BIG IoT – Bridging the Interoperability Gap of the Internet of Things

Deliverable 6.1.a:

Community Building Report

- first release

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Abbreviations

Abbreviation	Meaning
BIG IoT	Project title: Bridging the Interoperability Gap of the Internet of Things
DoA	Description of Action
IoT	Internet of Things
API	Application Programming Interface

1 Introduction

This report is about Task 6.1 Community building activities, a task that is, in its turn, an element of the work package WP6 "Dissemination and standardization" of the BIG IoT project.

The main aim of the WP is disseminating the outcomes of the project and contributing to standardization bodies to promote the adoption of BIG IoT results. While communication activities are more oriented to create awareness about the project solutions, community building focuses on allowing participation to the project realization, tailoring of project solutions according to stakeholders needs, thus promoting the adoption of solutions and continuity of the project after the funding period. Under this point of view, Community building represents the connection between communication and exploitation actions.

The pursuit of the objectives above described is feasible also thanks to the collaboration with EPI initiative (European Platform Initiative)[1], which allows collaboration among the projects participants to the ICT30 call, thus generating a significant "community" about IoT issues. A common management of activities devoted to dissemination (e.g. co-organization of communication events and hackathons), ensures more effectiveness, homogeneity of information and improves support to stakeholders, also with reference to Open Calls participation.

Focusing on the aim of the BIG IoT project, it has to be considered that many devices in our vicinity are already connected to the Internet. This number will continue to grow[2], as well as the number of IoT platforms which manage connectivity to these devices. According to the latest studies the number of connected devices has grown up to 10 billion[3]and the number of IoT platforms to more than 360 [4]. However, the creation of a truly successful IoT ecosystem has not happened yet. The main hurdle for this, according to the recent McKinsey analysis, is the *missing interoperability*.

Establishing the interoperability between existing and yet to come IoT platforms is the main goal of the BIG IoT project. For this, the project aims at providing technological enablers in

[1] IoT-EPI is a European Initiative for IoT platform development. The IoT-European Platforms Initiative (IoT-EPI) was formed to build a vibrant and sustainable IoT-ecosystem in Europe, maximising the opportunities for platform development, interoperability and information sharing.
[2] Gartner, IoT on Business at Gartner symposium, november 8-12 2016, Barcellona, Spain.
[3] Business Insider, „The Internet of Things report", november 2015.
[4] IoT Analytics, Current state of iot platforms, 2016. https://iot-analytics.com/current-state-of-iot-platforms-2016/.

order to facilitate the development of cross-platform and cross-domain IoT services. Those enablers are: (a) a common API implemented by different IoT platforms, (b) shared semantic models for describing available resources, and (c) a marketplace as a nucleus of an ecosystem to trade IoT offerings. These developed enablers will be open sourced in the second year of the project and made available for the wide community of developers.

The success of our approach depends heavily on the wide acceptance of proposed solutions and implementation in different domains. Thus, an important activity within our project is the activity T6.1, as specified in DoA, with the main goal to build and engage developers and stakeholder's community around BIG IoT. Thus, in order to test the first releases of the BIG IoT enablers by means of early adopters and to ensure its long term adoption with dissemination and diffusion of project results through the network of the community members.

This deliverable D6.1.a documents the main approach towards community building and conducted activities in the first year of the project. It will be updated yearly during the duration of the project.

1.1 Scope and structure of the document

This document describes at first the connection with exploitation and communication activities, since community building is a powerful tool for engaging stakeholders in the project and can be effective for creating awareness about the project solutions, gathering adopters' requirements, and exploiting also their direct contribution as developers when the project goes open source.

The document consists of two parts: the first part outlines the community building strategy (Chapter 2) and the methodology to organize effectively specific workshops and hackathons (Chapter 3), as primary means to involve stakeholders and create the community around BIG IoT.

The second part (Chapter 4) will report about the community building activities that were conducted during the first year of BIG IoT project and their effects on the growth of the project. It will also describe the planned activities for the following period known at the time of writing this report.

Finally, Chapter 5 concludes the document and presents the outlook.

1.2 Executive Summary

Starting from an outline of community building goals, the document describes the main community building strategy as it emerged from the first year of activity of the BIG IoT project. The strategy is consistent with the exploitation plan, which also guides the technical development of the project and the communication activities. Community building activities couldn't start at the very beginning of the project, since also its detailed aims had to be clearly identified: some part of the effort available was then used to prepare guidelines for the organization of events, in order to have them within reach and ready-to-use in the following years.

Nonetheless the guidelines have to be considered as recommendations for the partners; they are not mandatory and have to be adapted to the specific situation of the event that it is planned to be organized.

A short description of the organized events can be found in the latter part of the report. The events had the main goal of creating awareness around the project and to arise interest for the next Open Call to activate participation of stakeholders and future partners of the project.

2 Community Building Strategy

In a nutshell, the main goal of BIG IoT project is focused on providing a solution for interoperability of IoT platforms and igniting an IoT ecosystem. The duration of the project is medium-long (three years), if we consider the timing of evolution of software solutions in general and the rapid growth that is foreseen in the field of Internet of Things, in particular.

For these reasons, the link between the project activities and the ecosystem in which the project results are going be integrated is a key element to ensure the achievement of objectives and provide the survival of the project beyond the funding period.

It is logical to assume that community building, together with development activities and communication/dissemination strategy, are all based on the exploitation plan (Task 7.1), which defines consistently the target of all engagement actions. The main aim of all activities that are destined outward the project consortium is not only to create awareness and a solid reputation for the project, but also to gather suggestions and inputs from stakeholders to orient the on-going development of solutions. The primary goal of the Community building activity is not only to assess and promote the project results, facilitate and enrich communications towards and among stakeholders and target audiences. Community building activity in BIG IoT can effectively influence the whole project development, by involving stakeholders and acknowledging their needs since the early phases of requirements definition, thus realizing a real open innovation process in the project conduction. Community Building runs transversely and concurrently to all other project activities.

This will allow greater flexibility and some adaptation of the project to the variable ecosystem, during the solutions deployment and ensure greater compliance of results to the needs of adopters in the end. Furthermore, this will allow a real application of project findings in the realization of new services.

2.1 The Overall BIG IoT Ecosystem Strategy

The following tables describe the overall strategy that will lead BIG IoT solutions to become the cornerstones for the IoT ecosystem, providing a mean to overcome IoT platforms hurdles and a way to better exploit IoT data heritage.

The Table 1, Table 2 and Table 3 explicit the consequential link between exploitation activities and communication / dissemination / community building, in the different phases that will go through the entire project time span.

Table 1 BIG IoT project overall exploitation, community building and communication strategy 2016

Action	Phase	Activity Description
EXPLOITATION	**Inception:** preparation, context analysis, identification of exploitation items	Analysis of partners business models related to BIG IoT introduction; potential demand targeting; market analysis both on potential demand and competitors (existing solutions with comparable goals). First aspects of BIG IoT business model definition. First Open call sketching. First partners statements about corporate strategy involving BIG IoT.
DEVELOPMENT	**Design:** architecture design and proof of concept	BIG IoT API and pilots use cases definition
COMMUNICATION	**Awareness/reputation:** creation of awareness about the project and project goals, building consensus and trust on the validity of its approach.	Creation of the project website, social networking (Linkedin and Twitter account) and internal collaboration platform (WIKI) for project partners. Realization of a promotional video illustrating project goals. Identification of relevant channels for communication (journals, relevant conferences, workshops) and identification of standardization bodies to approach. Participation to workshops /presentation of the project. As for reputation creation, participation to scientific workshops and presentation/publication of scientific articles about the project solutions /research findings.
COMMUNITY BUILDING	**Audience**	Mapping of existing communities related to BIG IoT fields (already connected and easy to reach), definition of a Contact database, definition of guidelines for events organization, general workshops

Table 2 BIG IoT project overall exploitation, community building and communication strategy 2017

Action	Phase	Activity Description
EXPLOITATION	**Growth:** shaping the business logic of the project	Going open source; definition of standardization process; first Open call to start testing potential usages, increase awareness. Drafting of corporate strategy of BIG IoT consortium for project continuity after funded period.
DEVELOPMENT	**First release:** first release of architectural components (BIG IoT API- marketplace)	First release of architecture and 1st release of pilots services and applications
COMMUNICATION	**Involvement/ engagement**	Participation to workshops , scientific conferences, challenges and events attended by the targeted audi-

		ence, also exploiting EPI events
COMMUNITY BUILDING	**Seed/engage**	Start of community activities related to Open Source availability of the project solutions and standardization. Partners' involvement in engaging stakeholders. Hackathons to test potential usages, increase awareness and derive lessons learnt.

Table 3 BIG IoT project overall exploitation, community building and communication strategy 2018

Action	Phase	Activity Description
EXPLOITATION	**Maturity:** supporting the final release	Second Open call and gathering lessons learnt and results from Open Calls. Definition of operational steps to ensure solutions continuity after the end of the project. Refinement of project documentation/APIs to improve adoption and usability/usage
DEVELOPMENT	**Finalization:** final release of architecture and pilots	Refinement of first architecture release, acknowledgment of indications obtained in the first period of utilization, improvement of solutions and final release both of architecture and pilots.
COMMUNICATION	**Dissemination of results**	Participation to conferences and workshops to create awareness/disseminate project results, also exploiting EPI events
COMMUNITY BUILDING	**Promote/give value**	Strengthening and consolidation of existing communities through information activities, mailings, question-answering, management of operations within the open source and standardization communities related to the project

2.2 The Role of the Community within the Project

Community is an important component in various projects: from health to civic actions, the involvement of people from early stage is the key for effective results and long lasting effects.

It is quite clear that community building has to be differently handled depending on different aims and targets to be achieved.

The exploitation strategy of BIG IoT project in the first year of the project has identified platform vendors/providers as a main target for BIG IoT solutions. As matter of fact, these stakeholders would allow the project to gain value through the offering enrichment: the wider data heritage will be attainable via the BIG IoT infrastructure, the more this infrastruc-

ture will be used by application/service developers to implement new services and solutions. Furthermore, the project is going open source with some of the software components, and this represents another field of intervention for community building.

In a deeper analysis, the BIG IoT community is a way to manage a new marketing beyond B2C (Business to Consumer): both B2B (Business to Business, where Platform vendors/providers is the targeted business) and B2D - Business to Developer have to be taken into consideration. In this situation, selling/promoting adoption of a BIG IoT solution is more complex: we have a triangle among the API/SDK provider (depending on the case, BIG IoT solution provider/the platform vendor), the developer and the final user (business or consumer). When the final user (depending on the case, developer/business or consumer) finds the developed app/services useful, built using the provided API/SDK, the circle is closed and all the three actors achieved their objective.

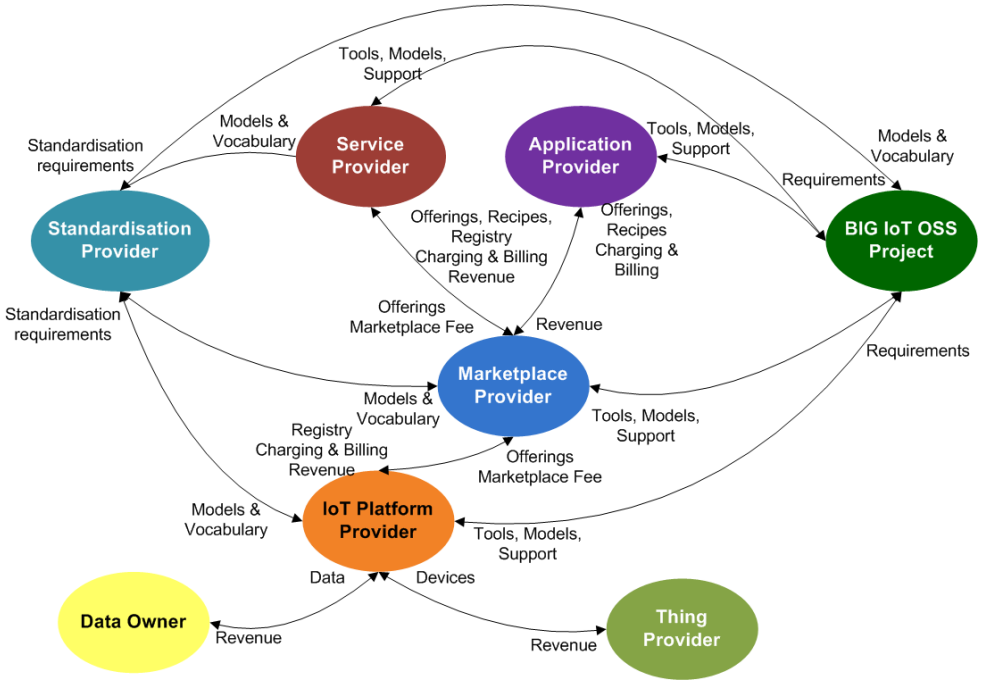


Figure 1 Value Network Model for Interoperable IoT Ecosystems

Figure 1 depicts the value network model and a successful process of co-creation that is the basis of the Open Innovation theory that promotes the outsourcing of ideas. This process has different names: incubator, accelerator, open source program, etc.

In this perspective, marketing has to be intended with a new meaning and the old 4P strategy (Price, Product, Promotion, Place) won't help us, as we're looking for partners, for creating an ecosystem, a community. The community itself will be later an effective support for marketing.

2.3 Define the Primary Goal of the BIG IoT Community

The essential element of creating and maintaining an organized community [5]is to define a primary goal to be achieved by the community, starting to answer to the following questions:

- What is the **mission?** It's crucial to define the primary mission of the community. What is the eventual outcome that we lust for?
- What are the **opportunities and areas of collaboration?** How the community can work together and achieve things? What are these areas? How can we work together in different ways?
- What are the **skills required?** What skills are needed in our community in order to establish later teams to house these skills?

Recovering the previously described strategy scheme, the main scope of Community Building is described by the following:

- **Mission:** allow BIG IoT solutions to be adopted by the largest public of stakeholders. The goal of BIG IoT is building a system that allows developers to use data from different sources and integrate them in a single application. The main purpose is facilitating companies in making business through IoT, supporting stakeholders in taking good decisions, create a market place for services and data providers.
- **Opportunities and areas of collaboration:** involvement of platform vendors on the BIG IoT main fields of interest (mobility, air quality, smart city in general)
- **Skills required:** app development, system integration, service development, communication protocols at cloud and device level APIs, security.

These statements allow us to define the **Mission Statement** of BIG IoT community, keeping in mind a good mission statements should be ***clear, memorable, and concise***.

A possible BIG IoT Mission Statement
Find your partner in IoT

[5] Bacon, Jono "The Art of Community", O Reilly, 2009, US.

2.4 Design the BIG IoT Community: the Five Elements

After defining the BIG IoT main goal, it's possible to go further in defining the five elements/phases that are needed to design a community: **Audience, Seed, Engage, Promote, and Value.**

In the BIG IoT project perspective, this will favorably fit with the agile methodology (adopted by the project), since incoming suggestions can be easily exploited in the iterative procedure and absorbed in the project from the moment of definition of requirements up to the design of an appropriate business model.

At the time being, apart from designing the community building strategy, the BIG IoT project focused its activity on audience targeting, preparation for seeding/dissemination and events organization/participation in order to enhance communication and spread the awareness of the project existence and of its goals. Nonetheless, even the organization of events is based on the same elements that guide Community Building and is itself part of the process, directly contributing to engagement and promotion.

This part is the result of an analysis lead to understand how a Community works and how it could be useful to achieve the project goals. In the following paragraph we will describe how the method applies to BIG IoT and which steps have been already accomplished.

The Figure 2 describes the community building phases with the aim of identifying activities to be conducted in order to create and maintain a dynamic community alive – which would mean that every activity has to be accomplished not just once but intended as a continuous iterative process, if we aim to keep the community vibrant and in line with the BIG IoT project evolutions.

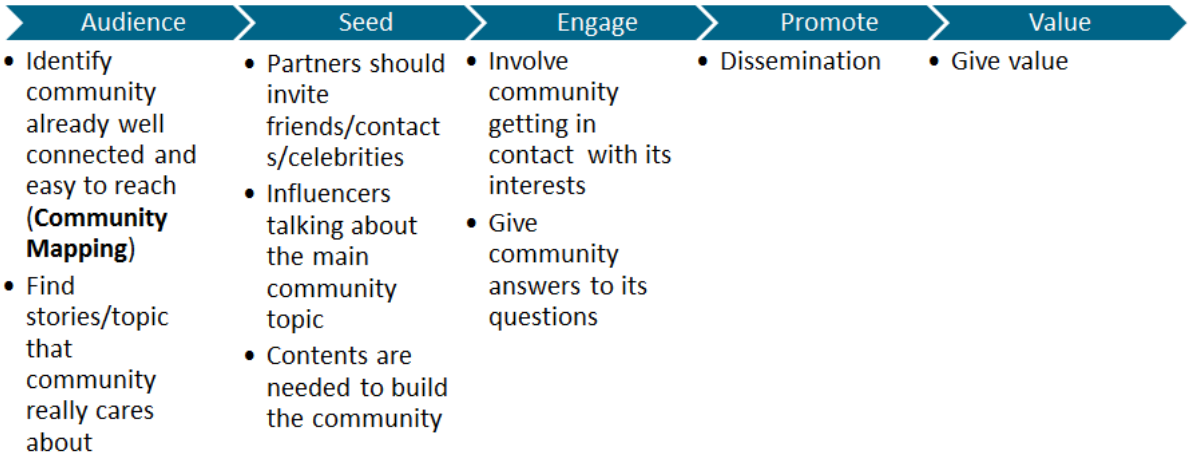


Figure 2 Phases of Community Building Activity

2.4.1 Audience Identification

To promote the BIG IoT community it is especially important to have developers in mind, tickling their fantasy and focusing on the final products/services that API could enable, not on API itself. As developers are providers of IoT platform, vendors, customers, by focusing on them we'll also target B2B customers.

In order to build effective services or viable product it's crucial to provide directions, support to the developer's community, as well as code samples and documentation. At the same time is important to give context: developers don't know the business, the customers and for this use cases and case studies can facilitate the process of "onboarding" or in other words of engaging people for joining the community.

Developers have a strong willingness to invest their time and effort towards people that understand (and possibly share) the same issues every day [6]. They can be involved by giving them support/training for development, an animated space to communicate and access source code.

In order to target our future community members, we have to keep in mind that there are millions of developers, they are of different ages (pre-school to senior), places and cultures;

[6] This assumption are based on the webinar "Best Practices for IOT developer" organized for IOT EPI Novemb23 2016 and led Stijn Schuermans, who is a Senior Business Analyst at Vision Mobile. Moreover it's possibile to check this whitepaper freely downloadble "The Essential Guide to Open Source on IoT" https://www.developereconomics.com/reports/the-essential-guide-to-open-source-in-iot

they could be single persons or an entire company, professional and hobbyist. In order to optimize effort, it's important to investigate what makes an API successful. A first idea is to analyze the API applying some filters in order to segmentate our audience: a good example is the Segmentation Framework provided by WIPfactory [7].

Table 4 -WIPFactory Segmentation Framework

FILTER	POSSIBLE QUESTIONS
1. Technical Imperatives	Does our product demand a particular platform? Where does our product fit in their Development Cycle? Does our platform demand a particular toolset? Does our product demand a particular language?
2. Individual Imperatives	Do the developers need special skills? What types of projects have they worked on? Will developers require experience? Have they brought an app to market? What are their needs? What motivates them?
3. Business Imperatives	What type of businesses support our objectives? What type of business can afford our tool and can build a sustainable app? What is corporate telling us? Who can best help us reach our Measurables/ ROI in the timeframe we require?
4. Market Imperatives	Is there a particular geography that is important to us? In what geography where developers are located? What are growing markets/verticals? What are industry trends we need to consider?

By adopting these filters we are able to better identify the kind of developer that we are looking for and that matches our community target.

[7] API University, How To Build a Strong Developer Community - http://www.programmableweb.com/api-university/how-to-build-strong-developer-community.

Table 5 –WIPFactory Segmentation Framework

CATEGORY/PRODUCT: Best API Ever	Developer Criteria and Experience Required
Technology Requirements	Android, RESTful APIs, communication protocols
Individual Skills/Experience	Software development, system integration
Business /Industry Focus	Mobility, Pollution, Parking, Automotive
Market/Geography	Transport, Public Administration, Parking management, Car Producers/ Europe and possibly pilot areas.

The phase of Audience targeting focuses on the identification of stakeholders to involve in the BIG IoT Community. Considering the BIG IoT project, stakeholders can be profiled considering both their field of interest and their role.

Table 6 - WIPFactory Segmentation Framework

Regarding the "interest", the project's themes are:	Regarding the "roles", the project is targeting to:
• IoT • BIG data • IoT platforms • Development of Apps for exploiting BIG IoT data resources available on the IoT platforms • Interoperability of platforms	• Developers • Hardware builder • Platform provider • Service provider • Marketplace provider

The involvement of developers should be related central in relation with the OSS (Open Source Software) strategy that the project will adopt.

Stakeholders can be involved in the project community through the invitation to events (Challenges, Hackathons, Workshops, Co-design workshops), through an on line activity of "animation" and active discussion, based on the project website and also inviting them to participate directly to the project as third parties (through the opportunity given by the Open Call).

A community mapping activity has been conducted, in order to understand the existing panorama of active communities in the fields of interest of BIG IoT.

In the exploitation activity, 16 platform vendors have been identified as possible target for exploitation/federation in BIG IoT.

Table 7 IoT Platforms and components analysis (source: BIG IoT project based on report on IoT Platform activities - UNIFY-IoT project

Layer	Components	Microsoft	Amazon	IBM	ThingWor	Bosch IoT	GE Predix	PTC Axeda	Intel IoT	ARMmbed	Xively	ThingSpea	Carriots	Evrythng	SensorCl	Kaa	Open ioT
Collaboration	Business System integration	v	v	v	v	v	v	v	v		v			v			
Application	Visualization	v	v	v	v	v	v	v	v		v	v	v	v	v		v
	Development Environment	v		v		v		v	v	v		v	v		v		
Service	Service orchestration	v		v	v	v	v	v			v		v	v			v
	Advanced analytics	v	v	v	v	v	v					v			v		
Abstraction	Event & action management	v	v	v	v	v	v	v	v		v	v	v	v	v	v	v
	Basic analytics	v	v	v	v	v	v	v	v		v	v	v	v	v	v	v
Storage	Storage/database	v	v	v	v	v	v	v	v		v	v	v	v	v	v	v
Processing	Device management	v	v	v	v	v	v	v	v	v	v		v	v		v	
	Edge analytics	v		v	v		v			v						v	
Network	Connectivity Network/modules						v		v	v							
	Edge gateway (HW based)					v			v	v				v	v		
Physical Layer	Operating System	v							v	v							
	Modules and Drivers	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	MPU/MCU								v	v							

Community mapping is useful to “learn from others” on the one side, and to identify well-connected and easy to reach communities, where promoting BIG IoT results and dissemination.

For this reason, mapped communities can be more and different from the communities promoted by the single platform vendors that have been analyzed for exploitation purposes, though many of them had been considered interesting.

In brief, the IoT Community landscape may be represented by the following tentative classification:

- Communities dedicated to learning hardware and software
- Communities that are built around an open source cloud service (platform)
- Communities focused on Open data/Open API
- Target-specific communities (e.g. citizen/SMEs)

Table 8 Classification of some significant IoT communities

Community name	Description	Target	Tools
Microsoft Azure https://azure.microsoft.com/it-it/	Extensive developer portal with blogs, videos and tutorials	Software developers	Developer portal @Microsoft IoT 30,4k followers 31k likes 24,3k followers at Microsoft Cloud n/a
Amazon AWS https://forums.aws.amazon.com/index.jspa	Community dedicated to learning Software offers also Community blog and forum	AWS platform users, Software developers	Developer guide+forum Amazon AWS 856k followers 166k likes 197k followers 14,2 k followers
IBM Watson IoT platform https://developer.ibm.com/iotplatform/	Developer portal with articles, tutorials, training tools and sample code, forums, blogs	Software developers	Developer portal IBM IoT 56,9k followers 3,8k likes 7,3k followers 610 followers
PTC Thing Worx https://community.thingworx.com/welcome	Community site with blogs, videso, Q&A forum for peer-support. Physical developer for a and on line events	Software developers	9k followers n/a

Community name	Description	Target	Tools
			7,8k followers n/a
GE Predix https://www.predix.io/	Developer portal which contains platform documentation, developers guides, examples codes and training material; blog, podcast, videos and blog	Software developers	GE Digital 24k followers n/a 59k followers n/a
PTC Axeda www.ptc.com/axeda	Community relying on Thigworx developer zone	Software developers	PTC 26,1k followers 8 likes 82,8k followers n/a
Intel IoT Platform http://www.intel.eu/content/www/eu/en/internet-of-things/ecosystem.html	IoT solution Alliance	Original design manufacturers Original equipment manufacturers System Integrators	Intel IoT 89,6k followers 44,3k+ likes 788k followers Intel 1,2 Mio followers
ARM Mbed https://developer.mbed.org/	Developers site with Form and Q&A	Software developers	Github for technical input 8,2k followers 5,7 likes 75,3k followers ARM

Community name	Description	Target	Tools
			60 followers
Xively https://developer.xively.com/	Developers site with APIs documentation, libraries	Software developers	92,4k followers 6,5k+ likes 1,5k followers 281 followers
Things Speak https://thingspeak.com/	Open data Platform for the Internet of things, offers also Community blog and forum	Learning based on specific sw	Github+forum 5,8k followers 450 likes 1,5k followers 129 followers 8 contributors, 294 commits
Carriots https://www.carriots.com/developers	Developers site with tutori-als and documentation	Software developers	Github 2,3k followers 74+ likes 224 followers 14 followers
Sensor Cloud www.sensorcloud.com http://www.microstrain.com/	LORD MicroStrain Sensing Systems community, documentati available		723 followers 151 likes 696 followers 36 followers

Community name	Description	Target	Tools
			6 contributors, 111 commits
Hackster.io- www.hackster.io	Community dedicated to learning hardware	Hardware builder and aggregator of communities-learning	13.800 followers 35.000 likes n/a n/a
Maker Zone http://makerzone.mathworks.com/	Community dedicated to learning Software	Software developers	n/a n/a n/a n/a
IEEE- http://iot.ieee.org/	Learning/Research	IoT Technical Community	15.500 followers 1.332 likes 5.669 followers n/a
KAAIOT /Device Hive/Leylan http://www.kaaproject.org/	Open-source IoT middleware platform	Service developers and companies	Github+forum 5k followers n/a 300 followers n/a followers 15/20 contributors
OpenIoT **www.openiot.eu**	Generic middleware IoT platform connecting devic-	Basis of various Eu projects	Github

Community name	Description	Target	Tools
	es and semantic Web services		n/a n/a n/a 60 followers 13 contributors 662 commits 243 Star gazers
Smart citizen https://smartcitizen.me/	Citizen focused community – based on a platform	Citizens (generate participatory processes of people in the cities)	821 follower 2.331 likes n/a n/a 10 contributors, 297 commits
IOTBE **http://www.iotbe.org/**	SME focused community Belgium National Cluster Companies built a community for managing new products	Companies (retail & technology) come together in order to move beyond the e-commerce era and build a total connected customer experience	590 follower n.a. 484 followers n/a 0 contributions
Theinternetof things http://www.theintern	a thinktank for the Internet of Thing	Knowledge base	9.695 follower

Community name	Description	Target	Tools
etofthings.eu/			n.a. 9.884 followers n/a n.a.
Sociotal **http://sociotal.eu/**	Eu project	socially aware and citizen-centric Internet of Thing	3862 follower 95 likes. n.a. n/a n.a

This analysis allows us to better define what we expect from a BIG IoT Community. A BIG IoT Community is a place where developers can:

- Learn hardware/software
- Get tips to access services/data
- Get tips on how to use services/data made available on the marketplace/platforms
- Develop new services (by accessing to the GitLab room)
- Promote new developed services (relation with the Marketplace)

  The BIG IoT community is designed for developers, researchers, SMEs/Startups, students, citizens.

2.4.2 Seed

The activity of "seeding" needs the commitment of all the projects partners and also of the Advisory board, whose members have access to particularly important and interesting environments for the project dissemination. Partners should invite contacts/testimonials to participate in the community: influencers talking about BIG IoT are needed. In the first peri-

od of the project, a first list of contacts has been created, to facilitate communication and involvement in future activities.

2.4.3 Engage and Promote

Engagement through the Community can be enabled by a first definition of issues to be discussed by the Community, define targeting activities such as asking stakeholders/other communities about their work/passion/interests, give community answers for their questions etc.

2.4.4 Values

As mentioned in the previous lines, Community is a good way to gather feedbacks concerning project development and results; by this way, project solutions will be value-added for adopters as they will respond to their real needs.

2.5 Community Building Tools

The focus of dissemination is to produce communication material and promote awareness of project activity and results while the focus of Community building is to involve stakeholders and engage all the actors in actively contributing in testing solution, proposing innovation and participating to the market place. From this point of view, the tools could be the same already described in the D.6.2.a with a special focus on the interactions.

3 Project Events Guidelines

Events organization is important for Community building activities: obviously, in the beginning it helps in forming the Community and arising awareness around the project, and will later give occasion for discussions among stakeholders and influencers in the more mature phases of the project. The organization of events go through the whole project timespan and events will be proposed preferably in the pilots areaof the participating partners.

According to the DoA, the project will organize:

- **2 EU-level and 3 regional hackathons**
- **general workshops**
- **4 co-design workshops**

The possible timeline of events develops from M10 to M34, following the project releases and the opportunity to collect use cases, user requirements proposals (for the project development) and allows platform- and data exploitation.

Regional hackathons will be possibly associated with co-design workshops and general workshops to enhance dissemination and exploitation in the regions in which pilots are developed. The format could be a two days venue with the second day dedicated to the hackathon (BIG Iot Challenge weekend).

We plan to coordinate these events with IoT-EPI (European Platform Initiative- cipher. Par.1-introduction) and engage with other EPI projects in order to share the best practices and reach a wider community.

In the following paragraphs we are proposing some guidelines to organize the different kind of events, just as hints for a rapid and effective organization. The guidelines are intended as recommendations that can be used to plan and organize regional hackathons. It is not mandatory to follow them, since, each event should have the proper format given the specific situation and should reflect the moment in the project time span when it will be hold.

3.1 General Workshop

The primary goal of this kind of event is animating and qualifying the request of IoT applications; the target to be involved are IT communities, IoT experts, citizens, decision makers, Advisory Board.

The advisable format for the event should be half day.

Workshop Goals

Before deciding to organize a general workshop, it is necessary to define the goals to be pursued with the event, what content we want to convey and whether the kind of event is suitable for this achievement and for the targeted audience. In a nutshell, it should be clear what we want to pursue with the event. This will help identify the key messages, meeting or event purposes and key topics for the agenda.

For example, developers prefer to attend co-design workshops or training sessions rather than conferences. A sort of "market research" should be done to understand the existing interest for the topic of the workshop to evaluate potential attendance.

Workshop Design

Furthermore, it is necessary to consider what type of experience participants should have. The event can focus on joint decision making, cultural exchange, sharing knowledge on a topic, debate, learning skills.

Also time available for organization and publicity and economic resources should be taken into account.

Managing of Costs

Considering costs, it is necessary to think about which kind of costs will apply:

- Venue hire.
- Equipment hire (see list provided in the checklist.
- Speakers' fees/travel/accommodation.
- Entertainment.
- Gifts/Koha – if you are being hosted on a marae, the koha should reflect the costs of normal venue hire as well as food if this is provided.
- Food and drinks.
- Artwork/displays/decoration.
- Childcare.
- Mail-out of invitations.
- Advertising.
- Transport (e.g. providing a bus etc.).
- Stationery and photocopying.

Given the costs to be expected, possibilities of sponsorship have to be investigated.

Location

Choosing the right location is another key point. The right location should be coherent with the different aspects of the event and with the workshop shaping such as: possible number of participants, logistics and practical details of the workshop (visibility of visual aids, possibility of teleconferencing, facilities for breakout sessions, possibility for accommodation nearby, catering facilities).

Agenda

Finally, an effective agenda of the meeting is also a critical step in the preparation of the event.

An effective Agenda should provide the following:

- Introductions: Welcomes and introductions are important to help people to get oriented and feel at ease. For meetings, workshops and seminars, introduce the organizers, speakers, the facilitator or chairperson at the beginning. If time allows, all participants should be asked to introduce themselves, especially when people will work together later on (for example, at a workshop). Consider using a round for introductions or an 'icebreaker'.
- Creating an inclusive process: everyone should be able to contribute constructively to the discussion and activities. This means a minimum of 'talking at' and a maximum of 'talking with' participants:
    - Use inclusive activities or methods to run the meeting or event.
    - Encourage participation when facilitating.
    - Provide time for feedback at critical points in the meeting or event and at the end.

Follow-up Plan

Finally, a follow-up plan should be drafted.

The only way to find out if the workshop was a success is to have an effective follow-up plan. It is useful to create a questionnaire to give to all participants at the end of the event, and give them plenty of opportunity to share their opinions on how well it went. Although this can be a bit scary, it's the only way to learn – and improve – for the next time. It's also important to have a plan to communicate the decisions that were reached during the workshop. To do this, a mass email can be sent to everyone with the details, or it can be published on the web. People need to know that their hard work actually resulted in a deci-

sion or action, and it is necessary to keep them informed about what's happening after the workshop has ended.

An example: Community Stakeholder General Workshops

Stakeholder engagement could be focused around a workshop organized yearly. As per the DoA, in the first round, the workshops' main objective is to elicit requirements for the project development and use cases and promote the project, Open Calls and ignite the BIG IoT ecosystem.

In the second and third year, the focus will be on reviewing the architecture for prototype implementation, and platform evaluation and showcasing, respectively. To facilitate the organization of the resulting workshop and to ensure a consistency in results across all events, we have established a hypothetic workshop blueprint, described below, optimized for the first round of workshops in 2016, in particular, the structure and agenda.

The blueprint will be updated for the second and third rounds (2017, 2018) accordingly and updates reported in the interim WP6 deliverables.

Stakeholder General Workshop 'Blueprint'
General Guidelines
A half- one day workshop (spread over multiple days if necessary) will be organized:(preferably) in the course of/collocated with a specific event, or as an independently organized event. In either case, a crucial requirement is the high-likelihood of attendance by EC representatives (including Units and DGs, together with a good balance of influential stakeholders in the SC sector. We will strive to target all areas and sub-domains of each SC in terms of coverage and stakeholder attendance, even if we will then only focus on some of them (as per DoW).
Consortium Workshop Team
At least 1 person from the respective Stakeholder Community domain representative
At least 1 person from the respective Stakeholder Community technical representative
At least 1 local organizer providing organizational support
At least 1 extra person for noting minutes and providing additional organizational support

Stakeholder General Workshop 'Blueprint'

Participants

We envisage between 10-30 participants for each workshop, depending on whether they will need to travel especially for the event, or they will be attending a main collocated event.

Attendees will include individuals from:

- Research & Innovation (H2020 projects)
- Academia
- EC representatives
- EU entities
- Industry (large companies, startups, SMEs)
- Public administration/Policy Makers
- Networking/Lobbying/Associations/Societal initiatives
- International Organizations
- Data community - Open Data & Data Science
- Other relevant stakeholders

Other Considerations

Gender balance

Regional balance (EU28)

Workshop Structure

Workshop can be managed within 4 to 6 hours.

Workshops can consist of up to four interactive sessions, each with a maximum of 3 input talks, or a panel discussion, as follows:

- BDE and existing data-centric initiatives in the Stakeholder Community
- Existing and potential BIG Data use-cases and applications in the Stakeholder Community
- Technical requirements for a BIG Data Platform in the Stakeholder Community
- Industrial session can be organized in parallel, or back-to-back, to collect feedback on EU policy

Stakeholder General Workshop 'Blueprint'

Draft Workshop Agenda

- Welcome & Introduction, 1/2 hours
  - Tour de Table
    - Name and affiliation
    - Role in organisation
    - Connection to big data & data management
    - Expectations for the workshop (what to take home)
- Introductory Talk
  - BIG IoT
  - BIG IoT in a nutshell
  - (To be extended per each Pilots, as relevant)
- Break, 0.5 hour
- Interactive Sessions (as per structure above), .. hours
- Session 1
  - [15' Input] Data-centric initiatives
  - [20' Interactive] Stories and persona
- Session 2
  - [15' Input] BIG IoT use-cases
  - [15' Interactive] Pilots
- Session 3
  - [15' Input] Technologies and tools used and envisaged
  - [20' Interactive] Data requirements
  - [20' Interactive] Technology requirements
- Session 4
  - [10' Input] Industrial session/ EU policy requirements
  - [10' Input] Legal issues around (big) data, Governance, Data portability
  - [20' Interactive] Other requirements
- Summary, outreach & farewell, 0.5 hours
  - Summary of results
  - **Give participants** clear picture of the workshop's outcomes
  - Q&A session
  - Closing note, outreach plans and farewell

3.2 Co-Design Workshop

Co-design workshops represent an occasion for co-creation by users and producers, and utilizers and enablers are also involved. The purpose of collaboration is producing products and services or solutions that have better market fit, though the results may comprise different outcomes which were not targeted in the beginning of the development work.

The modern concept of co-creation emerged from the business sector in the 1990's as a new form of engagement with customers. Instead of seeing customers as passive consumers, companies started inviting them to provide feedback, generate new ideas and actively participate in the development of products and solutions. All participants gained a greater sense of meaning and value from this process — customers felt more empowered and connected to products; businesses were better able to refine and test products and tap into new markets.

As far as the BIG IoT project is concerned, this approach can undoubtedly be useful to keep the project in touch with stakeholders needs rather than just focus on production of specific solutions; co-design/co-creation workshops will be organized to discuss and propose use cases and user requirements and are particularly interesting also in the Open call perspective.

The co-design process must be implemented in an inclusive and participative environment. The best option to create this type of environment is face-to-face meetings and workshops. There are several types of workshops that can be organized to accomplish a co-creation process, like unconference, Coding Dojo, World cafe[8] and so on. We prefer to focus here on the Basic SWOT Workshop, as it seems the most suitable to the aim of the project.

[8] The Unconference, also called Open Space conference is a participant driven meeting and it creates space for peer-to-peer learning, collaboration and creativity. The premise behind the unconference idea is that, "the sum of the expertise of the people in the audience is greater than the sum of the expertise of the people on stage." Unconferences are about empowering attendees to share their expertise. The agenda of unconference is typically created by the attendees at the beginning of the meeting and it can be conducted using a number of facilitation styles, as for example fishbowl, lightning talks, pechakucha and world cafè (https://en.wikipedia.org/wiki/World_Caf%C3%A9_(conversational_process).
A Coding Dojo is a periodic meeting (usually weekly) organized around a programming challenge where people are encouraged to participate and share their coding skills with the audience while solving the problem. The main principles of the Coding Dojo are to create a Safe Environment which is collaborative, inclusive, and non-competitive where people can be Continuously Learning.

3.2.1 Basic SWOT Workshops

Basis SWOT Workshops are standardized workshops with a predefined length (2.5 to 3 hours), following a specific agenda, with specific materials (presentations, context information, templates, etc.), questions to be discussed and documentation formats.

The objective of the Basis SWOT Workshops is to integrate the knowledge and perspectives of multiple stakeholders of a regional innovation system into a highly complex strategy development process. The objective behind the high involvement of all stakeholders in the strategy development process is to build a broad commitment for the future strategy among stakeholder groups very early on.

The design of the Basis SWOT Workshops allows collecting, documenting and discussion perspectives of different stakeholder groups on perceived strength, weaknesses, opportunities and threats of the innovation system.

These perspectives serve as a basis for the further elaboration of:

- strategic goals and activities based on the internal S & W of the actors of a larger system, and
- scenario building on external O & T relevant for potential futures of the respective context.

Due to the specific design, a concrete result of the Basis SWOT Workshops is a collection of strengths, weaknesses, opportunities and threats of the 'researched' region. In addition, participants define objectives and impacts that should be reached by the future strategy and describe concrete single actions each participant is willing and able to contribute to the achievement of these objectives or impacts.

Preparation

- Moderator has to find out beforehand what kind of people are going to participate in the workshop. Therefore, moderator should use available background information i.e. provided at the website of the group as well as talk to other people who already have been in contact with these groups.
- Moderator has to study the slides and the moderation handbook some days before the workshop. Ideally, new moderators should participate beforehand in at least one workshop that is moderated by an experienced moderator
- The back office has to contact workshop host organizations, agree a date that is convenient to both the group and the moderator and reserve the necessary facilities

(appropriate group rooms, beamer and flipchart). Then, back office should send out invitations to the workshop participants.

- Back office has to prepare the necessary workshop material.

Facilities and general material

For each group, a group room for up to 12 people is required. Tables and chairs should form a 'U', so that participants face each other. The room needs to be equipped with pin walls (or walls suitable for sticky tape), beamer, laptop and a flipchart. It is crucial that pin walls are large enough, one square meter per person reasonable.

Further general material needed for conducting the workshop are pens/markers (one per participant, same color for everybody), pins (or sticky tape) and board marker for the moderator. The moderator should bring a digital camera with him.

Print outs and templates

The following print outs are needed by the moderator for her/his own information: a printout of the presentation including instructions on slide content to be told, overhead projector slides as back up and the list of participants (name, organization, professional background).

For the workshop, the moderator and the participants need the following material:

- Color printed slide showing the different roles concerning knowledge transfer in the innovation system, one per participant
- Templates for writing down strengths (yellow), weaknesses (blue), opportunities (green) and threats (red), 10 per participant and SWOT element
- sticky points, 12 per participants
- SWOT Poster (A1Format)
- Templates for writing down three objectives for the regional innovation strategy, one per participant
- Template for writing down personal actions, one per participant.

3.3 Hackathon

A hackathon (also known as Hack Day or Hackfest) is an event that gathers several informatics experts: developers, web designers, data scientists, marketing experts. Its main aim is to combine different ideas, make people collaborate and, finally, develop, in a short time span (usually between 24 and 48 hours) a new web or mobile app around a given theme or fol-

lowing given rules. Developers team up in teams of 5-6 people and all participants work on a project related to the same assignment. Teams are free to choose their own development environment (e.g. Flash, C++) and are only constrained by the assignment itself and by time, which adds the pressure of a deadline and encourages creativity.

During traditional hackathons, participants only get the assignment on the starting day, in order to prevent them from planning too much in advance. 48 hours is a short period of time for developing an app, but it is enough for making prototypes and testing possible solutions.

Considering BIG IoT project, hackathons have a further result. Not only the development of new ideas /services that will exploit the resources made available by the platforms through the project technical infrastructure, but the event also leads to dissemination/ awareness of the BIG IoT API and increases the general perception of its potentialities.

3.3.1 Target audience

The main target audience or hackathons are developers: from students and start up to mature companies, and it would be advisable to gather a mix of them. Students have total freedom in what they create, plus they learn new skills, can exploit a valuable learning experience and can add their output to their portfolio. Mature companies can gather new opportunities for their own projects.

The most important results of a hackathon are not the concepts that have been developed, rather the cooperation within a region and the cooperation among different disciplines. They lead to new contacts, partnerships and cooperation well after the hackathon is over, and that means future for the project results.

3.3.2 Roles in the hackathon

In this paragraph the different roles that can be involved in a hackathon are described. Along the description of hackathon organization phases various actions towards types of stakeholders will be described in detail.

In brief, these are the main actors of a hackathon:

- **Organizer**. Most hackathon organizers will be business companies, knowledge institutions or network organizations. To organize a hackathon, it is important to have a strong outreach to possible participants for the hackathon, and a network where to find sponsors and the means to incorporate the output in developing environments.
- **Volunteers**. Most hackathons are held over a weekend, though this is not compulsory. During the hackathon there are a lot of things that need to be done, some at the

same time. Volunteers can help at the registration desk, with communication and with organizing the teams. Volunteers can be students who are not participating in the hackathon, or people from organizer's company who like to spend their weekend helping to make innovation in the field of IoT possible.

- **"Hackathoners"**. A team of hackathoners consists on average of 5 people. A good division needs to be made between skills. When companies join your hackathon, it is a good idea to let every company adopt a student. This works for both parties: students learn a lot from working with a real company and the company will get a fresh and different view on their own process and procedures.
- **Domain experts**. Most hackathons have a theme, and every hackathon has an assignment. Although the assignment comes with some background information and should be clear and easy to understand, it is highly recommended to attract thematic domain experts to the hackathon & entrepreneurs. The experts will not take part in the team but act as mentors and sources of 'just in time' information. One way to involve domain experts is by creating expert interventions during the hackathon.
- **Judges.** The judges are the people who are going to evaluate the results of the hackathon. They will consider whether or not the results fit the assignment and if they are of good quality, but also consider how much potential the app has for further development. Domain experts can be part of your judging team, but it is possible to include a sponsor or a client. In the "Bar camps[9]" judges are the same participants to the hackathon.
- **Sponsor**. Some sponsors will help in covering costs and others will give materials to be used during the hackathon. Sponsors can also be connected to the thematic field of application. Rather than being a sponsor they become problem owners.
- **Client or problem owner**. A client is someone who has an issue for which an app might be a possible solution, thus the term problem owner is also used. A client can be involved in the preparation phase to further enhance the background information about the theme of the hackathon and to sharpen the understanding of the assignment. As a problem owner he or she is also a very good candidate to give a short speech during the kick-off to give the hackathoners a better inside view into the top-

[9] A BarCamp is a kind of unconference usually focused around technology and the web, open to everyone, typically free of charge and generally restricted only by space constraints. Participants are typically encouraged to sign up in advance. All attendees are encouraged to present or facilitate a session or otherwise contribute to the event.

ic. A problem owner can also be a judge at the end of the hackathon. Furthermore, a client can make sure that the apps that are developed during the hackathon can be developed further to finished products.

- **Press** can help to gather participants but also create public support for the hackathon. After the hackathon is finished, press can disseminate the results (and hopefully someone will invest in one of the apps) and help in making sure the dissemination is effective.
- **Visitors**. A hackathon is a very creative process and for outsiders; it gives a quick look into the world of app development. It is possible to invite partners, network, investors and other sectors to let them see what apps can do for them. The best moments for visitors are during the kick-off and at the end of the hackathon when the results are playable.

3.3.3 Legal Aspects

There are some legal aspects that have to be taken into account when running a hackathon.

A short document for formalizing the commitments of both the organizers and the sponsors, in kind or in cash, is necessary. It'll be necessary to prepare a contract for participants (be they companies or students) and maybe a disclaimer if there are third parties working together while organizing the hackathon.

After a hackathon, there will likely be some discussions about developing an app further and this can raise new issues. For example, perhaps only three team members want to continue the development but what happens with the profit they make when the app is released; do the original team members then get something in return? Some legal points for this situation have been prepared with a case-based explanation dealing with the (legal) possibilities for both organizers and participants, of developing a hackathon project further after the hackathon.

3.3.4 Funding and Finance

The hackathon can be organized very cheaply, with only a small budget. In most cases the location is the biggest cost during a hackathon, so it is better if it is possible get this for free or at a low cost. Let the team members bring their own hardware and software (people are used to working on their own computer, so it also saves time).

Other important costs are for catering, marketing & PR, hours of management and legal costs. On average a hackathon will cost between EUR 5.000 and 20.000 (depending mostly on hours of management being included or not). To cover costs, look for sponsors.

3.3.5 Promotion

Promotion for a hackathon works in two ways. Firstly, it will be necessary to promote the hackathon in the local network to gather participants. This can be done by mentioning the hackathon on the project website, in a local newsletter, on social media and maybe even by sending out a press release.

Promotion also helps to create an understanding for the general audience into apps development and hackathons and how this is this helpful for innovation

Maybe let some of the students or participating companies help with making posters and dissemination material.

3.3.6 Assessment

Organizing a hackathon means a lot of work, it is therefore important to evaluate the impact of the hackathon after the event has taken place.

The impact is measured for the leading organization and the whole region, it also looks at the impact for teams and the field of application so that hackathons can be improved in the further editions.

3.3.7 Hackathon Organization Step by Step

Phase	Timing	Action	Description
INITIATION	3 months before hackathon	Internal Kick off: goals of the hackathon identification, initial overall planning, initial budget plan	● Start logging hours to keep overview of the time invested ● Plan internal kick off ● Make overall draft budget ● Determine funding needed ● Approval of overall budget within internal kick off meeting
LOBBY	2,5 months before hackathon	Dissemination/promotion of the hackathon to reach the right audience; identification of stakeholders, approach to potential sponsors	● Identify stakeholders and create third parties shortlist (stakeholders mapping according to the power of influence they might have on the project and on the interest they have in the project) ● Create third party proposal (what can be offered them)and eventually create a third party contract ● Contact third parties ● Make communication plan ● External presentation for sponsors
COUNTDOWN	2 months before hackathon	Preparation- concrete logistical organization	● look for location (enough space for teams to work, internet access a place for catering , sleeping facilities etc.) ● order catering ● gather participants ● draft participant contract ● gather volunteers ● determine a list of experts ● invite experts for getting to know each other
PREPARATION	1 month before hackathon	Actual launch of the hackathon	● search for potential media partners ● promote the hackathon ● track its visibility ● send out “save the date” for judges ● prepare script for hackathon ● brief team+ volunteers ● evaluate the state of budget ● invite press for hackathon ● send out theme information to participants (just to allow thinking and brainstorming about it)
LAUNCH		Execution: on Friday	● prepare rooms for participants ● prepare kick off presentation

			• prepare on site marketing (posters, rool –up banners) • open registration desk • form teams • give kick off presentation • let experts explain theme and assign-ment • let teams startworking • make final list of participants.
LAUNCH		Execution: on Saturday	• Saturday morning kick-off • Social media update • Check up with teams • Update sponsors and client • Guide press and visitors • Let domain experts visit teams • Prepare press release (begin writing the press release for after the event)
LAUNCH		Execution: on Sunday	• Sunday morning kick-off • Social media update • Check up with teams • Update sponsors and client • Guide press and visitors • Let teams udpload apps for final demon-stration • Brief the judges • Let audience and judges see the apps • Let participants fill out evaluation form • Awards show • Clean-up
EVALUA-TION	1 week after hackathon	Evaluate	• Send out press release • Be available for pree contact • Finish track press visibility document • Finische self-assessment • Make final cost overview • Evaluate hackathon with partners, spon-sors and participants • Finish time log
TRANSFER	After hackathon	Transfer after hackathon	• Transfer to developing • Transfer directly to market (market-place?) • Enriching the project development

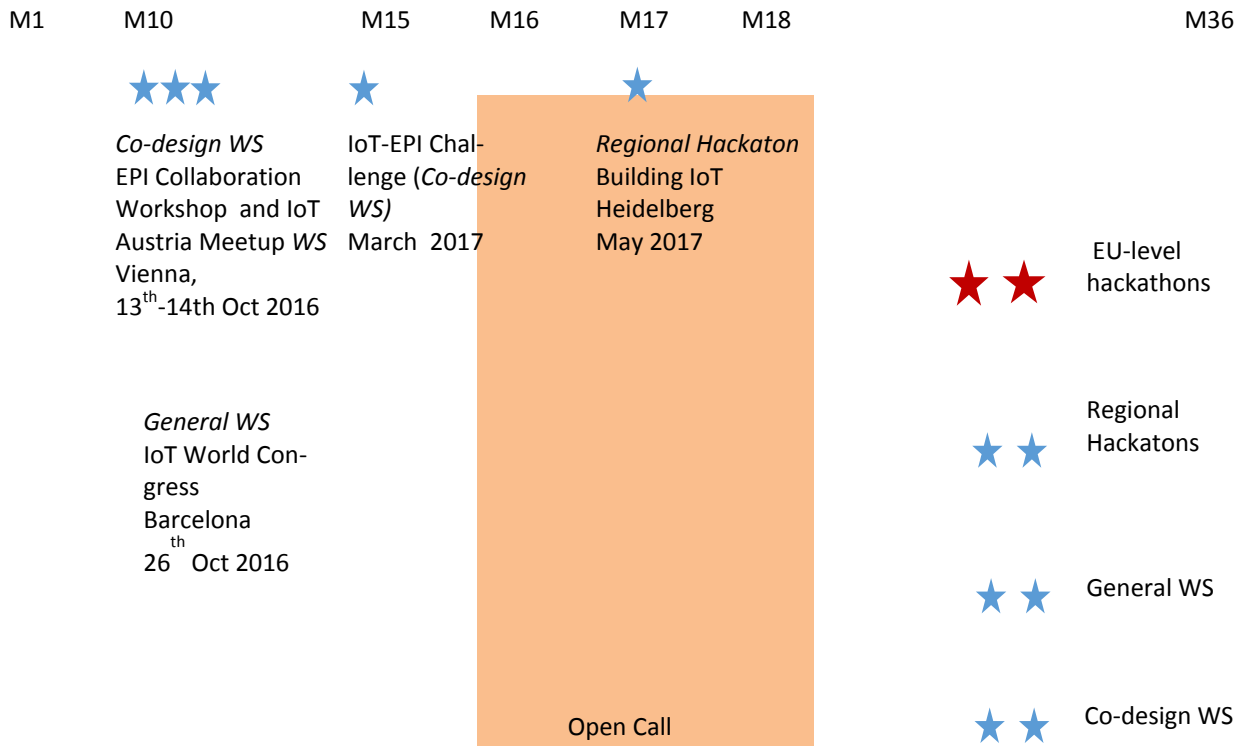
4 Events

One of the most important activities connected to the Community Building is related to the organization of hackathons and workshops. Community building communication activities are held in parallel with the general communication activities of the project; they are complementary since their target and goals is a bit different. The aim of the these events is to allow early adopters to use and test first releases of BIG IoT API in order to check its usability, attractiveness and more in general the possibility of their adoption in the future.

The project is expected to organize two European level and three regional level hackathon (in the three Pilot area – Northern Germany, Piedmont and Barcelona). Four general workshops will be organized before the hackathons and possibly preparatory to them, in which stakeholders and target groups will be involved. The aim of these workshops is to understand the demand of IoT applications. Strictly connected with the Open Call, 4 co-design workshop will all take place in order to involve “civic hackers” to discuss use cases and user requirements.

A first planning was done in order to schedule and organize these different actions at the beginning of the project. We present here the last version of the plan, that reports also the attended events. The Gantt is still undefined for some of the future events, to let the project size the occasion of events of particular importance that can be exploited and joined by BIG IoT , providing for example hackathons as side events.

In the first year we organized one General workshop (Barcelona, Oct 16) and one Co-creation workshop, both in October, as it was scheduled. Two other events are already planned in March and May 2017, as it can be seen in the plan below.



In the following more details are provided about already organized and future events.

4.1 Organized Events

In this paragraph we describe the events already organized by BIG IoT. In order to optimize the costs and to have a good participation, it was decided to set up workshops and other events, within IoT conferences already set up and when possible in collaboration with EPI IoT- initiatives.

In this first year, BIG IoT co-organized the followings events:

- Co design Workshop in Vienna, 14 October 2016
- IoT Austria Meets IoT-EPI in Vienna (Workshop), 13th October 2016
- General Workshop in Barcelona, 25-26th Oct 2016

Co-Creation Workshop: Value-Co-Creation Workshop - Vienna, Oct 14th 2016

The value co-creation workshop was coordinated by Charalampos Doukas (AGILE project) with support from ISMB (Unify project) and Etventure (Be-IoT project).

The goal of the workshop was to exchange the information about assets from each project and discuss the ideas of cross-project collaboration (demos, pilots, use-cases). All projects

from the IoT-EPI were presented. Martin Lorenz, Stefan Schmidt, Arne Broering and Jelena Mitic participated from the BIG IoT side and presented the BIG API and Marketplace. First ideas for the IoT Challenge in March have been discussed.

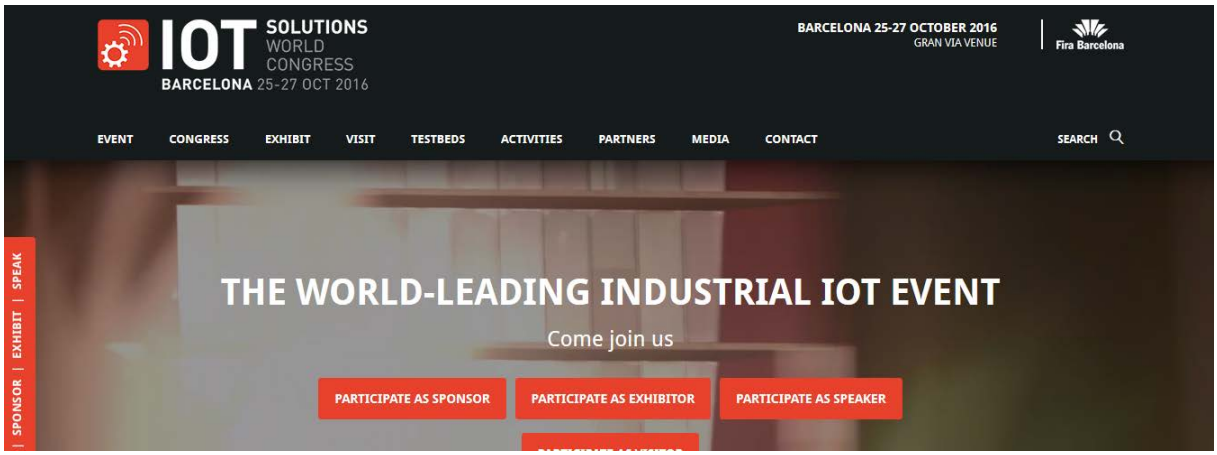
IoT Austria Meets IoT-EPI - Vienna, Oct 13th 2016

This event was organized by IoT-EPI and IoT Austria[10] to foster collaboration and to become a joint driver for IoT in Austria and Europe. All EPI projects gave 7-minute pitch presentations. Jelena Mitic and Arne Broering from Siemens gave a pitch presentation on the BIG IoT project:

https://www.youtube.com/watch?v=IR0yJDqIjtI

Martin Lorenz from Atos and Stefan Schmidt from Bosch presented the first BIG IoT demo during the networking breaks.

General Workshop in Barcelona - Barcelona IoT World Congress, Oct 26, 2016



The first General Workshop of the BIG IoT project was organized mostly by UPC, in order to take the opportunity of being hosted within the IOT Solution World Congress that took place in Barcelona on 25-27 October 2016.

At its second edition, IOT Solutions World Congress 2016 has already established itself as the leading global event focusing on industrial IOT. This global event is dedicated exclusively to join IoT providers with industry partners in order to help the latter increase productivity via this disruptive technology.

[10] https://www.iot-austria.at/en:events:2016:10:iot-vienna:iot_epi

The IOTSWC16 offers a highly international environment with more than 8,000 visitors and will focus on IoT solutions in six dedicated areas: Manufacturing, Healthcare, Energy & Utilities, Transportation & Logistics, Innovation and Technology.

The event is organized by *Fira de Barcelona* in partnership with the Industrial Internet Consortium, the Industrial IoT organization founded by AT&T, Cisco, General Electric, IBM, and Intel to bring together organizations and technology with the goal of accelerating the growth, adoption, and widespread use of industrial IoT.
Further reference at: http://www.iotsworldcongress.com/event/the-event/#sthash.93UwPPSH.dpuf

The title of the BIG Iot Workshop was: "***IoT: New business paradigm for SMEs?***"- inLab FIB UPC ([11]) Side Event and it took place at Fira de Barcelona, Gran Via Venue. Conference Center, CC1 Room 1.2

The IoT SWC side event organized by inLab FIB focuses on new business paradigms based on IoT implementation in industry, services and daily life of citizens. Special attention is paid to challenges that IoT will imply for SMEs and the necessary change of paradigm in their business models.

This session was divided in 3 sections, covering relevant insights in IoT, BIG Data Analytics and related Cyber Security both from EU and local perspective.

The first one dealt with the opportunities for SMEs offered by the H2020 BIG IoT project and the Barcelona Pilot. The second section focused on added value IoT represents to the whole cycle of industrial business models. Finally, the last section was devoted to Cyber Security, in terms of awareness, vulnerabilities.

PROGRAMME "IoT: New business paradigm for SMEs?"
First session: 09:00 - 11:00
09:00 Welcome and introduction by inLab FIB UPC (Prof. Josep Casanovas, inLab FIB UPC)
09:10 The H2020 BIG IoT project and the Barcelona Pilot (Mrs. Jelena Mitic, Siemens, Project Leader; Mr. Jordi

[11] inLab FIB is a research and innovation laboratory of the Barcelona School of Informatics of Universitat Politècnica de Catalunya – Barcelona Tech (UPC).

Ortuño, Barcelona City Council; Mr. Jordi Caus, SEAT)

The H2020 BIG IoT project represents a great opportunity to understand the possibilities of exploitation of IoT. The overall goal of the BIG IoT project is to ignite vibrant Internet of Things (IoT) ecosystems, by bridging the current interoperability gap between the vertically-oriented IoT platforms and creating marketplaces for IoT service and application providers as well as platform operators. The developed technologies will be concurrently demonstrated in three regional pilots (one of them in Barcelona). Under the common themes of smart mobility, smart environment and smart road infrastructure, various use cases within the pilots will validate the developed technologies.

09:45 BIG IoT API and Marketplace (Prof. Ernest Teniente, inLab FIB UPC, and Prof. Juan Hernández, ISG UPC)

The project approaches the existing interoperability gap based on (1) a common Web interface, called the BIG IoT API, (2) semantic descriptions of resources and services, as well as (3) a marketplace as the core driver of the ecosystem, providing functionalities such as authentication, discovery and charging. The BIG IoT API will be designed in an open community process and the project consortium will engage with current standardization initiatives to receive input and deliver contributions. As part of the project, 8 smart object platforms will implement BIG IoT API, thus allowing a real and widespread exploitation of their data and application heritage. The BIG IoT Marketplace will enable different IoT providers to easily offer and monetize access to their resources as well as IoT consumers to discover and use them.

10:30 Join BIG IoT: The Open call! (Mrs. Eleonora Panto, CSP)

A Europe-wide Open Call will be conducted as part of the project to engage SMEs in the implementation of services, applications, and platforms conforming with the BIG IoT approach. The speaker will give you more information about the call and will tell you how you could contribute to the BIG IoT project and receive EU funding for your work.

11:00 - 11:30 Networking breakfast (offered by the H2020 BIG IoT Project)

Second session: 11:30 – 12:15

Modelling and Simulation for Industry 4.0 – round table on opportunities and challenges in the new era of IoT.

Moderator: Mrs. Iwona Maryla Maciejewska, inLab FIB UPC.

Participants: Mr. Benito Cerrillo (Vicedean of New Industrialization in Informatics Engineering Professional Association of Catalonia), Prof. Ernest Teniente and Prof. Josep Casanovas, inLab FIB UPC.

Global competition in advanced manufacturing and industry engineering is becoming fiercer and fiercer. Nowadays, the introduction of IoT and IoS (Internet of Services) represents many opportunities, as well as challenges for the use of modelling and simulation in big and small industry.

Third session: 12:15 – 13:00

Cyber Security – awareness, vulnerabilities and solutions (Prof. Manel Medina and Mrs. Iwona Maryla Maciejewska, inLab FIB UPC)

The growth of IoT business, thanks to the reduction of costs of integration of Cyber-Physical Systems (CPS) in ICS (Industrial Control Systems) and intelligent buildings, making accessible from the global network their machinery, warehousing system, productions facilities, and even healthcare wearable devices. Since those devices have the capability to interact with the physical world, hacking them (gaining unauthorised access) may result in irreversible damage to buildings, production or storage facilities and even human bodies. Safety and security of these assets are important to ensure company's operational capacity, as well their market position.

Cyber Security resilience of IoT interfacing devices has to be promoted through awareness campaigns addressed to convince users to request security capabilities on the purchased products, and developers to build and offer cybersecurity solutions addressing SMEs needs to integrate them in their products.

The workshop was promoted through the BIG-IoT website and the social media channels of the project.

The registration was collected through Eventbrite: 36 persons registered to the workshop. The audience was mostly composed by CEOs and Senior Managers of IoT companies, public transportation officer (Municipality of Barcelona Bus and Parking), other stakeholders involved in mobility (Barcelona highways). The workshop was highly participated with many questions about the incoming Open Calls.

All the presentations are available on the BIG IoT slideshare channel and a short summary with photos of the events was made through Storify. After the workshop a questionnaire was sent to all the participants.

4.2 Next events

The second year of the project will be crucial for the Community Building and we need to organize as many events as possible, in order to make the BIG IoT API and Marketplace well known in Europe and to support people interests in the Open Call. For the moment we've already planned two events for 2017:

- The Idea Challenge in collaboration with IoT EPI, March 2017
- The hackathon "The IoT Challenge for Smart Mobility, Traffic, and Cities" at the build-

ing IoT 2017, May 2017 [12]

IoT-EPI Challenge – Berlin, March 16-17th 2017

BIG IoT will participate in the IoT EPI Challenge in Berlin. The project planning is still in progress, but BIG IoT will contribute participating to one of the selected challenges. The event will be addressed to around 20 member. All EPI projects shall provide mentors for the teams (3-4 mentors in total).

The main objectives of this event are:

1. Community Building (ecosystem building)
2. Reaching out to the IoT-Community (entrepreneurs/developers), multipliers (Accelerators) and Corporate Partners (incl. SMEs)
3. Finding potential cooperation partners (prepare entrepreneurs/developers for the upcoming open Calls)
4. Exchange on existing challenges (best practices, things to avoid, ...)
5. Communication: Promotion of Open Calls and projects

At the date of this deliverable, the challenges name are being discussed. The more consolidated are the indicated in the next table.

[12] https://www.buildingiot.de/index.php

Name of challenge	Idea Owner and Partners	Who else is interested?
Smooth on the move Personal Mobility in the age of IoT (4-6 teams)	Tobias Kraus (BMW) from **bIoTope** **Partner:** Ivan Gojmerac (AIT) from **symbIoTe**	
Scan to Share Smart Retail for Social Good (6-8 teams)	Charalampos Doukas (Create-NET) from **AGILE** **Partners:** Rob v. Kranenburg **TAGITSMART** Jelena Mitic **BIG IoT**	
In IoT we Trust Transparent & trust-worthy IoT devices (4-6 teams)	**Michele Nati** (Digital Catapult) from **Unify** **&** **Richa Sharma** (Fraunhofer) from **Be-IoT**	Umbrella challenge, in which all projects can get involved. Please let us know who else wants to join! **symbIoTe** (which contact?) **Vicinity** and **INTER-IoT**? both haven't added challenges to the list

Every challenge will give the participant the opportunity of co-generating ideas about a topic in three hours, so that this event is considered a co-creation workshop.

Regional Hackathon: "The IoT Challenge for Smart Mobility, Traffic, and Cities" at building IoT – Heidelberg, May 5-7th 2017

The BIG IoT project together with the W3C WoT has submitted a proposal for a joint hackathon and communication with the organizer is ongoing.

5 Conclusions and Outlook

Though at its very beginning, BIG IoT community building activities of the first year have paved the way for more operational activities to be conducted in the next two years of the project. Having in mind (thanks also to the exploitation strategy) the main targeted stakeholders, where it's possible to meet them and in which areas they're active, the key point of effective community creation will be pursued in the second year of the project, both through the Open Calls and the open source strategy of the project.

The developed technology enablers, i.e. BIG IoT API and Marketplace, are planned to be provided as open source within Eclipse Foundation. Through this and the standardization activities in W3C WoT we will drive community building activities, also in collaboration with IoT-EPI, in order to involve developers and platform vendors and to build a solid base for future crowd-collaboration within the growing BIG IoT community.

Figures and Tables

Figures

Tables

References

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API University, "How To Build a Strong Developer Community" - http://www.programmableweb.com/api-university/how-to-build-strong-developer-community

UNIFY- IoT project- "European Internet of Things Innovation Ecosystem" http://www.unify-iot.eu/. Deliverable d03_01- Report on IoT platform activities, october 2016

IOT-HACKATHON - IOT IN THEORIE & PRAXIS
http://www.buildingiot.de/2016/veranstaltung-5065-iot-hackathon---iot-in-theorie-%26-praxis.html?id=5065