Symbiosis of smart objects across IoT environments

688156 - symbIoTe - H2020-ICT-2015

D6.3 Contest Text and Supporting Documentation

The symbIoTe Consortium

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1 Executive Summary

The deliverable D6.3 “Contest text and Supporting Documentation” is the third deliverable planned for Work Package 6 “Open Calls”. This document outlines the procedures and objectives planned for managing the symbIoTe Contest, which took the form of a Hackathon, and was scheduled to take place during the last year of the symbIoTe implementation. This document defines the main goals and structure of the procedure for managing contest and the results achieved with the organization of such event.

The goal of the Hackathon is to create interest and an active community around the symbIoTe interoperability solutions by involving developers, experts on app and cloud-based services and designers operating at differentiated levels, such as students, researcher and companies as well. In order to reach a wider public the symbIoTe consortium identified as most suitable occasion for organizing the hackathon in the IoT System World Congress 2018, held in Barcelona. The **“HackaTown: the IoT Interoperability Hackathon”**[1] was organized as a side event of the IOTSWC 2018[2] in collaboration with BIG IoT project in consideration of the common goals and objectives in the interoperability field. The two consortia planned therefore synergetic actions in communication and organization of the event, such as communication campaign, evaluation criteria and awarding policy.

The Hackathon challenges were focused on interoperability; symbIoTe made available resources suitable for creating new mobile apps and Cloud-based Domain Enablers. Such resources were ideally located in the city of Zagreb as a virtual city: symbCity.

The participants of the hackathon were asked to answer to symbIoTe challenges by applying as team putting together interdisciplinary skills suitable for create either (i) Mobile/web-based applications using the symbIoTe libraries for creating new innovative services, or (ii) Cloud-based services using the symbIoTe libraries to create cross-domain added-value offerings. Six different teams subscribed the event by expressing their interest, therefore three teams competed for BIG IoT challenge and three teams competed for symbIoTe challenges.

The evaluation criteria were designed in order to consider all the aspects of an innovative app and cloud-based service, such as technical quality, interoperability, business potential and pitch quality but the main criterion was the usage of symbIoTe technologies and resources. The Hackathon gave us the opportunity to prove the usability and effectiveness of the IoT resources existing in symbIoTe. The solutions proposed by the contestants were all valuable and interesting.

Concerning prizes, symbIoTe project made available 10.000 euros, distributed on the two challenges: considering the number of teams subscribed, this total amount was decreased. This document, in the different sections, reports both the organisational work and supporting documentation realised before the event and the results and description of the event itself, including the prizes distribution.

[1] https://hackatown-2018.devpost.com/
[2] https://www.iotsworldcongress.com/

2 Introduction

2.1 *Purpose of the document*

The **D6.3 - Contest Text and Supporting Documentation** contains the description text and guidelines for the hackathon that was organized. The Hackathon documentation includes the description of the challenges and related resources, the eligibility criteria for the participants and the registration procedure for attending the event, and finally the prizes. This document also describes the communication actions carried out and a brief narrative of the event including winning teams and their solutions. This document in the current version also includes the description of the event and its results and achievement, the final section includes actually the description of the event and depicts the coding session.

2.2 *Structure of the document*

This deliverable describes the overall organization work done for carrying out the contest/hackathon planned to take place during the last year of symbIoTe project.

Section 3 provides a general overview of the goal of the hackathon and its overall context and organization details. Logistic details about the location, the agenda and communication and promotion activities performed prior to the event for reaching the targeted audience are described here. In this chapter, a brief description of the collaboration with BIG IoT project is also provided.

Section 4 describes the technical challenges and details of the hackathon and the related IoT resources, which were used in the hackathon and were made available by the consortium members. This section also reports on the technical skills of the audience targeted and the introductory presentations provided by mentors.

Section 5 describes the evaluation criteria and procedures, shared and agreed in collaboration with BIG IoT project.

Section 6 reports the hackathon results and prizes distributed to teams, which have applied for the symbIoTe challenges. We also give an overview about the solutions developed.

2.3 *Deliverable Submission*

In the last amendment to the DoA, this deliverable was postponed from M24 to M27 due to some delay and constraints related to technical implementation and finalization of the interoperability levels and for the additional reason that the procedures for running out the Second Open Call and taking on board the winning Third Parties took longer than expected. Furthermore, the delay was also due to the decision on the location of the event (co-location with IOTSWC 2018 taking place in autumn 2018) and to co-organise the contest in collaboration with BIG IoT project. The fruitful collaboration implied longer for taking decision and reaching agreements in order to design a common framework and homogenous environment for contestants.

3 Organization details

3.1 *Overview*

The 2-day Hackathon was organized in collaboration with BIG IoT project as a side event at the **IoT Solutions World Congress (IoTSWC) 2018** held in Barcelona. This section covers a summary of the organizational efforts of the event. The choice of the title **"HackaTown: the IoT Interoperability Hackathon"** was selected due to the specific focus of the contest addressed to resources for an ideal smart city "symbCity". The title was also chosen as it is quite attractive from a marketing perspective.

3.2 *Location*

The 2-day Hackathon has been organised as a side event at the IoTSWC 2018 held in Barcelona, Spain during October 17-18th. IoTSWC is considered one of the most important and largest of the IoT events in the world. In this year edition, it attracted 16,250 visitors during its 3 days from October 16th to 18th 2018. The choice of location was carefully discussed and agreed within the consortium, to take advantage of the wider international audience the IoTSWC normally attracts. The Hackathon registration information was also published on the main IoTSWC website under their side events page: https://www.iotsworldcongress.com/activities/side-events/ in order to boost participation, and provide greater visibility to the symbIoTe project.

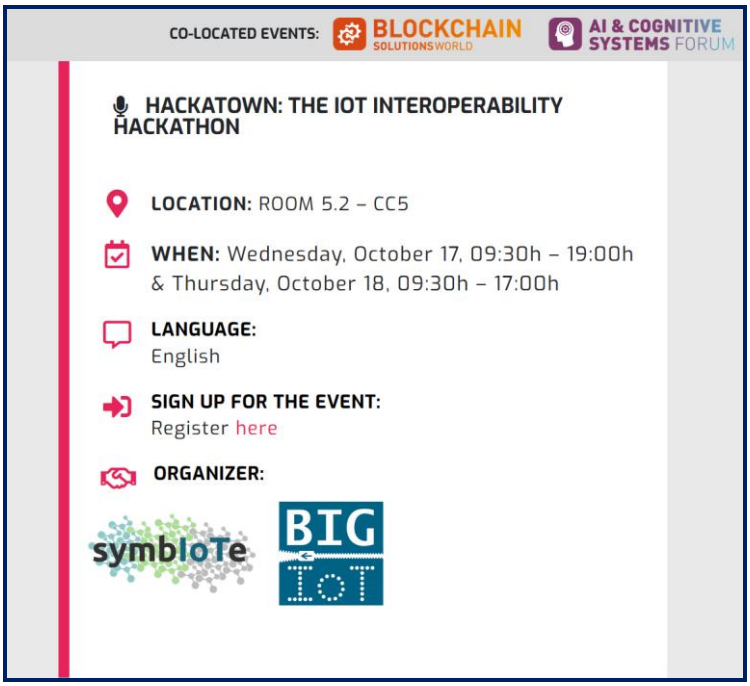

Figure 1 – Hackathon information published on the IoTSWC 2018 side-event website

3.3 *Goal of the contest*

The goal of the Hackathon was to prove the usability and effectiveness of the symbIoTe middleware in a virtual context, and to further enhance the community building activities of the project, by attracting start-ups, open source communities, Ph.D. students and junior developers to get familiar with the symbIoTe middleware. The symbIoTe consortium started a long and deep discussion to select the most appropriate and available resources to be used for the contest, in order to demonstrate and, importantly, to get meaningful feedback on the functionality that the symbIoTe middleware offers.

The final decision was to provide those resources suitable to create new mobile apps and Cloud-based Domain Enablers, also considering some organisational constraints, such as the available time for participants' coding session, and the status of several symbIoTe resources available during the Hackathon dates.

Two different *symbIoTe challenges* were formulated:

(i) Mobile/web-based applications using the symbIoTe libraries to create new innovative services on top of the available symbIoTe-enabled interoperable IoT platforms and their available sensors and actuators.

(ii) Cloud-based services using the symbIoTe libraries to create cross-domain added-value offerings on top of the available symbIoTe-enabled interoperable IoT platforms and their available sensors and actuators.

It was decided to create a virtual city, the *symbCity* and provide contestants access to different categories of IoT resources, all located in this city. These categories include Smart Home/Residence, Smart Mobility and Smart Yachting. The symbCity was created by making available all resources in the city of Zagreb, where two symbIoTe partners, UNIZG-FER and VIPnet are located. The map of resources made available for the challenge is shown in Figure 2. Most resources are real ones generating data measured in Zagreb, while some actual physical resources from Pisa, Barcelona, Viareggio were temporary moved to virtual locations as if they were located in Zagreb. Further details about available resources are given in Section 4.1.

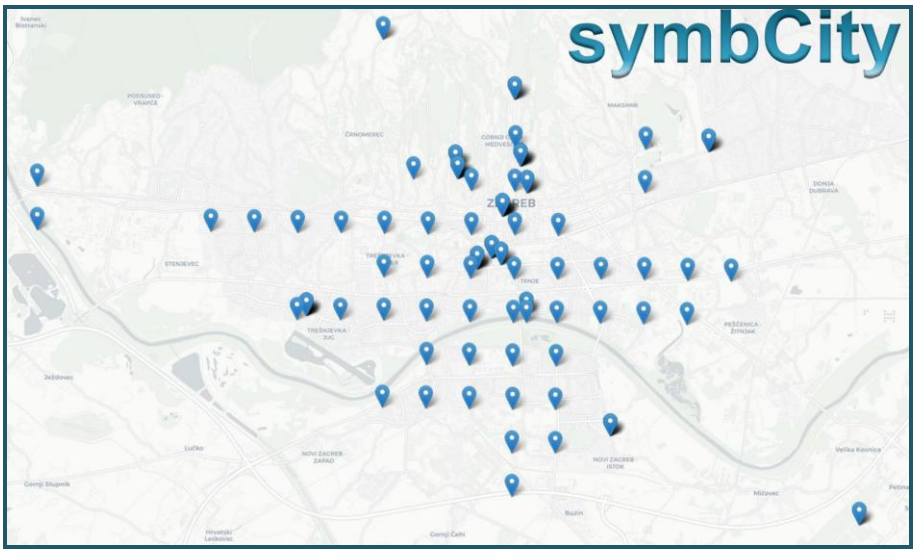

Figure 2 –Map of symbCity with resources made available for the challenge

The **first challenge** asks for **symbIoTe-powered mobile applications** (Android or iOS), or even web-based applications, that creatively combine resources from different platforms and domains in a user-friendly mobile app.

The **second challenge** is about creating **Cloud-based symbIoTe Domain Enablers**, which combine in creative way resources from different platforms and domains. Furthermore, the solutions should process data using Big Data techniques, interpolation methods, etc., in order to offer useful processed and aggregated data to the city authorities or to other 3rd-party developers.

The main target audience of the Hackathon were experts on mobile/web app and cloud-based service development, including UI/UX designers. Nevertheless, the emphasis was on interdisciplinary skills that the participating teams should have, by underlying the value of pitching and business potential of the developed solutions. For the hackathon, teams of 2-4 members were requested, with the afore mentioned skillsets.

As for the eligibility of contestants, teams already working together on IoT solutions, in start-ups, SMEs, or companies, including teams from research institutes or universities, were also allowed.

3.4 *Collaboration with BIG IoT*

The Hackathon confirmed the fruitful collaboration between symbIoTe and BIG IoT projects. This event strengthened once again the possibility to collaborate and address a common audience on the theme of Interoperability. The BIG IoT consortium team contributed in some of the organizational and dissemination activities of the Hackathon. Some of them were also present during the 2 days of the event acting as Technical mentors and judges for their respective challenge and teams.

The BIG IoT challenge was offered as the third Hackathon challenge with the following goals:

- Development of new applications/services based on existing BIG IoT offerings. This task focuses on the development of new applications and services using their existing offerings.
- Integration of data/services as new offerings on the BIG IoT marketplace and development of new applications/services based on new and/or existing BIG IoT offerings. This kind of proposal foresees both platform integration and development of new applications and services. Participants are expected to do both activities at some level.

In order to integrate resources and develop services and applications, BIG IoT made available various use-cases and domains such as:

- **Smart mobility & Environment:** The exchange of data between mobility and cities is going to be crucial in the context of the future of mobility. Every city is a living entity full of sensors and devices logging what’s happening on the streets. Provides environment information from air quality detectors.
- **Enhancing the traveller (citizen) experience & Eco-route:** Drivers and passengers are becoming increasingly demanding of their cars and digital

interactions with them. Smartphone applications can help to make our lives easier; our cars cannot fall behind.

3.5 *Communication actions*

An intensive communication campaign was planned, and several communication actions were implemented to reach a wide audience.

The figure below depicts the dedicated flyer produced for communicating about the hackathon on the symbIoTe web site and other social networks.

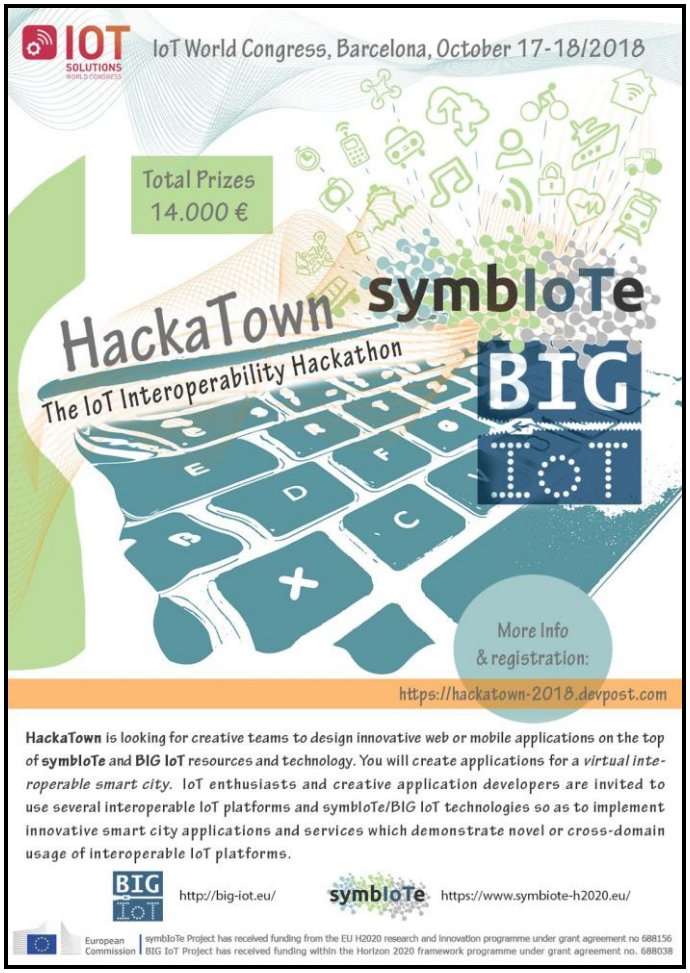

Figure 1 – hackathon flyer

As for institutional communication, the information was published on the symbIoTe web site in the News&Event section (*https://www.symbiote-h2020.eu/news-and-events/*). Furthermore, the information was spread also through the 3rd symbIoTe newsletter. This latter action reached also the symbIoTe Open Calls applicants.

Regarding social network coverage, the news was published and shared mainly through symbIoTe's LinkedIn (https://www.linkedin.com/company/h2020-symbiote/) and Twitter (*https://twitter.com/symbiote_h2020*) feeds.

In LinkedIn, the news was also shared through professional groups interested and focussed in various ways to IoT fields, such as:

1. H2020 TRANSPORT Research & Innovation and Intelligent Transportation Systems (ITS), https://www.linkedin.com/groups/4427028, 8,784 members
2. International Innovation Association - Expert Innovators Network by SOLUTIONSpeople.com, https://www.linkedin.com/groups/32614, 29,902 members
3. "H2020 SMART CITIES & Communities" ICT in Building and Construction, ASCE, BIM & VDC, https://www.linkedin.com/groups/4427029, 10,256 members
4. Internet of Things Community, https://www.linkedin.com/groups/4662022, 23,111 members
5. IoT – Internet of Things, M2M, Smart Cities, Connected Home, Car & Industry, mHealth and Wearables, https://www.linkedin.com/groups/8356116/, 106,503 members

To specifically target start-ups and entrepreneurs, the Hackathon information was advertised through the Investors & Fund raising platform F6S, in order to reach all the interested people and developers attracted through the first and second open calls. (https://www.f6s.com/hackatowniotinteroperabilityhackatho)

At European Level the information was spread through direct contacts and personal emails sent by the Coordinator to AIOTI WG03 and WG01.

Each symbIoTe partner was also committed in advertising the hackathon event in their own professional network. The table below lists all the organisations and communities informed.

Country	Communities & Organisations
AUSTRIA	https://www.iot-austria.at
SPAIN	Domotys http://www.domotys.org/es/ IoT Meetup Barcelona https://www.meetup.com/es-ES/iotbarcelona/ Betahouse http://www.betahaus.es/ Vicinity Project list http://vicinity2020.eu/vicinity/ Planetic http://planetic.es/ IkaaS project list http://ikaas.com/ P-Socrates Project http://www.p-socrates.eu/ GICI http://gici.eu/en Talent Garden Barcelona https://talentgarden.org BCN575 https://bcn575.com/ Technova barcelona www.technovabarcelona.org/
ITALY	*www.cnit.it* *www.apre.it*
CROATIA	Iot Community Croatia *https://www.meetup.com/Internet-of-Things-Croatia/* *HUB385*
PORTUGAL	COTEC http://www.cotecportugal.pt/en/ IEUA https://www.ua.pt/ieua/ INOVA RIA http://www.inova-ria.pt/en AIP http://www.aip.pt/?lang=en SPI http://www.spi.pt/en.index SANJOTEC http://sanjotec.com/

	Portugal Global http://www.portugalglobal.pt/en/ INESC TEC https://www.inesctec.pt/ip-en
GREECE	*Hellenic IoT Forum* *IoT meetup Athens http://www.meetup.com/Athens-IoT-Meetup/* *OpenCoffee.gr http://opencoffee.gr/* *EKT - Greek NCP http://www.ekt.gr/en*
POLAND	Wielkopolska ICT Cluster www.wklaster.pl Future Coworking Lab www.futurecoworkinglab.pl Securex International Fair www.Mtp.pl

Table 1 – Targeted communities and organisations by country

3.6 *Eligibility Criteria*

The Hackathon was open for any creative, **interdisciplinary team of 2-4 members** who will be able to design, implement, pitch and demonstrate innovative software solutions. Experts on mobile/web app and cloud-based service development, UI/UX designers, as well as pitching/presentation skills are desired profiles of the team members.

Teams that have prior experience in working together on IoT solutions, in **Start-ups**, **SMEs**, or **Companies** will be plus. But we were also open to teams from **Research institutes** or **Universities**.

Participants must be 18+ years. All nationalities, ethnicities and genders were welcomed to participate.

3.7 *Prizes*

For this contest, symbIoTe project allocated since the proposal stage a total sum of **10.000 euro** as prizes. The distribution of the awards was planned is such a way for dedicating equal chance to contestants applying to different challenges, therefore 5.000 euro were assigned to contestants for the Challenge **symbIoTe-powered mobile applications,** while 5.000 euro were dedicated to contestants applying for the second challenge **Cloud-based symbIoTe Domain Enablers.** In the frame of each challenge, we planned to grant a prize to the second and first best teams respectively of 2.000 euro and 3.000 euro. BIG IoT also offered a total prize amount of 5.000 euro for contesting teams of their Challenge. In total, **15.000 euro** worth of cash prizes were on offer for the Hackathon.

3.8 *Devpost site & Google form for team registrations*

The registration of participants was managed in a two-stage process. First, all the interested people were asked to subscribe at the Devpost web site (https://hackatown-2018.devpost.com/). This platform was selected since it allows the individual registered people to search, contact and form teams. The web site listed 45 participants, excluding the organizer profiles. The second step consisted of a subsequent registration of the teams in a dedicated Google Form. This second step was necessary to have a control on the issuance of entrance passes to each participant. This second subscription step ended on 15th October as fixed deadline. The entrance passes were provided by FIRA Barcelona

which gave free access to the venue of the IoTSWC and its Expo area during the 3 days of the Congress.

The separate team registration form was also useful to check the interest of teams in a specific topic and to assign them the related mentor during the hackathon. The form was edited and published as Google form and is available at the following link:

https://docs.google.com/forms/d/e/1FAIpQLScfXBUPL2hs5XMCtWYcmhD0gkGIy_YwNIoK3bvBIAx991g0mQ/viewform?usp=sf_link

4 Challenges description

4.1 *Technical details*

The main goal for the contestants was to interact with a virtual interoperable smart city - the *symbCity* - in order to create new applications and enablers on the top of the symbIoTe-enabled IoT resources (sensors, actuators and services). Those resources are exposed by various interoperable IoT platforms and made available through the symbIoTe's IoT Portal (https://symbiote-open.man.poznan.pl/symbioteSearch/). Contestants get access to IoT resources from different domains: Smart Home/Residence, Smart Mobility and Smart Yachting. The **first challenge** asks for **symbIoTe-powered mobile applications** (Android or iOS), or even web-based applications, that creatively combine resources from different platforms and domains in a user-friendly mobile app. The application can be built from scratch, or even extend an existing application already provided by participants, so as to offer added-value services to the citizens of the symbCity. The **second challenge** is about creating **Cloud-based symbIoTe Domain Enablers**, that creatively combine resources from different platforms and domains and process the data using Big Data techniques, interpolation methods, etc, so as to offer useful processed and aggregated data to the symbCity's authorities or to other 3rd-party developers. Applicants could also combine the symbCity resources with other relevant external and open data sources, like weather data, satellite data, etc.

The available resources of the symbCity are provided by six different symbIoTe-enabled platforms (OpenIoT by UNIZG-FER, openUWEDAT by AIT, nassist by S&C, Symphony by NXW, NAVIGO and openHAB by UNIZG-FER) and the Smart Mobility and Ecological Routing (SMEUR) Enabler which is a joint result of UW, AIT and UNIZG-FER. Around 130 resources are offered as listed below, per domain:

- Smart Mobility: fixed outdoor air quality sensors (PM25, PM10, CO, NO2, SO2), crowdsensing measurements for noise, light and air quality parameters (temperature, humidity, pressure, CO and NO2), air quality interpolator and urban routing service offered by the SMEUR Enabler;
- Smart Home/Residence: temperature, humidity, luminosity, smart lamps, presence sensor, light sensor, light dimmers, motorized curtain, RGB dimmer;
- Smart Yachting: proximity sensor, Average Fuel Consumption, Fresh, Grey and Black Water tanks levels, Service Fuel and Storage Fuel Oil tanks level, Port Exhaust and Starboard Exhaust temperature, list of consumable and maintenance needs.

symbIoTe provides a unified interface that allows Cloud-based IoT platforms to open and expose their resources and services in a uniform way, making them discoverable by 3rd parties. The main objective is **to simplify the development of next-generation IoT applications and services** using symbIoTe adaptors marked green in Figure 1.

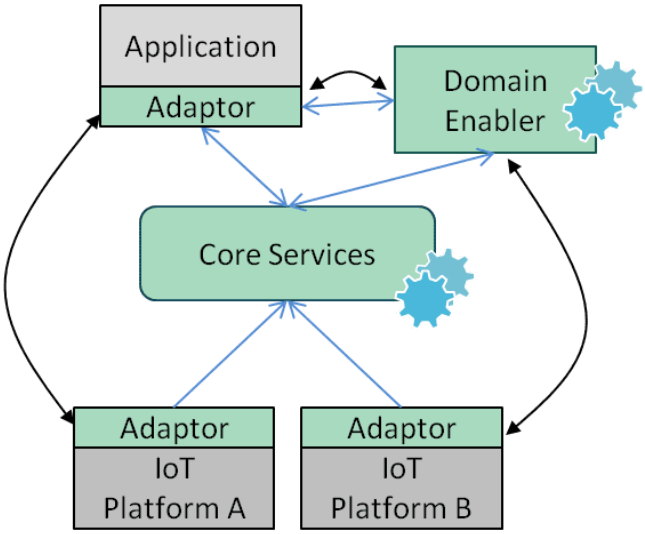

Figure 1. symbIoTe high-level architecture

The symbIoTe offerings for app and service developers were as follows:

- Core Services: maintains a registry of platform's resources and offers a Semantic IoT search engine to find adequate resources to be used in apps and services. It is implemented to offer semantic interoperability, i.e., resources from different platforms have a common representation. Core Services for the hackathon are running at https://symbiote-open.man.poznan.pl/.
- Adaptor on top of IoT platforms offers 1) unified access to IoT resources on the platform side via a RESTful OData-like interface and 2) an attribute-based security layer to platforms for full control of the access policies for their exposed resources. A list of platforms and resources for the hackathon is searchable on the symbIoTe's IoT Portal (https://symbiote-open.man.poznan.pl/symbioteSearch/)
- Domain Enablers: back-end services which simplify the interaction with various platforms so that contestants only need to focus on the actual data analytics or business logic when implementing a new enabler, e.g., to process the acquired sensor data streams, or trigger actuation based on your specific decision-making process. Teams need to deploy and use generic enabler components developed by symbIoTe and extend them with the logic specific for own smart city service.

More information about the concepts and practical examples can be found in symbIoTe's tech blogs:

- **How to build a symbIoTe enabled App** https://www.symbiote-h2020.eu/blog/2018/03/08/initial-steps-to-build-a-symbiote-enabled-app/
- **Enabler concepts and architecture** https://www.symbiote-h2020.eu/blog/2018/07/23/implementing-virtual-iot-platforms-via-symbiote-enablers/
- **Creating cooperative IoT platforms with symbIoTe** https://www.symbiote-h2020.eu/blog/2017/02/17/creating-cooperative-iot-platforms-with-symbiote/

All **documentation** for building a symbIoTe-powered app or a symbIoTe domain Enabler were available at https://middleware.symbiote-h2020.eu/, including also **examples.**

4.2 *Skills and equipment required*

For the **symbIoTe-Apps challenge**, applicants need to design and build mobile or web apps which use symbIoTe-enabled resources (sensors, actuators and services) searchable using the symbIoTe's IoT Portal.

For the **symbIoTe-Enabler challenge;** applicants need to design and build a symbIoTe Enabler to provide specific smart city service on top of symbIoTe-enabled resources (sensors, actuators and services) searchable using the symbIoTe's IoT Portal while also using and deploying the generic Enabler components provided by symbIoTe in the GitHub repository.

Useful (but not obligatory) competences of the team, depending on the challenge selected are the following:

- Android / iOS mobile app development
- Web Development
- Backend Java development
- UI/UX design
- Experience with RESTful APIs, OData, Authentication and Authorization workflows
- Experience with Spring Boot, basics of Unix/Linux (shell scripting), basics of using Unix/Linux tools: GNU screen, curl, ssh
- Experience with Data Analytics / AI

Contestants work on their own personal laptop, equipped with the necessary software, libraries, IDEs, SDKs, and other frameworks, in order to implement, test and demonstrate the solution. Below is a list of tools, technologies and equipment that may be useful:

symbIoTe-Apps challenge	symbIoTe-Enablers challenge
• Personal computer for app development with an IDE for Java, C#, Objective-C or JavaScript • Software Development Kit(s) for mobile development (Android, iOS or Cross-Platform) • Mobile Device(s) for testing, validation and demonstration	• Laptops for development: Java 8 SDK, Java IDE, gradle, docker • If the Enabler will be hosted on participant's laptop then 4GB RAM are needed only for running an Enabler. It is advisable to use a laptop with 8-16MB of RAM. Enablers can also be deployed and hosted on Cloud-based servers that the participants have access to.

5 Evaluation criteria and procedures

5.1 *Evaluation Criteria*

The evaluation criteria was selected in order to evaluate the results under different points of view for demonstrating the quality and the proper use of available resources and technologies opened by symbIoTe and BIG IoT as well. The judging criteria and related maximum scores are listed below:

- **Usage of symbIoTe / BIG IoT technologies**
  Usage extent of the symbIoTe / BIG IoT technologies and how suitable they are for the designed and implemented solution - max points: 30
- **Technical Quality**
  Technical quality of the demonstrated solution - including design and correctness of operation - max points: 20
- **Interoperability**
  Cross-platform and cross-domain usage of symbIoTe/BIG IoT resources, how many different IoT platforms and domains the proposed solutions cover - max points: 20
- **Business Potential**
  The business perspective of the proposed solution - max points: 20
- **Pitch Quality**
  Pitch quality and overall impression - max points: 10

Each Judge was provided with a table for collecting impressions and scores during the pitch session.

HackaTown: The IoT Interoperability hackathon							
Venue: IoTSWC Barcelona							
Evaluation date: 18.10.2018							
Judge: Please fill in your name here							
Challenge	**Teams**	**Usage of symbIoTe / BIG IoT technologies MAX 30 points**	**Technical Quality MAX 20 points**	**Interoperability MAX 20 points**	**Business Potential MAX 20 points**	**Pitch Quality MAX 10 points**	**Comments (not mandatory)**
BIG IoT	Magnesium						
BIG IoT	Dama						
BIG IoT	Big Koalas						
SYM Apps	Merluzos						
SYM Apps	make(this.team).win()						
SYM Enabler	Mare Nostrum						

Table 2 – Score table

The winning teams were those reaching the highest score as results of the total points collected from all the judges.

6 Running of the hackathon

6.1 *Participants and Teams*

There were 24 attendees in the Hackatown event as indicated below.

Full Name	Affiliation
Clara Jiménez	CeDInt UPM
Ester Lorente García	UPC
Ferran Larriba Pérez	CEP
Gisela Ruzafa Amado	UPC
Gonzalo Recio Domènech	UPC
Guillem Ortega i Benito	UPC
Guillermo Cañada	CeDInt UPM
Javier Perez Perez	UPC
Javier Torralbo Gil	Sparsity
Jorgina Arres Cardona	UPC
José Francisco Crespo Sanjusto	UPC
Josep de Cid Rodríguez	UPC
Juan José Vázquez Giménez	UPC
Marc Vila Gómez	UPC
Pau Torrents i Gallego	FXStreet
Pol Casasayas Esquerda	UPC
Sandra Martín Bartolomé	-
Sergio Morales Bonet	UPC
Sergio Paredes Sigüenza	UPC
Silvia Calatrava	CeDInt UPM
Toni Arellano	UPC
Ivo Krajinovic	Microlink d.o.o.
Ivica Kontent	Microlink d.o.o.
Charlie Isaacs	Saleforce

Table 3 – List of attendees

The contestants were for the majority affiliated to the Universitat Politecnica de Cataluya as students, and one of the teams comprised of researchers affiliated to Universidad Politécnica de Madrid. There were also 5 registered participants representing different companies.

There were six (6) teams formed, which applied to different challenges, as indicated below. The teams resulted equally distributed between BIG IoT and symbIoTe challenges. As for the distribution within symbIoTe challenges, two teams were applying for the challenge Apps and one for the challenge Enablers.

Team	Challenge
Merluzos	symbIoTe Mob Apps
MareNostrum	symbIoTe-Enablers challenge
Magnesium	BIG IoT challenge
BigKoalas	BIG IoT challenge
make(this.team).win()	symbIoTe-Apps challenge
Dama	BIG IoT challenge

Table 4 – Subscribed teams

6.2 *Agenda*

The event was planned for two full days. The agenda foresaw an opening session dedicated to introductory information to the contestants, related to symbIoTe and BIG IoT project, Moreover, an explanation about the challenges' objectives and related resources available for creating new solutions were presented. During the hackathon session, three mentors were available to contestants for providing explanations and information.

On the second day, the morning session was dedicated to finalize the solutions and to prepare pitches and presentations. This session was organized in 15 minutes slots dedicated to each one of the team in which contestants had to present the solution, run the related demo and answer questions to the jury.

The overall agenda is depicted below, as also published on Devpost web site.

AGENDA

Day 1 - 17 Oct

09:30 - 10:00 Welcome
10:00 - 11:00 Introduction to challenges
11:00 - 19:00 Hackathon session
19:00 End of Day 1

* Coffee and soft drinks will be available all day
** Pastries will be available from 11:00 - 12:00 and 16:30 - 17:30
*** Sandwitches will be available from 12:30 - 15:30

Day 2 - 18 Oct

09:30 - 14:00 Hackathon session
14:00 - 16:00 Pitches and demos
16:00 - 17:00 Jury meeting / Get-together and networking
17:00 - 17:30 Awards
17:30 End of HackaTown

* Coffee and soft drinks will be available all day
** Pastries will be available from 10:30 - 11:30
*** Sandwitches will be available from 12:30 - 15:30

Figure 2 – Hackathon Agenda

6.3 *Preparatory Workshop and Mentoring*

An initial workshop has been prepared for introducing the challenges and giving the contestants an overview of the goals and on the symbIoTe middleware. The list of available software resources on GitHub was provided, as well as a list of the available IoT resources consisting the virtual symbIoTe city; the symbCity.

A second presentation was given by symbIoTe, which followed BIG IoT's presentation about their challenge and covered Business aspects, like sustainability and how to build a business model canvas, as well as suggestions for the preparation of the pitches by the teams.

The presentations, including the introduction to BIG IoT challenge, are available in the links listed below:

- symbIoTe presentation: https://www.symbiote-h2020.eu/wp-content/uploads/2018/10/HackaTown2018-symbIoTe-presentation.pdf
- BIG IoT presentation: http://big-iot.eu/wp-content/uploads/2018/09/2018_HackaTown_BIG-IoT_intro_AZ-3-c.pdf
- Business/pitch presentation: https://www.symbiote-h2020.eu/wp-content/uploads/2018/10/HackaTown2018-Business-Tips_V2.pdf

During the coding session, mentors and other technical staff form symbIoTe were available for questions and clarifications. From symbIoTe project, four mentors were attending the event:

- Mario Kušek from UNIZG-FER for the topic symbIoTe Enablers
- Karl Kreiner from AIT for the topic symbIoTe Apps (android/web app)
- Konrad Leszczyński from PSNC for the topic symbIoTe Apps (iOS App)
- Digu Aruchamy from S&C for Business aspects.

Additionally, Sergios Soursos, project coordinator, and Ivana Podnar Zarko, technical manager, were available for further clarifications.

Figure 3 – Mario Kusek and Vasilis Glykantzis from UNIZG-FER and ICOM respectively, mentoring the team applying to the Enablers challenge.

6.4 *Coding session*

The coding session started right after the presentations of the challenges and run for 8 hours in the first day and for 4.5 hours on the second day. Despite the first day session ended at 19.00 pm, the teams were allowed to continue their work at their own premises. The coding session ended at the event place at 14.00 pm on 18th October.

Figure 4 – Coding Session

6.5 *Presentation of results*

Each team was assigned with a time slot of 15 minutes to present and demonstrate their solution. The presentation included the description of the overall idea, the involved resources, and its potential impact. The demonstration showed the usage and usability of the involved applications or Enabler. At the end of the pitch, a short “Questions & Answers” session took place in order to allow the judges to attain a deeper insight of the solutions developed.

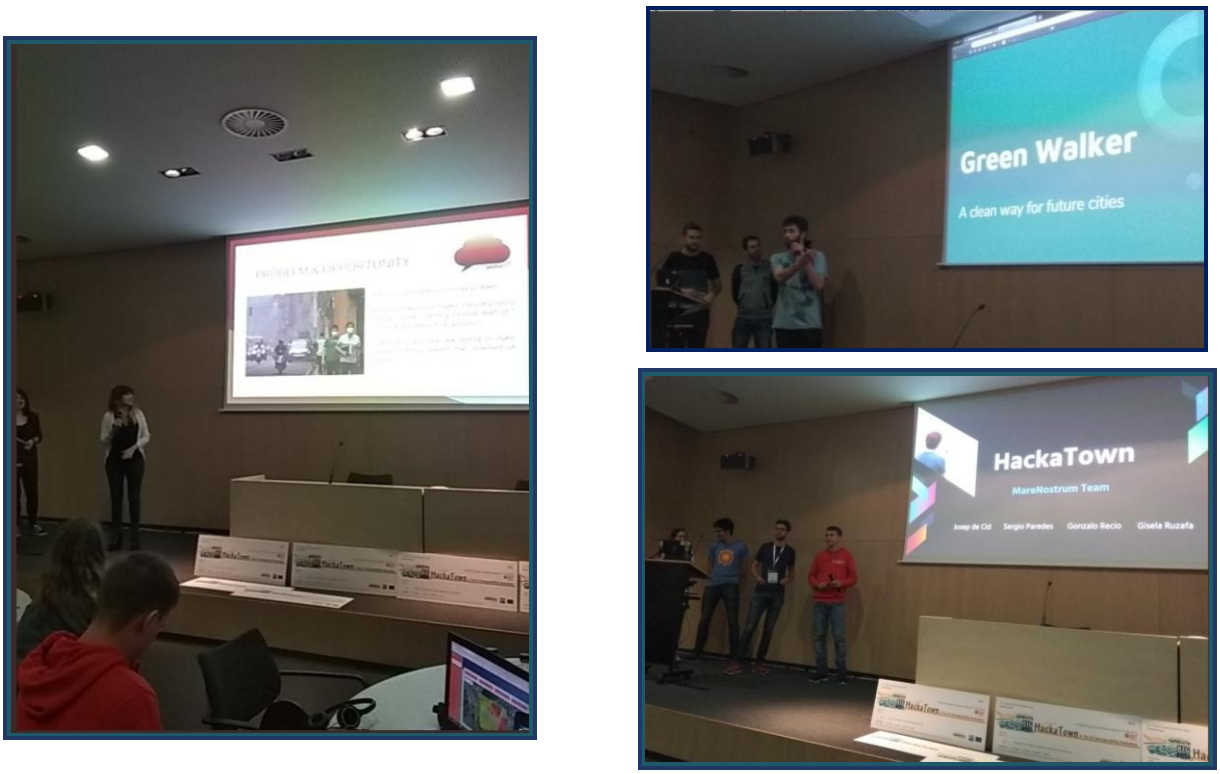

Figure 5 – Pitching session

Below, we give an insight about the focus of the solutions developed by the teams participating in the symbIoTe challenges:

- **SymbPolluTalks** - Air Quality Index Map and alerts to citizens is a web-app using two data sources (fixed stations and mobile stations) and the interpolation service for pollution prediction. The Web-app sends twitter alerts and through the web app allows the data visualization

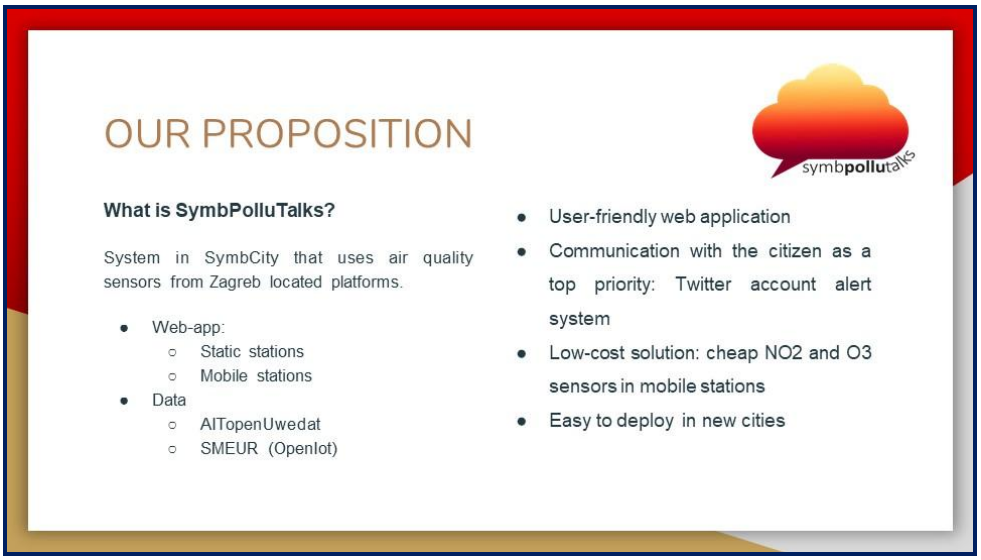

Figure 6 – SymbPolluTalks slide

- **airEnabler** is an Enabler with a simple interface in Google Cloud Platform combining existing information from sensors/actuators and adds additional information from other sources, it uses data analytics and provides analysed data and interpolation for non existing data

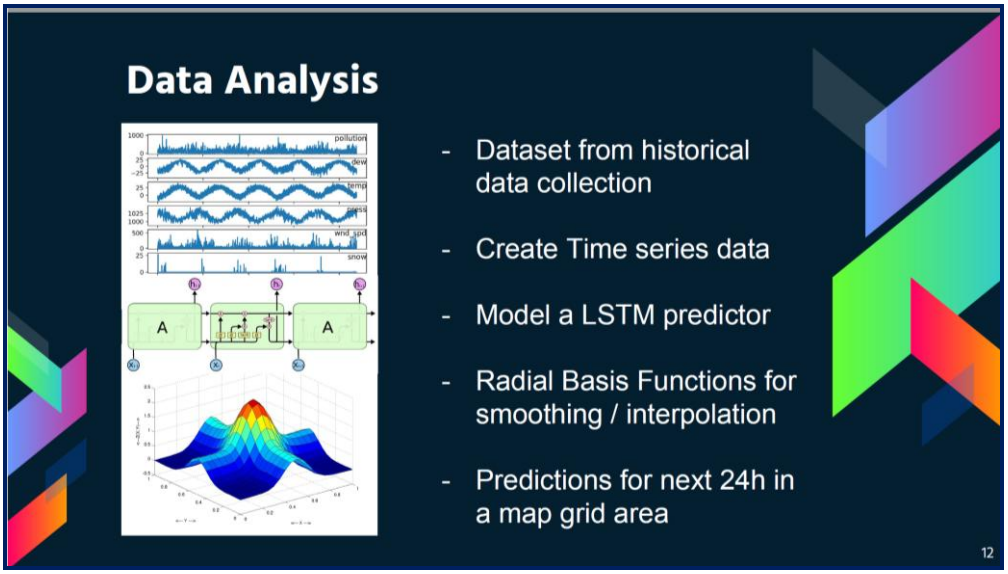

Figure 7 – airEnabler slide

- **Green Walker** is an app for Air quality applied to Zagreb. The app is running both on Android and iOS system. It combines a routing Service with an Air quality Interpolation Service.

Figure 8 – Green Walker slide

6.6 *Jury and evaluations*

Representatives from the symbIoTe and BIG IoT projects composed the jury, in a balanced way, as reported below.

1. Sergios Soursos - Intracom SA Telecom Solutions
2. Pablo Gimenéz - Sensing&Control
3. Ivana Podnar Zarko - University of Zagreb
4. Herruzo Sanchez - Seat Es
5. Achille Zappa - Insight Center for Data Analytics
6. Rosa M. Martin - Universitat Politecnica de Catalunya

Figure 9 – The symbIoTe judges

Figure 10 – The BIG IoT judges

6.7 *Winning Teams*

After the pitching and demo session, the Jury met in a private session for sharing their views and discussing the details of each submission. Then, each judge provided scores for each criterion for all the six teams, in a disclosed manner. The following table shows the average scores for each criterion and final scores for each team.

Challenge	Teams	Usage of symbIoTe / BIG IoT technologies MAX 30 points	Technical Quality MAX 20 points	Interoperability MAX 20 points	Business Potential MAX 20 points	Pitch Quality MAX 10 points	Total Score
BIG IoT	Magnesium	17,83	9,67	11,50	8,83	5,50	53,33
BIG IoT	Dama	20,67	15,33	9,33	10,17	7,33	62,83
BIG IoT	Big Koalas	25,33	16,67	15,00	17,00	9,33	83,33
SYM Apps	Merluzos	17,67	13,33	9,33	5,50	7,17	53,00
SYM Apps	make(this.team).win()	17,83	13,17	10,00	8,33	7,67	57,00
SYM Enabler	Mare Nostrum	22,00	18,83	9,50	10,00	6,67	67,00

Table 5 – Final scores

For symbIoTe challenges the winning teams in decreasing order are:

- symbIoTe-Apps challenge - 1st prize: **make(this.team).win()**
- symbIoTe-Apps challenge - 2nd prize: **Merluzos**
- symbIoTe-Enabler challenge - **Mare Nostrum**

In consideration of the low participation and competition among Teams, the consortium decided to lower the prize to the second App-challenge team according to the value of the solution proposed.

The granted prizes are:

- symbIoTe-Apps challenge - 1st prize: 3.000 euro for **SymbPolluTalks** - Air Quality Index Map and alerts to citizens
- symbIoTe-Apps challenge - 2nd prize: 1.500 euro for **Green Walker** - An eco-friendly map router
- symbIoTe-Enabler challenge – 3.000 euro for **airEnabler** - An enabler for symbIoTe platform to enhance air quality data

For BIG IoT challenge the winning teams in decreasing order are:

- 1st prize: **Big Koalas**
- 2nd prize: **Dama**
- 3rd prize: **Magnesium**

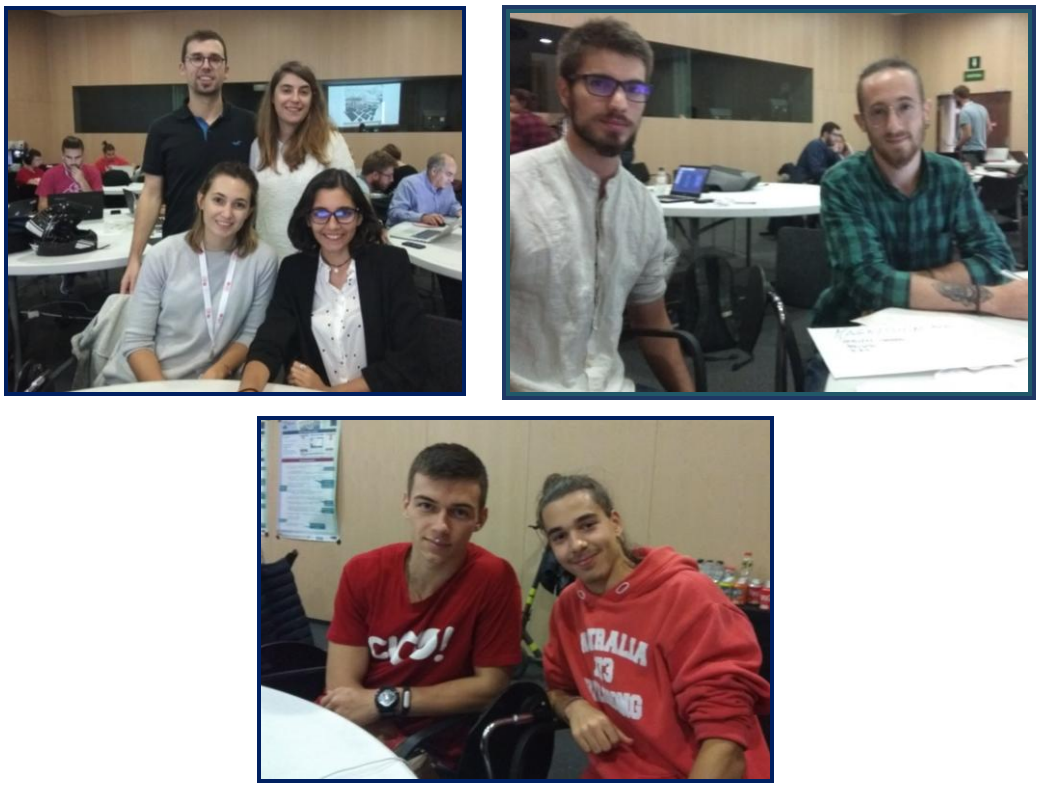

Figure 11 – BIG IoT teams, respectively from left: Big Koalas, Magnesium, Dama.

Figure 12 – Closing ceremony

7 Conclusions

The deliverable D6.3 “Context Text and Supporting Documentation” outlines the procedures and objectives panned for managing the symbIoTe Contest/Hackathon. The preparatory work within the consortium started from the selection of the most suitable and feasible challenges and goals for a coding session. The communication actions were addressed to IoT informal communities mainly based in Spain but without excluding communities and developers coming from other countries, in consideration of the resonance of the main event, the IoTSWC 2018.

The total number of participants was satisfactory and our hackathon session was one of the biggest hackathons organized in IoTSWC 2018. The attendees were mainly coming from the academia (MSc/PhD students), although we targeted many communities from the industry.

The Hackathon gave us the opportunity to prove the usability and effectiveness of the IoT resources existing in symbIoTe and grouped, for this event, in a virtual city. The contestants were able to realise in a very short coding session web/mobile applications and enablers actually using symbIoTe. We received valuable feedback from the participants which we considered when updating the documentation and examples of the symbIoTe middleware.