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D4.12 Hackathon to the open data and open APIs generated
in the project

WP4, Task 4.5

Transition of EU cities
towards a new concept of
Smart Life and Economy



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Task description	<p>Task 4.5: ICT and Urban Platform developments – ICT & URBAN PLATFORM</p> <p>Energy and district-level components will be developed and up-taken into Helsinki Urban Platform. Currently the Urban Platform consists of over 600 various systems. With Lighthouse, the zone-specific and energy-specific components both to the static open data as well as real-time data (IoT) systems will be implemented. Also, two specific Apps will be developed to demonstrate the value of the new open data and open APIs, and a hackathon will be organised to engage external developers for further data exploitation.</p> <p>D4.12 deals with the definition and promotion of Open Services based on Open Data and Open APIs to be used by third parties</p>		
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30/1/2020	2.1	Timo Ruohomäki (FVH)	Final review with peer review comments from SAL and ARM. Ready for submission.

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Abbreviations and Acronyms

Acronym	Description
mySMARTLife	Transition of EU cities towards a new concept of Smart Life and Economy
API	Application Programming Interface, a set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application or other service
GIS	Geographical Information System
SME	Small and Medium Business
Stara	City of Helsinki construction services department

1. Executive Summary

This deliverable provides a summary on the definition and promotion of Open Services based on Open Data and Open APIs to be used by third parties, as defined in the Description of Action. While the topic of the deliverable is about hackathons, the work was based on various methods of innovation. As addition to traditional hackathons, service demos were created as part of innovation challenges, innovation projects for students and sparring programs for established companies.

During the first three years of the project hackathons and similar activities were established as a part of the culture of City of Helsinki under the name *Helsinki Loves Developers*, that brought together the city open data developers, independent developers and companies interested in providing services to smart city needs. The group meets several times a year with typical attendance of 20-30 developers. The topic of the latest meetup was “Smart Mobility with Open Data¹”.

It can be seen that the hackathon in various formats has during the mySMARTLife project become a natural way of connecting the city challenges with developers. The city is participating on hackathon events frequently and creates additional, supportive innovation challenges as needed.

¹ <https://www.meetup.com/Open-Data-Finland/events/266199800/>



2. Introduction

2.1 Purpose and target group

This document provides an overview on open, social development methods such as hackathons for general audience.

2.2 Contributions of partners

The following table depicts the main contributions from participant partners in the development of this deliverable.

Table 1: Contribution of partners

Participant short name	Contributions
HEL	Review and comments, hackathon challenges by Helsinki logistics unit Stara and Helsinki Regional Infoshare
SAL	Peer review
ARM	Peer review

2.3 Relation to other activities in the project

The following table depicts the main relationship of this deliverable to other activities (or deliverables) developed within the mySMARTLife project and that should be considered along with this document for further understanding of its contents.

Table 2: Relation to other activities in the project

Deliverable Number	Contributions
D4.9	This deliverable can provide new services to the Carbon Neutral Me
D4.14	This deliverable can utilize the data opened as a result of D4.14 monitoring system
D4.24	The building-level energy savings potential and related datasets were used as source data on innovation challenges

3. Background

Hackathons in general refer to gatherings where programmers in small teams collaboratively code in an extreme manner over a short period of time. The events are somewhat competitive by nature and winning team might receive a monetary prize that in larger events might be significant, especially when the participants are hobbyists or students.

Over the years the use of the hackathon term has varied and new types have been created when the goal is not anymore creating code. The following examples of alternative hackathon types provide an overview:

- *Ideathon* is a short, intensive brainstorming event to help young talents to generate fresh solutions to provided challenges
- *Data hackathon*, where data scientists compete with advanced solutions to provided challenges
- *Innovation Challenge* is a specific and focused idea creation process for participants to engage and contribute during a set timeframe. This can also be arranged with student groups as part of the university curriculum.
- *Growth Hacking* is typically intended to start-ups and SMEs who look for business growth by new marketing ideas and product/market fit. In the smart city context growth hacking might have a meaningful impact by educating the companies to better understand the city and public sector needs

The hackathons are typically organized by companies, organizations or universities. These have become elemental in EU funded innovation programmes. Some hackathons have also been organized by the agencies of the European Commission. As an example, the Research Executive Agency organized in November 2019 an Earth Observation Big Data Hackathon as a joint event of five EU-funded Horizon 2020 projects².

The mySMARTLife-project has been involved with several hackathons as part of the initiatives to promote open data, open source software and open APIs in the smart city context. Since the prerequisite for this is new and meaningful data being made available, the hackathons have been somewhat limited. The city urban logistics unit Stara however saw the potential and with the support of other initiatives, identified and opened new datasets for developers to use.

² https://ec.europa.eu/info/events/h2020-eo-big-data-hackathon-2019-nov-07_en

In order to learn more about the hackathon methods and best practises, mySMARTLife project members attended on hackathons hosted by the logistics and construction services department of Stara. The hackathons were part of a big data project funded by the European Regional Development Fund that looked for data driven concepts with challenges from the daily operations of the department. For mySMARTLife, it was useful experience also from the point of the next level of urban platform development, how to make a data platform to better support operational processes in the city. For Stara, the ultimate goal was to enable demand-driven production to better serve the customer, the city and its citizens. For mySMARTLife, the datasets used in challenges were also datasets that will be used to calculate datasets and provide simulations in other deliverables. Also, Stara has been active in mySMARTLife mobility action group and one of the actions related to electrically powered utility tractors is connected to their equipment and operations.

The hackathons that were participated by the project were Industryhack that was organized specifically for Stara in October in Helsinki and Junction that is held annually in November in Espoo. Attending both the challenges over the period of the co-development camp as a member of jury provided a good insight on what in the challenges attract participants and where the level of expectations can be set.

4. Hackathon Events

4.1 Industryhack

Industryhack is a turn-key hackathon service created by a Finnish company Industryhack Ltd. The concept is well structured and organized. The pilot project following the co-development phase is vital in their process. On average, of the 103 teams taking part of the innovation challenges in 2017 30 went further to pilot project. Typically, the pilot projects started 4,5 months after the innovation challenge event and lasted 4-8 weeks, consisting of two weeks sprints with 2-4 milestones. The following figure illustrates the process:



Figure 1: Industryhack Innovation Challenge Process

By 2018 Industryhack had organized over 40 open innovation challenges with their industry partners. The goal is that open innovation could truly be used to solve major and meaningful challenges, in a way that makes it easy for companies to work together with other organisations. They recommend to measure the true success of open innovation rather by the number of completed projects and the results they bring than the number of trials or hackathon events (Ronkainen et. al. 2018).

Based on a study of the first challenges – including the one with challenges from the city of Helsinki, Industryhack formulated their instructions into nine specific rules that will help to create a successful innovation challenge:

1. Look for a partner with serious intentions, so no time gets wasted
2. Define the scope of the challenge so you know who to include to the project

3. Involve all people relevant to the project from the very beginning
4. Plan the schedule ahead so the process doesn't get left hanging
5. Build a multidisciplinary team
6. Appropriate length for the pilot is 4-8 weeks and cost 10k€ - 30 k€
7. Make sure you know the basics of a culture of experimentation
8. The project should be lightweight to carry out and contracts should be flexible
9. A neutral third party ensures that the process is fair

In Stara StreetReboot innovation challenge, the participating teams were invited to attend a co-development camp that lasted one weekend. About half of the teams represented their employers, sometimes utilizing technologies the companies provide. Students formed about half of the teams. Two teams were awarded for their solutions. For the pilot stage, a solution that was forecasting road conditions to better optimize maintenance truck route planning was selected. Of the seven attended teams, four solutions were piloted in smaller scale. One solution went to production use only four months after the innovation challenge weekend.



Figure 2: Maintenance Truck Demo to Industryhack Participants

4.2 Junction 2017

Junction is a large event with several parallel challenges. It is held close to the Slush event that attracts talent widely to participate. Even though the Junction has been held only three times, it has already created a tech community of 20.000 talents.

In Junction2017, 1.500 developers from 86 countries gathered in one location in Espoo, making it the biggest hackathon event in Europe. The participants were selected from 5.000 applicants. The challenges were assigned into 13 thematic tracks. For the 37 challenges announced during the event, a total number of 320 projects were formed. The majority of participants have already worked as developers as the coding experience includes only university level CS major studies and full-time working experience.



Figure 3: Sami Aherva, Unit director at Stara, announcing the city challenges

The winner of the Junction 2017 was team Glados, that was working on the Stara challenge. They built an app that streams live video from the user's phone to Glados traffic sign detection server. User films the streets from their car, while driving around the city. The application processes the video live and when a traffic sign is recognized it is saved with its GPS coordinates. Later, from all the stored pictures of traffic signs user determines which ones need repairing and which not.

The second team that went forward on piloting phase was Smart City Maintenance. Their demo was a feedback ticketing system that was made more automatic by applying analytic and cognitive services to

the mix with an analytics engine that can be easily integrated with existing operating systems by open APIs.

In general, the demos responding to the operational challenges were impressive and close to production quality, even though put together in very short time. The pilots also have links to the development made in the mySMARTLife -project. The team from Stara that attended both the events included staff that were involved with the challenges in their real, daily life. This approach was clearly motivating the staff but also rising their expectations on new tools to help their daily work.

4.3 Junction 2018

In 2018, City of Helsinki participated on Junction with the theme Rebuild the Streets, with specific expectation on getting new ideas to speed up roadworks with data driven solutions. The main part of data provided for the challenges was collected from a major street rebuilding operation in Mechelininkatu. The street is one of the main streets of the city of Helsinki and rebuilding operation was expected to be challenging due to the various pipe- and powerlines dating back to early 20th century. The exact positions of the lines were not known because the oldest maps were over 100 years old. Because of this, the whole project was expected to take up to two years. The challenges provided to the development teams were focusing on traffic management, visualisations and communications.

The winning team, “Make Mechelininkatu Great Again”, created an app to collect and analyse feedback originating from the work site more accurately and faster. The app utilized artificial intelligence, traffic flows based on mobile phone data and map data. The feedback from residents was easier to submit because of a QR -code.

As addition to the winning team, another team called TerrainSense also received a prize with their app that utilized heart rate monitors to monitor worksite vibrations.

In 2018, over 1200 developers around the world participated on the hackathon.

4.4 Junction 2019

In 2019, City of Helsinki and Stara again attended on the Junction, this time with challenge titled Reboot Building Repairs³. The motivation for the challenge came from the management of the over 4.000 annual smaller and bigger repair projects of the buildings owned by the city of Helsinki. In construction projects the departments of the city have multiple roles: the city as a real estate administrator orders the work, the initial planning is done by the design engineers at Stara, the work site is prepared and finally the actual work is performed typically in the middle of everyday life in the space. Finally, the work is documented in various ways.

³ <https://2019.hackjunction.com/challenges/reboot-building-repairs>

The role of the data in such processes is significant. To improve efficiency, more information about the work should be provided in advance in order to minimize the planning visits to the site. The thorough documentation of the work also allows to decrease the number of required visits on the site.

For the challenge, Stara again provided skilled mentors with practical hands-on experience and know-how of the data. The data came from actual examples, combined with open APIs and open data sources such as the Helsinki Region Information Service.

In total, 18 development teams joined to provide their solutions for the challenge. The winning team, Staroake, provided a communications tool that will link together the contractors, their workers, supervisors, customer and interested third parties.



Figure 4: Mentors of Junction 2019 and the Winning Team

4.5 KasvuOpen 2019

When the traditional coding hackathon as a method was used several times to meet the project goals, alternative hackathon types were evaluated in early 2019. As a result, concepts related to more mature development teams were identified as a new target to better involve existing SME's as addition to students and hobbyist developers. In that target group the challenges are typically different, moving from coding challenges to growth challenges. The Growth Hack concept aims to provide the start-ups and established SMEs better understanding about the market needs, thus both helping companies to grow but also to provide cities new sources for the acquisition of innovative smart city technologies. In practise this has

meant educating the companies on the role of open API's, open data and open algorithms and the success stories other companies have had in such ecosystem.

The Growth Hack concept was chosen to support the project goals. Together with a Finnish non-profit innovation company Kasvu Open Ltd. They have over the years created a comprehensive concept, KasvuOpen, for the mentoring process. In 2019 the first Smart City -themed track was developed as a joint effort together with companies Schneider Electric, Ramboll, YIT and VTT which is also a partner in the mySMARTLife consortium.

The Smart City track was only one of the many themes the KasvuOpen challenge contained. Due to the long history and nationwide coverage, the program was popular: on all the tracks in 2019, a total number of 3.600 companies had sent applications.

In the 2019 Smart City track the concept was split to the following stages:

1. Application stage, when typically 20-50% of applications are accepted to growth track. Acceptance criteria include assessment on the skills and level of ambition on expanding the operations.
2. Growth Workshop, where attending companies meet the mentors for the first time to get more information about the expectations and challenges.
3. Growth Highway 1, where attending companies pitch their smart city solutions to mentors. The mentors represent the ecosystem in various roles, providing insights on requirements, use cases, marketing and sales strategies.
4. Growth Highway 2, that is structured in the same way than the previous workshop, but in the end of the event voting is arranged with mentors to choose the most potential companies on each track.

While the discussions between the mentors and companies are private and confidential, the events also include joint sessions and the goal is to create peer networks between companies to improve offerings with co-operation and also to create support channels to the entrepreneurs.

In Smart City Track 2019, the winning company was Maptionnaire Ltd that provides participatory geographical information systems (GIS) to improve the management of cities and to ease the participatory actions. As a research-driven company Maptionnaire benefitted from the discussions with skilled business professionals and received advice on how to improve marketing and sales in order to better reach the smart city market. From the mySMARTLife project perspective, KasvuOpen was a good opportunity to promote new open datasets and open APIs to companies that are already in the market. With Maptionnaire, the process lead to further discussions on how to better utilize the participatory GIS method on various city development initiatives.

5. Conclusions

The experiences from the major hackathon events of various types lead to the conclusion that hackathon is still a valid method to co-create and generate innovations on given challenges. Even though the actual development time is extremely short, because of open source, open data and open APIs impressive demos can be created.

Participating on hackathon events is a major marketing and branding event to the city. In both Industryhack and Junction the city teams were very visible with their yellow vests and the same “uniform” was also provided to the team. This made them the brand agents of the city within the thousands of developers over the weekend. It can be seen essential to the smart city to be developer friendly and doing that in a convincing way requires active participation on developer events.

The budget allocation on mySMARTLife does not cover the expenses of major events like Industryhack or Junction. Because of the other funding sources and the dedication of the city organisations, significant results were achieved. Smaller innovation challenges can be organized instead of large events, but attracting talented developers may be an issue. With innovation partners like universities there are also other methods that can provide good results, as an example innovation challenges and innovation projects that are part of the curriculum.



6. References

Ronkainen, E., Roiha, E. (2018) *Industryhack White Paper*. Industryhack Ltd, Helsinki.