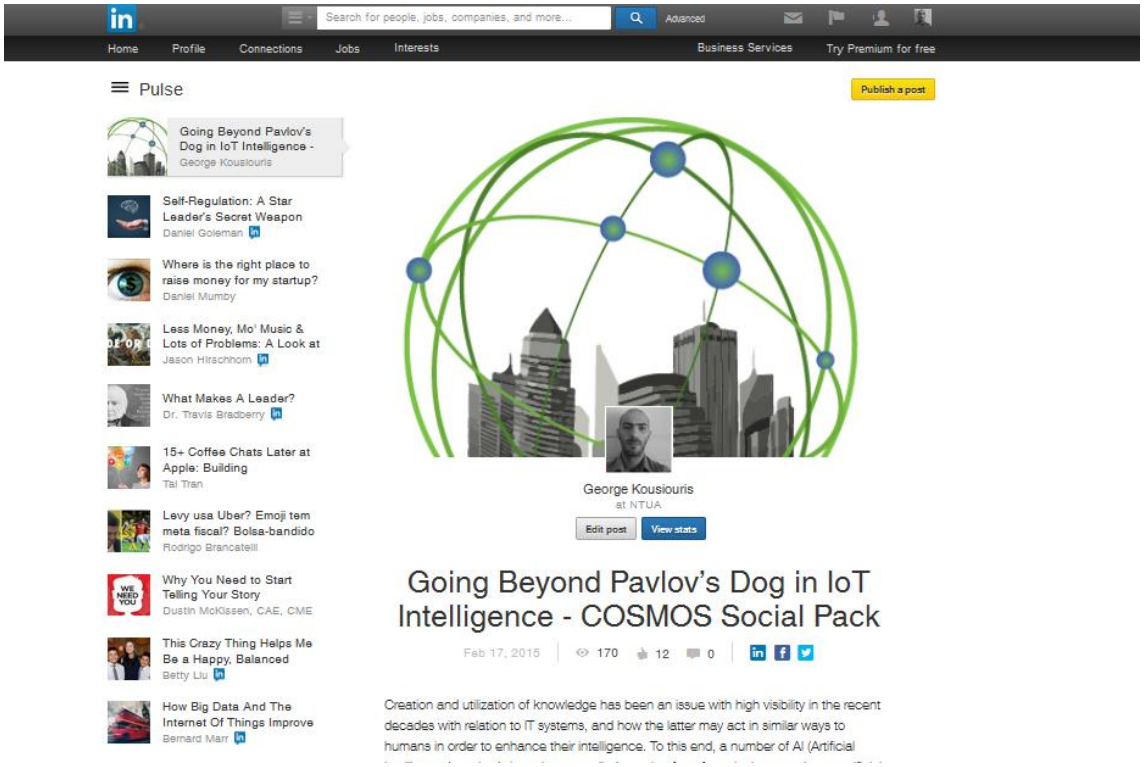


Figure 17: COSMOS Social Pack LinkedIn Pulse post

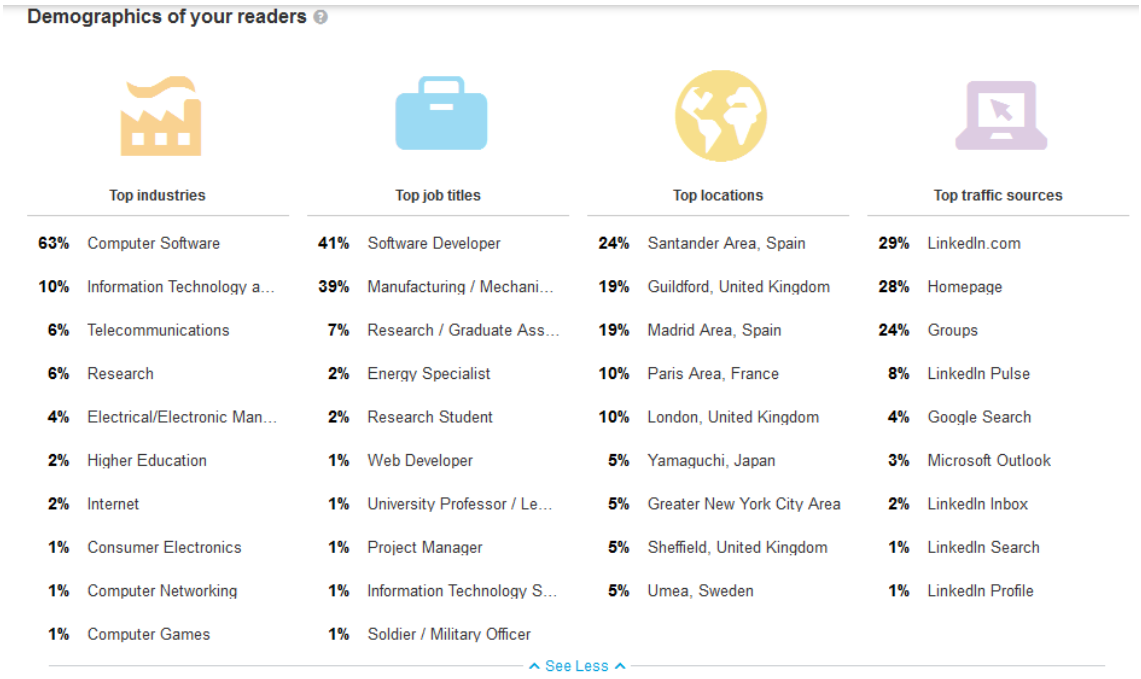


Figure 18: COSMOS Social pack post demographics

5.1.3.4.2. "The IoT Rubicon Crossover: Merging Machine Learning with CEP for Proactive IoT Applications" LinkedIn Pulse Post

Another Pulse post [32] was created in order to demonstrate the COSMOS work on bridging machine learning approaches with CEP technologies (Figure 19). The article included an introduction on the basic concepts of ML and CEP as well as initial information on how these are combined in the context of the applications.

Figure 19: LinkedIn Pulse article on ML and CEP collaboration

5.1.3.4.3. "The Little Friend Supported Device that Could" LinkedIn Pulse Post

Another Pulse post [31] was created in order to highlight the experience sharing mechanisms of COSMOS (Figure 20), working together with the CBR cases in the context of IoT. The post was shared in relevant groups

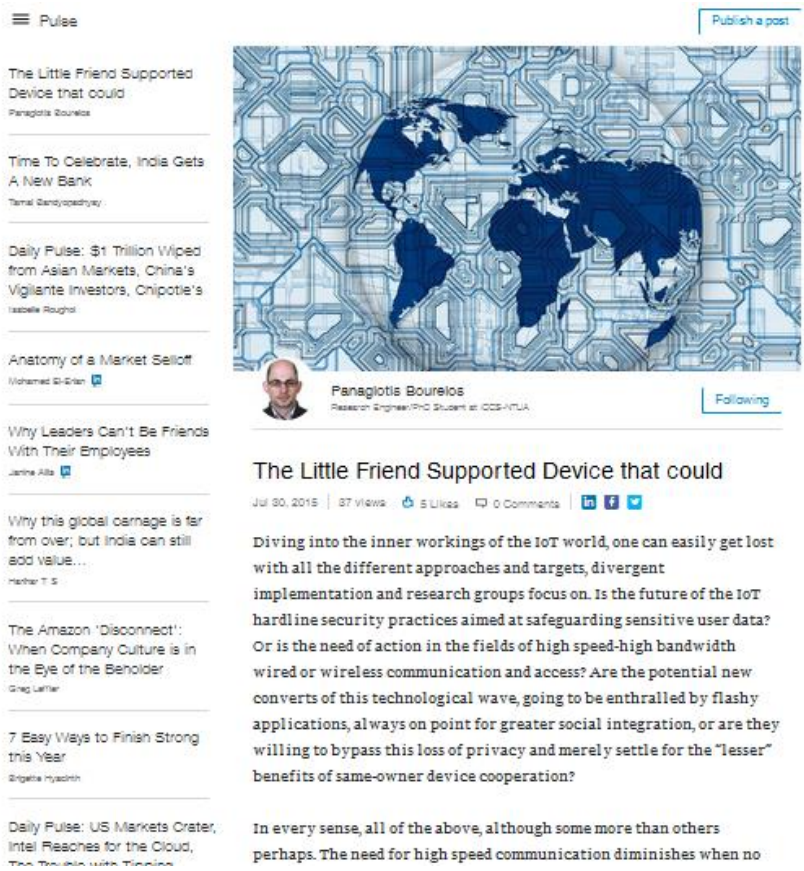


Figure 20: LinkedIn Pulse post on Experience Sharing

5.2 Promotional Material

5.2.1. Flyer

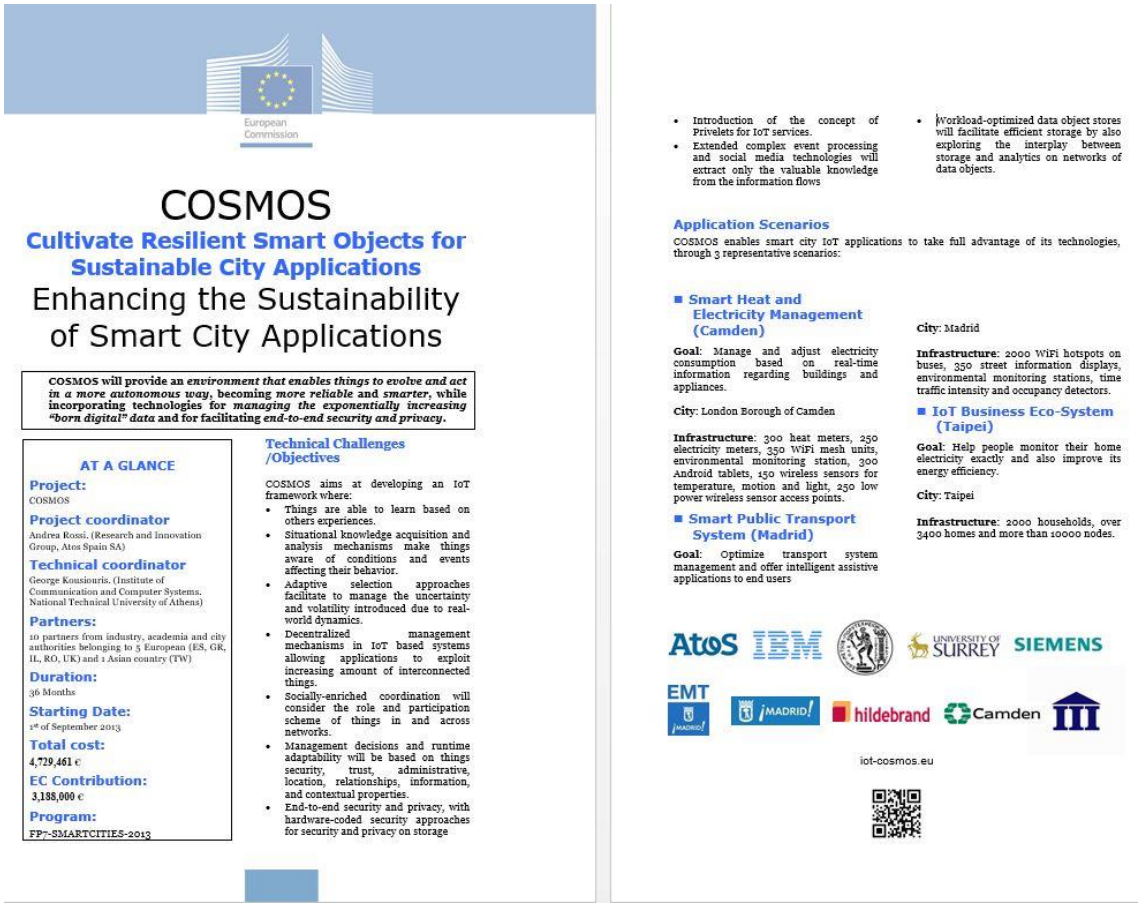
We considered useful, in order to promote our work and make our project known, to produce flyers.

The flyer of the project (Figure 21) contains the following items:

- an overall description of the project, short and easy to read for a broad non-expert audience.
- the major innovations developed on the project.
- areas of application and some descriptions of application scenarios.
- the website URL and a barcode, through which anyone interested could be further informed.

Figure 21: COSMOS Flyer

An updated version of the flyer (Figure 22) was produced in order to include Taipei use case and also provide more details about the application scenarios.



European Commission

COSMOS

Cultivate Resilient Smart Objects for Sustainable City Applications

Enhancing the Sustainability of Smart City Applications

COSMOS will provide an *environment that enables things to evolve and act in a more autonomous way*, becoming *more reliable* and *smarter*, while incorporating technologies for *managing the exponentially increasing "born digital" data* and for facilitating *end-to-end security and privacy*.

AT A GLANCE

Project: COSMOS

Project coordinator
Andrea Rossi. (Research and Innovation Group, Atos Spain SA)

Technical coordinator
George Kousiouris. (Institute of Communication and Computer Systems, National Technical University of Athens)

Partners:
10 partners from industry, academia and city authorities belonging to 5 European (ES, GR, IL, RO, UK) and 1 Asian country (TW)

Duration:
36 Months

Starting Date:
1st of September 2013

Total cost:
4,729,461 €

EC Contribution:
3,188,000 €

Program:
FP7-SMARTCITIES-2013

Technical Challenges /Objectives

COSMOS aims at developing an IoT framework where:

- Things are able to learn based on others experiences.
- Situational knowledge acquisition and analysis mechanisms make things aware of conditions and events affecting their behavior.
- Adaptive selection approaches facilitate to manage the uncertainty and volatility introduced due to real-world dynamics.
- Decentralized management mechanisms in IoT based systems allowing applications to exploit increasing amount of interconnected things.
- Socially-enriched coordination will consider the role and participation scheme of things in and across networks.
- Management decisions and runtime adaptability will be based on things security, trust, administrative, location, relationships, information, and contextual properties.
- End-to-end security and privacy, with hardware-coded security approaches for security and privacy on storage

- Introduction of the concept of Privelets for IoT services.
- Extended complex event processing and social media technologies will extract only the valuable knowledge from the information flows
- Workload-optimized data object stores will facilitate efficient storage by also exploring the interplay between storage and analytics on networks of data objects.

Application Scenarios

COSMOS enables smart city IoT applications to take full advantage of its technologies, through 3 representative scenarios:

Smart Heat and Electricity Management (Camden)

Goal: Manage and adjust electricity consumption based on real-time information regarding buildings and appliances.

City: London Borough of Camden

Infrastructure: 300 heat meters, 250 electricity meters, 350 WiFi mesh units, environmental monitoring station, 300 Android tablets, 150 wireless sensors for temperature, motion and light, 250 low power wireless sensor access points.

Smart Public Transport System (Madrid)

Goal: Optimize transport system management and offer intelligent assistive applications to end users

City: Madrid

Infrastructure: 2000 WiFi hotspots on buses, 350 street information displays, environmental monitoring stations, time traffic intensity and occupancy detectors.

IoT Business Eco-System (Taipei)

Goal: Help people monitor their home electricity exactly and also improve its energy efficiency.

City: Taipei

Infrastructure: 2000 households, over 3400 homes and more than 10000 nodes.

Atos IBM UNIVERSITY OF SURREY SIEMENS EMT ¡MADRID! hildebrand Camden

iot-cosmos.eu

Figure 22: COSMOS Flyer Update

5.2.2. Bookmarks

Another type of promotional material we thought about was bookmarks (Figure 23) that we could share in any event we would be asked to present COSMOS. The use of them is similar with the flyers.

The bookmarks also contain:

- a brief description of the project, short and easy to read.
- the partners list, everyone involved in the development of the project.
- the website URL and a barcode, through which anyone interested can be further informed.

Figure 23: COSMOS Bookmarks

5.2.3. USB Flash Drives

We thought of printable USB sticks as a great opportunity to promote our project. A USB flash drive is mandatory for conferences and a very useful “tool” in general. So, we ordered some pieces to distribute them on any chance. The USB flash drive has the COSMOS logo printed on it and a URL that directs to the website our project already has. We pre-loaded the flash drives with all the useful information anyone interested should know about the project and we expect this move to be effective on the dissemination plan of COSMOS.

5.2.4. Poster

Another object that we created in the context of the presentation and dissemination of the project, whenever we will be called to present it, is a poster.

Therefore we designed a poster for the entire lifecycle of the project, which will be with us in several events, such as special workshops, demonstration events and conferences.

The poster is designed to provide general information about the project, like the flyer, the innovations with which we work and develop, the partners list and the case scenarios considered.

The first appearance of the poster was on “IoT Week”, an event which took place in London.

The poster is presented in Figure 24.

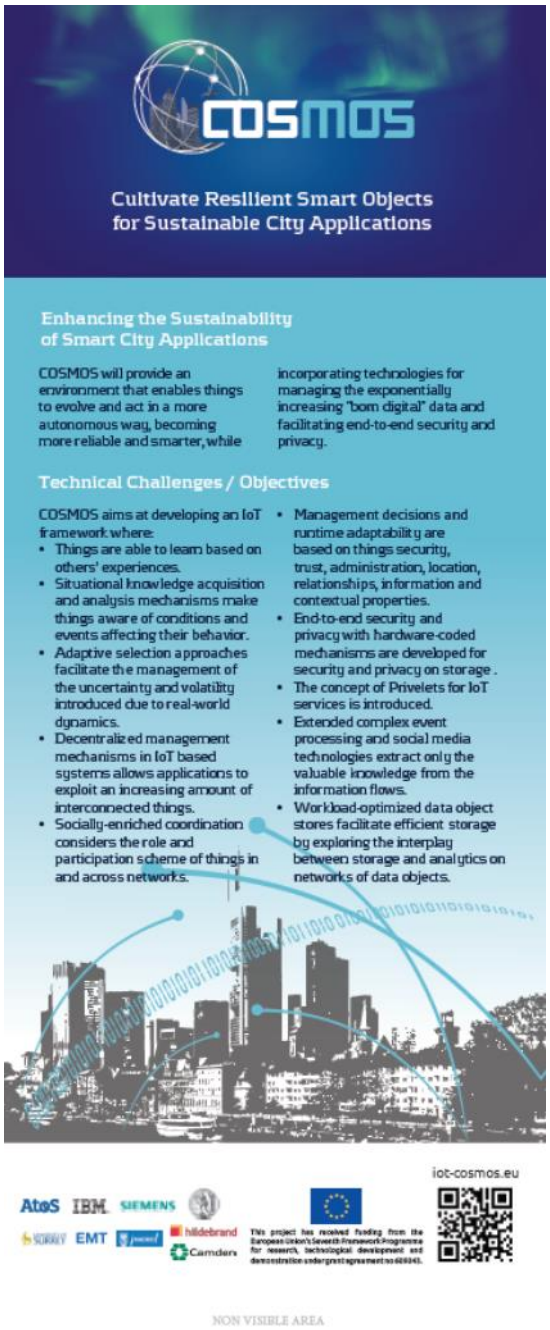


Figure 24: COSMOS Poster

5.2.5. Newsroom

The COSMOS Newsroom is electronic and the first news feed was published on April 2014. Through the Newsroom we:

- help people to get a first touch with the term “Internet of Things”;
- explain the general aim and goals of the COSMOS project;

- inform people about the latest results of the project, release of public deliverables and other publications, events where we have been present, future actions we plan to perform etc.

A screenshot of the Newsroom is provided in Figure 25.

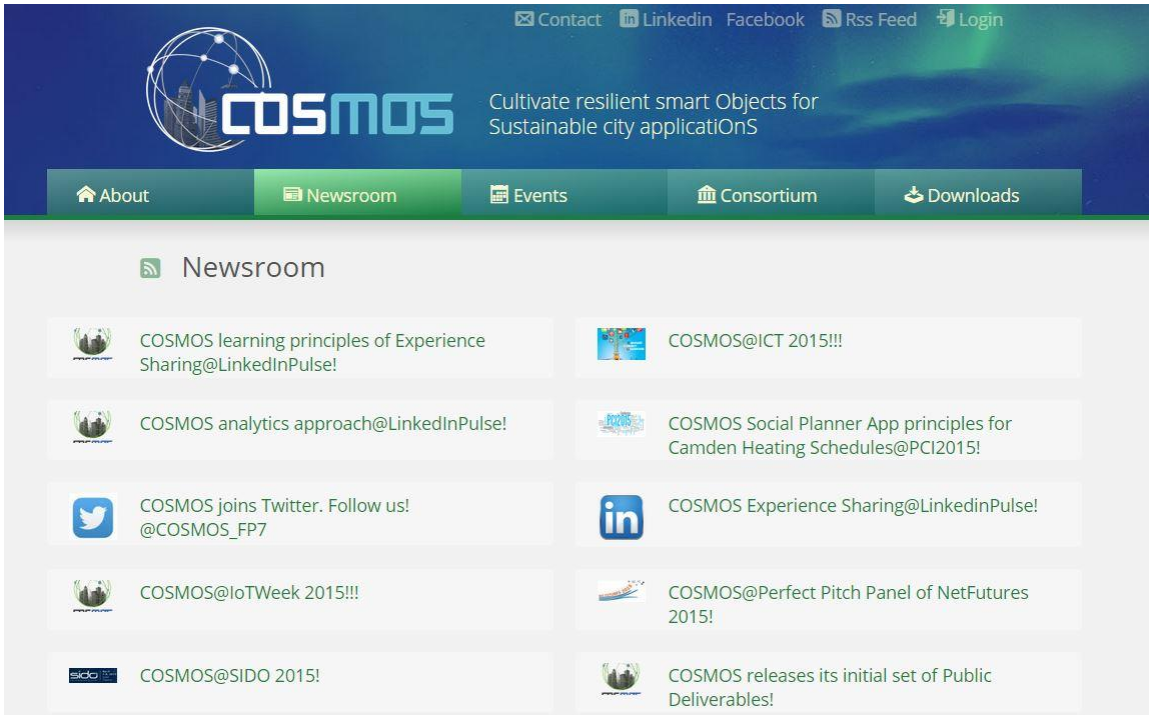


Figure 25: COSMOS Newsroom for Updates

Furthermore, anyone will be able, through the project website, to download and access the news and the public deliverables, at any moment, without the need to be subscribed.

A project Newsletter intends to disseminate the most recent news of the project to a broad audience that may either belong to a specific technology sector or be classified within the general public audience. Our website offers the option of Downloads/Publications [38], from where anyone interested can retrieve our newsletters and be informed about COSMOS.

5.2.6. Press Releases

The publication of press releases in national and international media is an efficient way to reach a broad audience. Therefore, the possibility to publish press releases will be investigated by all the partners in the consortium in their respective countries and organisations.

They can be either general articles including general concepts of the project or more specialised articles on concrete topics, targeted to specific sectors press. Their purpose is usually to announce something recently occurred or to taking place in the near future, therefore COSMOS press releases will be published coinciding with major milestones of the project (e.g. release of a prototype, demonstration event, release of a concrete technology innovation etc.). They can be published in different media, from newspapers and magazines to radio and TV stations.

At this early stage of the project, initial press releases are issued by the partners to inform the public about the project's start and its objectives.

On the 12th of May 2014, IBM made an announcement in an event in Boston called Signature Moment. IBM announced Elastic Storage and as a glimpse into the future included Storlets in this announcement. It also mentions that Storlets are developed in the context of several EU funded projects. COSMOS is one of these projects. However, it was not mentioned specifically in the announcement since it is a much newer project than those mentioned and specific COSMOS Storlets had not yet been developed or demonstrated at the time of the announcement.

The event is available for replay at [3]. Storlets are described by Michael Factor, a Distinguished Engineer from the IBM Haifa Research Lab from minute 38 until minute 48. A description of Storlets is also included in Michael Factor's blog entitled "Storlets: Turning Object Storage into a Smart Storage Platform" [4].

5.2.7. Multimedia Recordings

Multimedia recordings, such as promotional or demonstration videos illustrating the main concepts of the project, are envisioned to be produced.

They will serve as a support to present the project in different events, workshops and as demonstration and training material. The target audience can be of every nature, being thus a general kind of dissemination channel to introduce the project to the interested people that can, in future, follow the progress through more specific dissemination tools. The relevant material may also be uploaded on YouTube [5] or made available through the COSMOS web-site, in order to gain more visibility (for the case of YouTube) and direct people on the main source of documentation for the project (the COSMOS web site).

5.3 Publications

5.3.1. Scientific Journals

The DoW provides a long list of Journals we are going to address for the publication of COSMOS results, depending obviously on the particular technical focus of the publication. In general, universities tend to favour journals with a high impact factor like IEEE [6] or ACM series. The following lines describe some new journals which were not yet identified during the writing of the proposal:

- **IEEE Internet of Things Journal:** Newly created (1st issue beginning of 2014), the IEEE IoT-J publishes papers on the latest advances, as well as review articles, on the various aspects of IoT from open call and special issues. Topics will include IoT system architecture, IoT enabling technologies, IoT communication and networking protocols, IoT services and applications, and the social implications of IoT. Examples are IoT demands, impacts, and implications on sensors technologies, big data management, and future internet design for various IoT use cases, such as smart cities, smart environments, smart homes, etc. The fields of interest include:
    - IoT architectures such as things-centric, data-centric, service-centric architecture, CPS and SCADA platforms, future Internet design for IoT, Cloud-based IoT, and system security and manageability.

  - IoT enabling technologies such as sensors, radio frequency identification, low power and energy harvesting, sensor networks, machine-type communication, resource-constrained networks, real-time systems, IoT data analytics, in situ processing, and embedded software.
  - IoT services, applications, standards, and test-beds such as streaming data management and mining platforms, service middleware, open service platform, semantic service management, security and privacy-preserving protocols, design examples of smart services and applications, and IoT application support.

- **IEEE Communications Surveys & Tutorials:** IEEE Communications Surveys & Tutorials is an online journal published by the IEEE Communications Society for tutorials and surveys covering all aspects of the communications field. Telecommunications technology is progressing at a rapid pace, and the IEEE Communications Society is committed to providing researchers and other professionals the information and tools to stay abreast. IEEE Communications Surveys and Tutorials focuses on integrating and adding understanding to the existing literature on communications, putting results in context. Whether searching for in-depth information about a familiar area or an introduction into a new area, IEEE Communications Surveys & Tutorials aims to be the premier source of peer-reviewed, comprehensive tutorials and surveys, and pointers to further sources. IEEE Communications Surveys & Tutorials publishes only articles exclusively written for IEEE Communications Surveys & Tutorials and go through a rigorous review process before their publication in the quarterly issues.
- **IEEE Transaction on Cloud Computing (TCC):** IEEE Transactions on Cloud Computing will publish peer-reviewed articles that provide innovative research ideas and applications results in all areas relating to Cloud computing. The transactions will consider submissions specifically in the areas of Cloud security, standards, architecture, development tools, applications management, and more. For further information, visit http://www.computer.org/portal/web/tcc. IEEE Transactions on Cloud Computing is now accepting manuscript submissions. To submit your manuscript, please use the ScholarOne Manuscripts manuscript submission site. - See more at: http://Cloudcomputing.ieee.org/publications#sthash.fBY79pa9.dpuf.

5.3.2. Conferences, Workshops and other Events

Similarly with the journal publications, we will tend to favour Conferences and Workshops which are affiliated to IEEE or ACM because of a higher impact factor. Among the most well-known conferences we can find –in addition to the list already identified in the DoW- are:

- **IEEE international conference on Internet of Things** (iThings-2015)
  - Dates to be announced;
- **IEEE International conference on Communications** (ICC-2015):
  - Paper Topic: “Contextual Occupancy Detection Using Non-Intrusive Load Monitoring”;
  - Paper Submission Deadline: 15th Sep, 2014;
- **IEEE International Conference on Future Internet of Things and Cloud** (FiCloud-2015):
  - Dates to be announced;
- **IEEE International Conference on Intelligent Sensors, Sensor Networks and Informative Processing** (ISSNIP 2015)
  - Dates to be announced;

5.3.3. Performed Publications

5.3.3.1. Y1 Publications

- **18th Panhellenic Conference on Informatics** (PCI2014) [7]. COSMOS submitted a paper with title "Achieving Autonomicity in IoT systems via Situational-Aware, Cognitive and Social Things" and authors: Orfefs Voutyras, Spyridon V. Gogouvitis, Achilleas Marinakis, Theodora Varvarigou, on the conference which took place on 02-04/10/2014 in Athens, Greece, was accepted and published on the conference proceedings by ACM in ICPS after the presentation of the paper.
- **Third International Workshop on Internet of Things Communications and Technologies** (IoT-CT 2014) [8]. The workshop took place on 08-10/10/2014 Larnaca, Cyprus. COSMOS submitted a paper there with title "An Architecture supporting Knowledge flow in Social Internet of Things systems" and authors: Orfefs Voutyras, Panagiotis Bourelos, Dimosthenis Kyriazis, Theodora Varvarigou which was also accepted and presented at the conference. The paper is included in the conference proceedings of WiMob 2014 and IEEE Xplore.
- **IEEE International Conference on Communications.** The event took place on 08-12/06/2015. COSMOS has submitted a paper with title "Contextual Occupancy detection using Non-Intrusive Load Monitoring for Smart Office" and authors: Adnan Akbar, Michele Nati, Francois Carrez, Klaus Moessner.

5.3.3.2. Y2 Publications

- **ICIN** [40] 2015 was held on 17-19 February 2015, kindly hosted by Orange Labs in Paris and was organised around 4 tracks on Service Webification, Online Social Networks, Network IT-isation and Internet of Things, chaired by Roch Glitho, Bruce Maggs, Jiangtao Wen and Raouf Boutaba. COSMOS submitted a paper at the conference with title "Social Monitoring and Social Analysis in Internet of Things Virtual Networks" and authors: Orfefs Voutyras, Panagiotis Bourelos, Spyridon Gogouvitis, Dimosthenis Kyriazis and Theodora Varvarigou and was also accepted and presented at the conference. The paper is included in the conference proceedings and is available in IEEE Xplore too. Credits to Imran Khan for the photos.
- **19th Panhellenic Conference on Informatics** (PCI2015) [41]. COSMOS submitted a paper titled "Heating Schedule Management Approach through Decentralized Knowledge Diffusion in the Context of Social Internet of Things" and authors: Panagiotis Bourelos, Orfefs Voutyras, George Kousiouris, Theodora Varvarigou, on the conference which will take place on 01-03/10/2015 in Athens, Greece, was accepted and will be published on the conference proceedings by ACM in ICPS after the presentation of the paper.
- **12th European Mediterranean & Middle Eastern Conference on Information Systems** [42] took place on 01-02/06/2015 in Athens, Greece. COSMOS submitted a paper there with title "A Cross Layer Management Framework for Achieving Added Value IoT Services" and authors: Achilleas Marinakis, Spyridon Gogouvitis, Dimosthenis Kyriazis, George Kousiouris, Panagiotis Bourelos, Orfefs Voutyras and Theodora Varvarigou, which was accepted and presented at the conference.

- **IEEE World Forum on Internet of Things.** COSMOS has submitted a paper in 2nd IEEE world forum on Internet of things which will be held in Milan from 14th to 16th Dec, 2015 with the title "***Predicting Complex Events for Pro-Active IoT Applications***" and authors are Adnan Akbar, Francois Carrez, Klaus Moessner and Ahmed Zoha.
- **IEEE World Forum on Internet of Things.** COSMOS has submitted another paper in 2nd IEEE world forum on Internet of things which will be held in Milan from 14th to 16th Dec, 2015 with the title "***Context-Aware Stream Processing for distributed IoT Applications***" and authors are Adnan Akbar, Francois Carrez, Klaus Moessner, Juan Sancho and Juan Rico.

5.4 Events

There is a wide range of events that can offer us visibility, networking and dissemination/communication opportunities. On such events, which are more "Dissemination & Networking" oriented ones than purely scientific, we will be able to demonstrate our work and our results. In paragraphs 5.4.1 and 5.4.2 we list relevant events that we have attended during Y1 and Y2 of the project respectively, whereas in 5.4.3 we describe the events that we will attend in the future.

5.4.1. Y1 Attended Events

5.4.1.1. Mobile World Congress

The GSMA Mobile World Congress [9] is the place where mobile leaders gather, collaborate and conduct business. The annual event provides the planet's best venue for mobile industry networking, new business opportunities and deal-making. Mobile World Congress includes a world-class conference featuring visionary keynotes and action-provoking panel discussions; an exhibition with more than 1,800 companies displaying the cutting-edge products and technologies that define the future of mobile; App Planet; and the annual Global Mobile Awards ceremony, which recognises the most innovative mobile solutions and initiatives from around the world. In 2014, Mobile World Congress hosted more than 85,000 mobile professionals from more than 200 countries in our largest-ever event. Make your plans now to be part of the excitement at Mobile World Congress 2015, in the Mobile World Capital, Barcelona. The exhibition was organised on 24-27 February 2014 in Barcelona with main subject on the mobile industry. COSMOS was presented on a wide industrial and general audience and showed great success via a general rolling presentation and a stand-alone poster.

5.4.1.2. Future Internet Assembly

FIA Athens 2014 [10] took place at the Megaron Athens International Conference Centre. FIA Athens has featured an exhibition of innovative ICT projects, technologies and their demonstrations. The aim was to provide Future Internet stakeholders and other participants with up-to-date information and a hands-on experience on the latest Future Internet applications, systems and services, prototypes and innovative solutions. Moreover, the exhibition aimed at addressing key questions for delegates and providing an informal networking environment. COSMOS showed participation in the FIA event which took place in

Athens on 17/3/2014 where has been a general presentation of the project and the objectives that we aim for.

5.4.1.3. IoT Week

The IoT week [11] is a yearly event organised by the IoT Forum [20]. The IoT Week 2014 was hosted in London between the16th and 20th June at the Grange Tower Bridge Hotel located in the heart of the city. The event was the pre-eminent event attracting industry and academia from around the world. Building on the successes of Helsinki, Venice and Barcelona, the IoT Week London continues the journey,

- Bringing focus to the emerging opportunities;
- Connecting the global business and research communities innovating at the boundaries of IoT;
- Promoting international collaboration and addressing societal and market issues.

The 2015 event was organised in Lisbon – Portugal on 16-18/6/2015. In the former 2014 event COSMOS had a booth for early dissemination of project objectives and early results (in the form of slide sets, brochures, USB flash drives and a roll-up poster in particular). More interest on the project was shown on the planned autonomous nature of virtual entities, the Cloud storage technologies used and the potential scenarios regarding the implementation of the project. The exhibitors of the project had the chance to attend certain presentations relevant to the main goals of COSMOS such as “Smart IoTs - Edinburgh Napier University”, “ARM - small data, big data” and “Smart Homes & Buildings Association- IoT-Bay”. A software demonstration of the project results will be ensured during the two next IoT Week events.

Figure 26: COSMOS Booth in IoT Week

5.4.1.4. European Researchers' Night

European Researcher's Night [12] is a mega event which takes place every year simultaneously in several hundred cities all over Europe. This year, among other venues in Greece, the event took place in NTUA's premises in downtown Athens, on Friday, 26 September 2014 between 18:00 and 24:00. It addresses mainly the general public but also fellow researchers, NTUA students etc.

COSMOS was included in the DKMS lab booth (Figure 27, Figure 28) and material from the project was made available through the following channels:

- DKMS Lab presentation through a projector, including all of the lab projects with main highlights and achievements (Figure 30)
- Distribution of the COSMOS Factsheet and bookmarks in a printed version (Figure 29)

Furthermore, we were enquired throughout the event regarding current hot topics and directions in the industry, giving us the chance to disseminate COSMOS goals and the generic concepts of Internet of Things and Big Data.

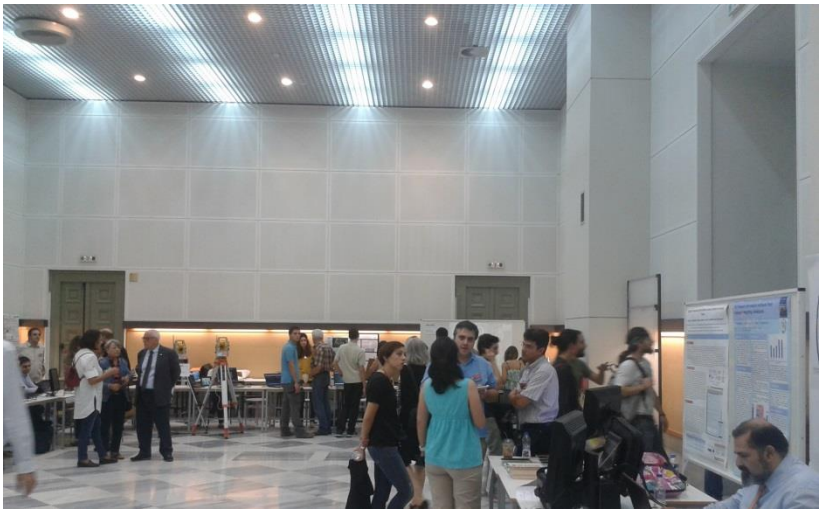


Figure 27: Researcher's Night Exhibition Room

Figure 28: DKMS Lab Booth

Figure 29: COSMOS Dissemination Material

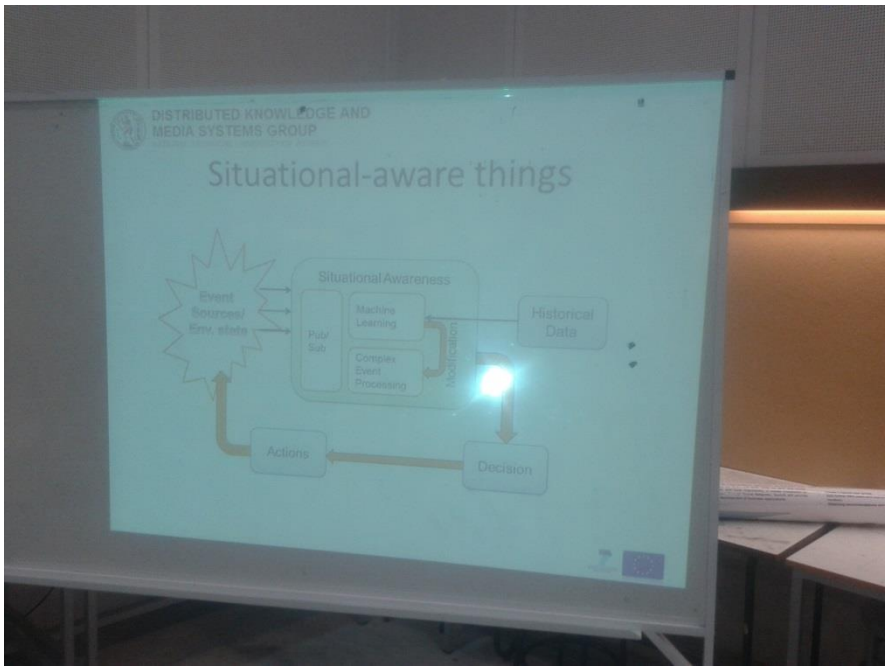


Figure 30: Presentation of main COSMOS Concepts

5.4.2. Y2 Attended Events

5.4.2.1. IoT 360

The IoT360 [13] is a unique event bringing a 360 degree perspective on IoT-related projects and activities and aiming to coach involved people on the whole path between research to innovation and all the way through to commercialisation of ideas, projects and technologies. The Summit is a powerful and inspirational event that brings together industry representatives, makers, vendors, experts, developers and others to plan, learn, network, collaborate, strategize and more effectively tap into the immense potential of the IoT domain. The event offers a wide set of activities among which tutorials, presentations, panels and keynotes covering new methods to accelerate in the market, monetize technologies & IPR and raise funds in Europe. Structured professional networking to turn cutting edge into business through exploitation and commercialisation opportunities is a key priority. The event took place in Rome – Italy on 28-29/10/2014. We participated through a presentation alongside with a recorded demo titled "Building a Privacy Preserving Data Service" The demo introduced the concept of Storlets used for achieving facial blurring and thus enabling people to retain privacy when their photos are securely uploaded in the cloud storage. Moreover, COSMOS participated in the IoT360 Hackathon (ALMANAC) Challenge 2014. The COSMOS participant along with other team members came up with the best smart city application for improving and optimizing the waste management system of the city of Torino and won the first prize!

Figure 31: COSMOS Participation in IoT360 2014

5.4.2.2. OpenStack Summit 2014

The OpenStack Summit [14] is a five-day conference for developers, users, and administrators of OpenStack Cloud Software. It's a great place to get started with OpenStack. The Design Summit sessions are collaborative working sessions where the community of OpenStack developers come together twice annually to discuss the requirements for the next software release and connect with other community members. It is not a classic track with speakers and

presentations. The event took place in Paris on 3-7/11/2014. The thematic area of the event that we were interested in was “OpenStack - Cloud Storage and Compute Platform”. COSMOS participated and also IBM Research Haifa presented 2 sessions related to our work: A) "The Perfect Match: Apache Spark Meets Swift" [34] and B) "Docker Meets Swift: A Broadcaster's Experience" [35].

5.4.2.3. NetFutures 2015

COSMOS project was present on the 25th and 26th of March 2015 in Net Futures conference in Brussels. The scope of NET FUTURES is to maximize competitiveness of the European technology industry. During the two days of the event over 700 attendees share their thoughts and work in the ICT domain. The profiles involved in the conference cover the following areas:

- Research & Innovation
- Market Validation & Living Lab Research
- Business Development, Entrepreneurship & Enterprise Strategy
- Policy Making

COSMOS presented the work developed in a Pitch Panel session where eight projects showed the results and the expectations for the market take-up of the developed solutions.

Figure 32 Andrea Rossi, COSMOS Project Manager after project presentation with Mr. Campolargo

5.4.2.4. SIDO Event

A new international event dedicated to the Internet of Things, SIdO 2015, took place in Lyon, France, on April 7 & 8, at Cité Internationale. SIdO focused on providing a tradeshow where

startups, manufacturers, tech companies, digital players, labs, investors, designers, contractors and media could gather to explore the Internet of Things and make it the new economy. With 4,500 visitors, 110 exhibitors and 42 lectures and conferences, SIdO provided an ideal environment were participants could think connected! COSMOS participated in this event as one of the 12 members of the EU/IERC village that SMART-ACTION [37] coordinated to promote research results of the project to SMEs and start-ups. COSMOS booth attracted many individuals as well as companies who had the chance to learn about the current results of the project through software demonstrations and dissemination material. Visitors were mostly interested in the social aspect that COSMOS introduces in the IoT, the Cloud storage technologies developed by the project and the potential scenarios regarding its implementation.

Figure 33: COSMOS Participation in SIdO 2015

5.4.2.5. IoT Week

The IoT week [11] is a yearly event organised by the IoT Forum [20]. The IoT Week 2015 [39] was hosted in Lisbon between the 16th and 18th June at Lisbon Congress Centre. COSMOS had a booth where visitors had the chance to see our demonstrations regarding geospatial Madrid metadata search, traffic state in Madrid City and Trust & Reputation ranking in participative social smart buildings

Figure 34: COSMOS Participation in IoT Week 2015

As part of IoT Week, there was a session dedicated to IERC AC3 Cluster to which COSMOS belongs. COSMOS project presented the work done in the pilots in the last IoT week, there were a session were different projects covered by this cluster presented the work towards the execution of the pilots and demonstration. The talk focused on the main achievements and also highlighting the locks and barriers found towards a successful execution of the plans.

Figure 35 Juan Rico from Atos on the stage presenting COSMOS application scenarios

COSMOS was also represented in a round table on how to overcome problems in pilots and what can be done at cluster level so as to add value to their activities

5.4.2.6. Smart Cities Day

Smart Cities Day is a new conference based on case studies of the most inspiring cities worldwide. Held jointly with 3 international tech conferences, this one-day event invites city officials and innovators to shift from a technology-driven to a resident-centric approach. At stake: scaling-up urban labs and demonstrators for a global smart and inclusive city. The event took place in Marseille, France on 16/09/2015.

20 Smart Cities experts and officials will be on stage to share lessons and insights. They will bring concrete answers through key areas of innovation: M2M/IoT platforms, Contactless and Identity/Security services.

Among the key challenges to be addressed:

- How to make cities smart, simple and citizen friendly?
- Urban innovations quick wins for rapid ROI
- From a silo approach to horizontal and bottom-up approach
- Platforms & standards for sustainable and replicable services
- Best business models for quick deployments

COSMOS presented in the event the Madrid Smart transport use case.

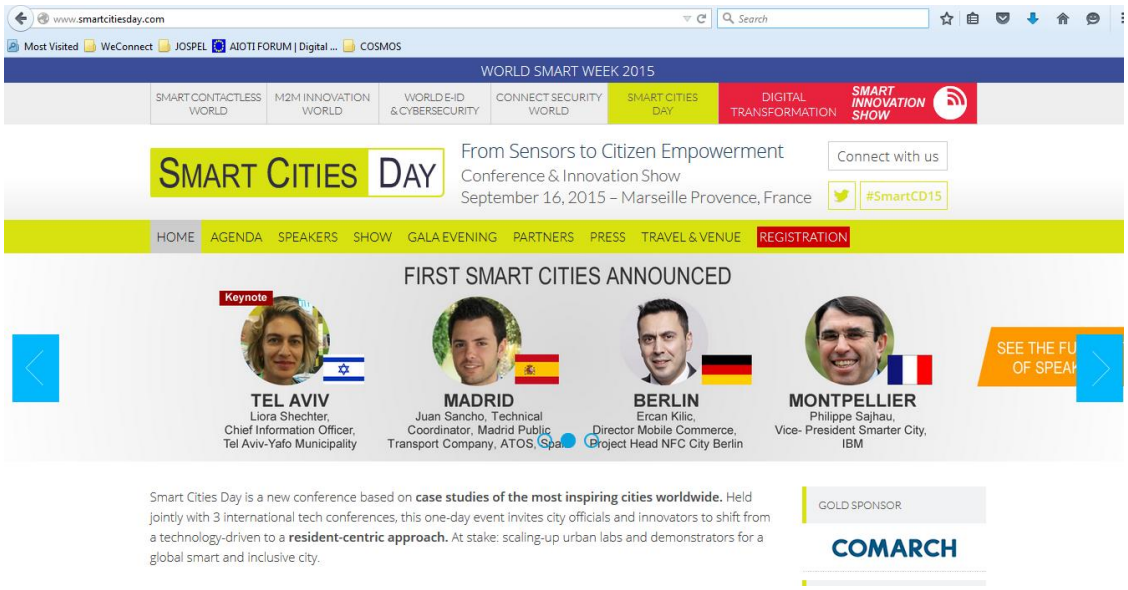


Figure 36 Main event website

5.4.2.7. Smart Cities Week DC

ATOS has participated in the Smart Cities week [44] in Washington DC USA in September 2015. ATOS booth includes the work that has been already developed by the company in the framework of COSMOS project. Conference objectives will be link recognized leader in smart cities education, the event highlights best practices for breaking down barriers to progress and instilling a culture of collaboration — cross-cutting solutions that public officials can use to improve livability, workability and sustainability in their communities. It will be also possible to see, hear and experience showcase demonstrations of the next wave of innovative, integrated technologies that are helping cities save money, build more robust economies and enhance citizens' lives.

5.4.3. Confirmed Future Events

ICT 2015

COSMOS has applied and has been selected to participate in the ICT 2015 event in Lisbon, Portugal. The project will be present in a booth, including demonstrations and representatives in order to disseminate the results and inform the public of the ongoing progress [30]. Furthermore, the project has been selected for extended visibility by the organizers, thus contributing to a specialized article on the Digital Agenda website.

Apache Spark Summit Europe 2015

In October 2015, IBM will present “How Spark enables the Internet of Things: Efficient integration of multiple Spark components for Smart City use cases” at the Apache Spark

Summit Europe taking place in Amsterdam [28]. This presentation covers work done as part of the COSMOS project by IBM, the University of Surrey and ATOS.

OpenStack Summit 2015

The OpenStack Summit [45] is a four-day conference for developers, users, and administrators of OpenStack Cloud Software. It's a great place to get started and keep connected with OpenStack**.** COSMOS will present "Boosting the Power of Swift using Metadata Search", showcasing the EMT use case and showing our geospatial metadata search on EMT historical bus trip data.

Annual Polis Conference

The Polis Conference [17] is a major platform for cities, metropolitan areas and regions to exchange on their transport challenges. High-level plenary sessions are complemented by technical sessions showing innovation in policy and practice across the transport spectrum. 2015 Annual Polis Conference on "Transport innovation for sustainable cities and regions" will take place on 19 and 20 November 2015 in Brussels. COSMOS will present "An open platform for transport data in Madrid", demonstrating the development of an open platform through which the various elements related to transport and traffic are made available to citizens and businesses under a completely new and innovative model.

Smart City World Congress

The world leading smart city event [46], bringing together global, national, and regional urban representatives, thought leaders, academic institutions, research centres, incubators, investors, and top corporations that have the kind of decision-making power that drives smart cities and empower its citizens, will take place in Barcelona on 17-19/11/2015. COSMOS will share a booth there.

5.5 Project Documentation

Other general project documents that are not focused on a concrete event are under this group, e.g. public deliverables, general presentations, whitepapers, etc.

- *Deliverables:* The document must display clearly project title, Activity and WP number, deliverable number, filename, scheduled and actual delivery dates. It must declare dissemination level, Public, Restricted to other program participants and group specified by the consortium or Confidential to members of the consortium. Responsible editor and its revision history are also identified as well as the authors and internal reviewers. All deliverables will be available to the European Commission and only the ones classified as Public will be available through the project web site to the general public.

- *Presentation*: Presentation templates will be used by any member of consortium when presenting any project material. It must contain official COSMOS logo, name of the presenter, date of presentation and name of the partner organisation. The presentation must display clearly COSMOS logo with confidentiality information. A general project presentation has been prepared as a basis for general presentations of the project. This will be updated with the latest results as the project progresses. Figure 37 shows some of the slides included in the presentation that was demonstrated in COSMOS booth during the IoT Week 2015.

Figure 37: Indicative slides from IoT Week 2015 Presentation

- *Whitepapers*: Whitepapers about different topics addressed in COSMOS project, from an overview of the project to a concrete technology innovation, will be made available through the project website. In principle they should not be targeted to a concrete event, but they may be considered also as dissemination material to be distributed in events, conferences, etc.

5.6 Demonstration

Demonstrators will be setup, in order to show real scenarios where the main project objectives are put in practice. In the Demonstration activities, a specialised version of the integrated prototype will be presented to users for exhibition in real contexts of use like the Madrid use case scenario and the Camden use case scenario, to elicit 'pre-launch' interest from potential customers, obtain experience of use, and identify any customisation that is required.

The demo events may be included in dedicated project Workshops or external ones organised by other projects.

5.7 Training Material

Training material will be produced during project duration, that will enable the description and usage of the COSMOS provided tools by external users. The first step of this process has been performed in M10 with the initial release of the project's prototypes, that includes an Installation and usage section for each software component.

Furthermore, demo videos will be produced, demonstrating the combined usage of the COSMOS components in accordance with the scenarios identified in D7.7.1 [21], to display the overall functionality. We will also investigate the production of individual videos for each component, to indicate the necessary sequence of actions for their installation and usage.

Especially for the video training material, a YouTube channel may be created that is focused on COSMOS, including also more generic dissemination items.

5.8 Collaboration with other IoT Projects and IERC

IoT-A & IoT Forum: The IoT-A project has officially finished on 30th November 2013, but its main result, the IoT Architectural Reference Model, is being sustained and evolved since within the IoT Forum. In this context COSMOS has from the beginning being considering reusing the ARM methodology within its own architecture work (taking place in WP2) and will maintain close coordination with the IoT Forum as far as the ARM validation and evolution are concerned (the COSMOS WP6 Leader is also chair of the Architecture Working Group at the IoT Forum). Details on how COSMOS has been reusing the ARM are available in the D2.3.1 Architecture COSMOS Deliverable [16] and is mainly focussing so far on applying the Requirement engineering methodology and tailoring the IoT-A Domain Model to the COSMOS peculiarities (more to come in next project phases).

CityPulse EU project

During the IoT-week 2015, COSMOS had the chance to visit the booth of CityPulse [15], an EU project under FP7. One of the main tools developed by this project is a smart city scenarios "bank" with 101 scenarios [43]. For each scenario, a description and (in some cases) data-sets are given. Each scenario can be evaluated (by citizens, technical persons or city stakeholders) and, as a result, a ranking of these scenarios can be extracted.

This ranking and the information that can be extracted from this can be proved really helpful for COSMOS. Indicatively, it was found out that the smart-heating scheduling scenario, COSMOS is working on for the Camden use-case, is ranked 13th and 16th ("Energy Performance of Buildings" and "Energy Efficient Building" scenarios).

Besides this performed action and alignment, we envisage for Y3 collaboration with COMPOSE EU Project [48], concerning Node-Red and web interfaces.

5.8.1. IERC Cluster Involvement

COSMOS has participated in IERC AC3 cluster providing content to the different documents that have been generated in the framework of this cluster. The project has contributed to deliverable D1.2 of “Inventory of IERC tangible outcomes and showcasing plan – Summer 2015”. This document contains the information of how the different technical components we are developing in the project fit in the framework of the innovative pilots Madrid, Camden and Taipei which are covered by the project. Since the document inputs were submitted by end of April, there are still some points like TRL that will be refined in future versions.

5.8.1.1. IoTWeek ppt and others

COSMOS participated in the *Innovations and experiences from IoT deployments and demonstrators* workshop. The workshop provided an overview of some a group of EU-funded research projects in the area of Smart Cities and related applications areas. During the first part of the workshop, a group of IoT projects introduced the pilots and demonstrators planned to be delivered, sharing their experiences and lessons learned during the IoT deployments performed. The workshop also aimed to collect individual projects’ suggestions for the creation of a collective plan to promote concrete cooperation and synergies among the projects to overcome the barriers towards large-scale deployments, and eventually the market.

The workshop concluded with a panel discussion in which projects, entrepreneurs and an IoT accelerator representative will exchange ideas on how they can better exploit their results and how to bridge the existing gaps to market.

The slides presented by COSMOS can be found below:

Figure 38 Slides presented at IERC AC3 session

6 Conclusions

The updated version of the Dissemination Plan and Activities report describes an enhanced dissemination strategy taking advantage of the social networks and the linking between them. COSMOS active presence in the social networks has, among others, a positive impact on the visibility of the website and therefore on the dissemination of the project.

To this end we have created an automated sharing process between the different social network channels which consists of both manual and automated steps. Firstly, the creation of a LinkedIn Pulse article and its sharing through the COSMOS web site is carried out manually. Subsequently and in order to achieve the automation of the process, a Node-Red flow has been created that subscribes to the COSMOS web site's RSS feed, filters the notifications (i.e. separate the normal general feeds from the Pulse related) and inserts the appropriate hashtags that will make them more visible. Regarding the selection of these hashtags, from a variety of linguistic possibilities relevant to the same technical topic, Ritetag analysis can be used, whereas hashtagify.me is suitable to indicate relations to other hashtags and influencers. Thus, after separating RSS feeds on the basis of their keywords, a tweet is automatically published in COSMOS Twitter account and through the use of the online service IFTTT.com, accounts on different channels can then be automatically linked and forward the information of the tweet.

Following Y1, COSMOS has been very active in participating in major events during Y2 of the project as well. Specifically, in Y2 we participated in 7 major events, in comparison with 4 in Y1. New events have been identified and plans for our participation in them are being drafted, either in the form of presentations or demonstrations, based also on the COSMOS technical results level of maturity. Furthermore, in Y2 we published 5 scientific papers, in comparison with 3 in Y1.

For Y3, a major target is the drafting of more scientific publications and the more frequent COSMOS newsletter releases.

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