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ABSTRACT

Exploitation of project results aims to enlarge the business and/or research, education and consulting portfolio of the participating organizations and to improve their competitiveness. This report outlines the first iteration of the CPaaS.io exploitation plans and the first activities undertaken towards their implementation.

Disclaimer

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1 Exploitation Strategy

This document presents the status of the plans for exploitation of expected CPaaS.io results by consortium partners after year one. While still 1,5 years of R&D are ahead of us, the plans which initially were stipulated in the project proposal became already much more concrete, new opportunities have been identified and activities towards exploitations have been undertaken already from the beginning of the project.

Exploitation is contributing to the business model of the individual partners. For Universities and Research Organisations it addresses mainly the impact on their education and consulting activities, for industry partner advances for their hard-and software products and for system integrators a wider business portfolio. Common to all stakeholders is the exploitation in other R&D activities.

In the following chapters the individual partners have listed their relevant exploitation channels and described their plans, how they expect to gain impact from the findings of the CPaaS.io project. In addition the activities towards exploitation have been listed, which at that stage mainly address the promotion of the project to existing or potential business partners.

This document can be considered a living document which will be released in a final version by the end of the project. Especially the last project months are foreseen for the consolidation of the exploitation plans and start of practical impact creation. At this time also concrete paths for an exploitation of the platform as a whole will become tangible.

2 Exploitation by BFH

2.1 Organisation Profile

Bern University of Applied Sciences (BFH) is the region's largest state university for applied research performing a wide range of lecturing and R&D activities. Priorities of BFH's E-Government Institute are in the areas of Open and Linked Data, Security, Identity, and Privacy with international projects and projects related to or inside the national e-government program, Data Science with international projects and projects related to federal and cantonal social welfare programs, Digital Sustainability with projects related to the activities of the Swiss Parliamentary Group Digital Sustainability, and Public Innovation in Municipalities and Cities with a focus on knowledge transfer and sharing as well as citizen participation. The work of the Open and Linked Data group deals with the use of data in federal systems, the maintenance of shared data infrastructures and the reduction of risks that arise from data use (e.g., privacy and security). The work aims to minimise the hurdles in the deployment, general use and reuse of data and information across organisational boundaries as well as to develop concrete solutions and innovative business models, based on sustainable interaction between data producers, consumers and intermediaries.

The smart city topic is gaining importance in many city administrations in Switzerland. For the E-Government Institute, CPaaS.io is a flagship project that enables to offer better consulting services in its interactions with officials from different cities, and that furthermore helps to strengthen our topic leadership in the field of smart city, in particular the combination of IoT, Open Data and Linked Data.

2.2 Exploitation Plans and Activities

CPaaS.io can be exploited by BFH in three ways: offering consulting services for cities and other public administrations, as material for improving our teaching offering, and as a technology basis for other research projects.

2.2.1 Exploitation in Consulting Services

Regarding consulting services, CPaaS.io is a concrete implementation of public service provision – transparent, efficient, and participative. It requires skills that cover and strengthen our profile as an unique interdisciplinary research unit: at the political and legal levels the aim is to ensure that open access to public sector data becomes a reality in Switzerland and that suitable measures are developed to counter the social challenges that are associated with the advent of the of the 'Big Data' era. We help public administrations and partners within organisations to better understand the requirements of their stakeholder groups and to define the requirements for appropriate solution concepts. We also provide support to organisations in both the semantic and technical contexts to enable them to generate data and information in a more effective, efficient and suitable form, to model relevant ontologies and to remove any barriers impeding interoperability. In the first year of the project, exploitation activities have mainly consisted of presenting the project to administration officials in different cities – either in direct meetings or in workshops where different smart city stakeholders partake. In one new consulting project where BFH helps the authorities of a smaller Swiss canton to define an open government data strategy and possibly a move towards a smart city, learnings from CPaaS.io regarding smart city in general and success factors in particular have provided valuable input that may lead to follow-up projects.

We plan to increase the discourse with various cities in Switzerland with the goal of generating additional projects regarding smart city and open government data strategy and implementation, hopefully leading to additional consulting projects with specific cities.

2.2.2 Exploitation in teaching curricula

In the first year, CPaaS.io has provided topics for several case studies as well as bachelor theses. In the next years, this will continue to be the case. Additionally, we plan to identify existing or new courses or course modules where CPaaS.io can contribute results.

2.2.3 Exploitation in other R&D Projects

We have realized that a technical platform as developed in CPaaS.io provides a valuable basis for smart city innovation, but to actually put this in practice, community platforms like Amsterdam Smart City will also be needed. We have thus proposed together with a Swiss consulting firm a new Innovation Action project, named SustainACity.io to the ICT-11-2017 topic. The evaluation of that proposal is still pending.

Also, the work in CPaaS.io has directly lead to the establishment of a new line of research for our group about smart city strategy frameworks, which will facilitate the adoption of smart city concepts as well as CPaaS.io results in cities.

2.3 Actions towards exploitation

Table 1 lists the current activities that BFH has carried out towards exploitation. We here only list concrete exploitation activities directed at a specific stakeholders; more general promotional activities – even if they have the target to generate consulting or R&D projects in the long run – are listed in D7.3.

Date	Event/Location	Activity	Target Audience	Result
Jan. 2017	Internal meeting with city of Zurich	Update on project	Smart City Strategy Lead of the city of Zürich	Continued cooperation in the city stakeholder board
April 2017	EC H2020 Call, ICT-11-2017 topic	Proposed Innovation Action	EC, cities of Amsterdam, Santander, Tampere, Winterthur	Pending
April 2017	Basel	Smart City consulting as part of OGD strategy project	Officials from smaller canton in Switzerland	Potential follow-up projects.

Table 1: Overview of BFH exploitation activities

3 Exploitation by AGT Group (R&D) GmbH

This section describes the exploitation plans and activities by AGT Group (R&D) GmbH.

3.1 Organisation Profile

AGT Group (R&D) GmbH is a German company based in Darmstadt and is part of AGT International, a privately held multinational company headquartered in Zurich, Switzerland. AGT is a pioneer in IoT data management and advanced Big Data analytics solutions that offers its solutions as part of its IoT Analytics platform (IoTA). Gartner named AGT International as one in four "Cool Vendors in IoT Analytics" developing "a broad set of reusable Internet of Things (IoT) analytics modules that can be used to deploy a wide range of applications". AGT provides products and solutions for its key verticals Manufacturing and Energy, Smart Cities, Sports & Entertainment Events (Social IoT) with the ambition to change the way life events are managed and experienced. Through HEED, the recently created joint venture with WME|IMG, a global leader in sports and entertainment, AGT has access to over 800 events that are either owned or managed by WME|IMG. These events include fashion (e.g. New York Fashion Week), sports events (e.g. Basketball Euroleague Final Four), concerts and many other events (e.g. Miss Universe) at which AGT has deployed IoT technologies that have been used for creating stories, media and content providing a new, quantifiable perspective at these events. In the areas of smart cities AGT has developed and deployed, among others, solutions for traffic and energy management.

AGT engages in research activities in order to continuously enhance its analytics portfolio, platform capabilities with cutting edge technology. Due its lean organisational structure, mature research results produced by the research team are not only exploited in related R&D projects, but are directly transferred to product and commercial project development teams.

CPaas.io relates to both AGTs Smart City and Social IoT verticals. Consequently projects results will be exploited towards both the HEED joint venture and AGT's smart city division.

3.2 Exploitation Plans and Activities

AGT exploitation plans and activities are primarily focusing on the following areas:

- Assessment of inclusion of new capabilities to its platform products
- Test drive the deployment of novel sensors and evaluate their suitability in customer projects
- Enhance AGTs analytics portfolio with new analytics
- Identify new application scenarios and services that could extend the product portfolio of the AGT-WME|IMG joint venture
- Identify new applications and service for Smart Cities products
- Evaluate potential of transferring analytics and platform capabilities to other verticals, in particular Industry 4.0
- Exploitation in other R&D projects

In order to maximize the exploitation of results, the AGT project team is constantly evaluating and assessing the project with AGT product teams (including product managers, data scientists, architects, development teams) executive management. As a concrete example, we have already provided the data collected at the Color Run to our IoT sensor data team that uses the data to compare the performance and accuracy of the various wearables we used in the event. In addition, we discuss CPaaS.io concepts and results related to analytics and the platform with existing and prospective customers. This enable us to evaluate the transferability of CPaaS.io results already in early stages of the project and constantly align and adapt to customers' needs.

We are also examining the exploitation in current and future H2020 projects. For instance AGT is developing computer vision based analytics in the Smart City project **VaVeL** in which City of Dublin and Warsaw are participating. We have already contacted the City of Dublin considering opportunities to use CPaaS.io project results in mass sport events in one of the cities. In addition we are exploring how elements of the CPaaS.io platform could be used in the H2020 project **GrowSmarter** in which we apply energy analytics in Smart Homes with the objective to reduce overall energy consumption. Finally, we plan to build on CPaaS.io results in upcoming H2020 and nationally funded projects (e.g. by the German Ministry for Economic Affairs and Energy).

3.3 Actions towards exploitation

Table 2 lists the current activities that AGT has carried out towards exploitation.

Date	Event/Location	Activity	Target Audience	Result
October 2016	Darmstadt, Germany AGT Offices	Provided anonymized data to IoT Sensor team for comparing performance of different wearables	Sensor Experts	New insights about wearable performance in mass sport and fun events
November 2016	Darmstadt, Germany AGT Offices	Presentation of CPaaS.io project overview	CEO of AGT	Project considered as highly relevant for AGT
December 2016	Darmstadt, Germany AGT Offices	Presentation of CPaaS.io project overview	Senior Vice President Smart City and IoT Solutions	Considered for further exploration in Smart City solutions portfolio

January 2017	Darmstadt, Germany AGT Offices	Presentation of CPaaS.io architecture and technologies	Architects and development teams	Awareness generated
March 2017	CeBit 2017, Hannover, Germany	Interviewed potential customers about interest in applying Color Run analytics as part of an Urban Pulse feed	City officials and urban planners	Considered as highly relevant and worth further exploring

Table 2: Overview of AGT exploitation activities

4 Exploitation by NEC

4.1 Organisation Profile

NEC is a leader in the integration of IT and network technologies that benefit businesses and people around the world. By providing a combination of products and solutions that cross utilize the company's experience and global resources, NEC's advanced technologies meet the complex and ever-changing needs of its customers.

NEC Laboratories Europe conducts leading research and development in Europe across IT and communications, including Cloud and Big Data, the Internet-of-Things, Future Internet, next generation fixed and mobile networks, and security and privacy technologies. NEC has a strong background in developing service architectures and edge-cloud data-platforms, and is a key contributor and platinum member of the FIWARE Foundation.

Applying the achievements from the FIWARE activities to enable trusted new IoT Smart City solutions is one of the key goals for NEC in CPaaS.io to leverage NEC’s commercial smart city activities in Europe.

4.2 Exploitation Plans and Activities

Fast conversion of research results into commercial products and other R&D projects are a tradition of NEC Laboratories and visible, e.g., in their integration in NECs recent European deployment of CiDAP (City Data and Analytics Platform) in Santander, the Smart City control centre (CCOC), the development of the NEC LEAF ENGINE product (integration of heterogeneous sensors to ease development of applications) and the NEC KITE edge IoT device. In the same way there is a clear plan how results of the CPaaS.io project will leverage NECs scientific, innovative and commercial activities in Europe.

4.2.1 Commercial exploitation

The experience and results gained through CPaaS.io are contributing to NECs rapidly growing activities with commercial smart city services in Europe and beyond. In detail we envisage the following exploitation opportunities:

1. NEC Iberica is deploying commercial Smart City Services in Europe and beyond, based on their Cloud City Operation Centre (CCOC). The CCOC is based on the FIWARE open source API-enabled

platform and uses different Generic Enablers from the IoT chapter, notably the IoT Broker GE of NEC and the Orion Broker GE. It was developed by NEC Iberica together with NEC Laboratories. Findings of the CPaaS.io project are supposed to become commercialized in the next generation of the CCOC, which is targeting to enable interagency collaboration between state government agencies, city government and private data sources.

2. NEC further owns an IoT-cloud-edge collaboration platform, which will become available as open source software in Europe. CPaaS.io results in the area of secure and privacy-aware edge computing will be directly transferred and enhancing this platform.
3. NECs use case contribution on pedestrian mobility detection is expected to later serve as blueprint for many other cities.

Last not least, the CPaaS.io activities together with Japan are contributing to the establishment of FIWARE in Japan. Once tangible results can be demonstrated in Japan to a wider public, NEC will intensify its exploitation activities of FIWARE and CPaaS.io into this direction.

4.2.2 Exploitation in other R&D Projects

NEC is involved in a number of R&D projects which target the development of a scalable, powerful but still easy to deploy and maintain IoT platform components, both, as individual modules as well as a holistic platform. Among other projects the following two are supposed to benefit most from making use of CPaaS.io results.

1. Horizon 2020 Project WISE-IoT: in WISE-IoT NEC is looking towards semantic mediation gateway technology to make FIWARE interoperable with other platforms, and to harmonize FIWARE with the onem2m standard. CPaaS.io is dealing with platform interoperability in specific cases, and experiences made are welcomed input for the parallel WISE-IoT activity.
2. Horizon2020 Project Synchronicity: Synchronicity is one of the IoT large scale pilot projects, targeting Smart Cities. NEC recently joined the consortium and is looking on scalability aspect of smart city services. CPaaS.io use cases will provide valuable input for the requirement analysis and obstacle identification.

4.3 Actions towards exploitation

Table 3 lists the current activities that NEC has carried out towards exploitation.

Date	Event/Location	Activity	Target Audience	Result
6.-7.10. 2016	6th Japan-EU Symposium on ICT Research and Innovation, Chiba, Japan	ICT Strategies and Japan-EU ICT cooperation, results and information from joint EC-MIC/NICT projects	Policy makers, academic and industry researchers from Europe and Japan.	Promoted Smart City research activities and links created to potential partners for future exploitation
11.1.2017	Impulsgespräche City of Heidelberg	Outlook into the future of Smart City Technologies and outlining NEC competencies	City Mayor and city government, Digital-Agentur Heidelberg (responsible for smart city conversion activities).	NEC recently became partner in the development of the Heidelberg Innovation Park, a pilot area for smart city conversion
7.3.2017	FIWARE Open	Final event of FI-PPP,	European Commission,	NEC FIWARE business

	Day, Bruxelles	outlook into commercial exploitation of FIWARE	FIWARE stakeholders	strategy including CPaaS.io communicated by NEC Head of IoT Strategy
19.3.2017	Internal meeting with the Chairman of NEC, Endo-san, Hannover	Introduction of project and joint EU-Japan collaboration	Top Management of NEC Corporation including Chairman of the board.	Raising awareness with Top Management and enabling them to promote the project activity in Japan and beyond
20.-24.3. 2017	CeBIT 2017, Hannover	NEC booth with upcoming Smart City products, which will be target for CPaaS.io exploitation	CeBIT visitors	NEC Smart City products promoted and planned roadmap with CPaaS.io results communicated
13.6.2017	Smart City Talks and Hackathon by Digital Innovation Hub for City of Düsseldorf	Presentation of CPaaS.io	Digital Innovation	PoC use case developed together with Digital Innovation Hub and large industrial technology provider, activity is ongoing

Table 3: Overview of NEC exploitation activities

5 Exploitation by OdinS

5.1 Organisation Profile

Odin Solutions (OdinS) is a technology SME founded in August 2014. OdinS works in the fields of Internet of Things, Big Data and Security. The OdinS personal have strong expertise in research and development of IoT embedded systems and Big-Data platforms for energy efficiency, security and tele-management of infrastructures. OdinS has several patents in the area of telecontrol systems and building automation. OdinS provides open, flexible and interoperable products able to connect infrastructures and mobile platforms for Smart Buildings and Smart Cities.

The multidisciplinary and enterprising team of OdinS everyday works to face new challenges of a society that is becoming more connected and technological. Some of the awards received by OdinS are:

- Award in the National SocInfo 2014 for SmartCities Solutions

- Finalist in the National Startup4Cities 2014

- Award in the National EnerTIC 2014

- Award in the International IoT360 2014 (Internet of Things Summit)

Within the software/hardware solutions work related to CPaaS.io we can identify

- city monitoring: OdinS has an extensive solution on sensors gateways and 6LoWPAN sensors that could be integrated in City Explorer a ScadaWeb system with main target being the infrastructure monitoring.
- guardian angel and safety: OdinS already developed a solution for emergency button in Android OS and that it is connected to emergency responder and safety companies.
- OdinS has several security components developed for constrained deviced to support security (ECC on DTLS for CoAP) and privacy (access control based on capabilities)

5.2 Exploitation Plans and Activities

Within the strategy of OdinS CPaaS is an important step towards several main areas:

- Design new sensors and gateways with advanced functionalities as defined in this project in order to cover new scenario where distributed intelligence is required.
- OdinS will leverage the results of this project to extend and improve the service development as well as the service creation framework of the platform that is constantly being improved by OdinS, thus improving usability of the platform and extending potential groups of users.
- It will also open up opportunities for extending the said platform for Smart City in such a way that it can successfully address a niche IoT market (end users as opposed to enterprise) which represents an excellent business opportunity.

5.2.1 Exploitation in Products

The current solution to An Information Management System for Smart Infrastructure of Odin Solutions (OdinS) is based on the City explorer platform, which integrates the following components (see Figure 1):

- Sensors: temperature, humidity, lighting, power meter, presence sensor, RFID System, etc.
- IP controlllers: hardware and software gateways.
- HMI:
    - Local: control panels
    - Remote: PCs and mobile devices
- Scada web: data collection software

Some of the integrated sensors in our system are developed by OdinS, but thanks to the high level of integration of different technologies of City explorer, sensors from third parts can be also integrated. Currently, all sensed data by the sensors are gathered by the Scada web of City explorer, using in some cases the IPex16 nodes of OdinS as gateways between sensors and the City explorer platform.

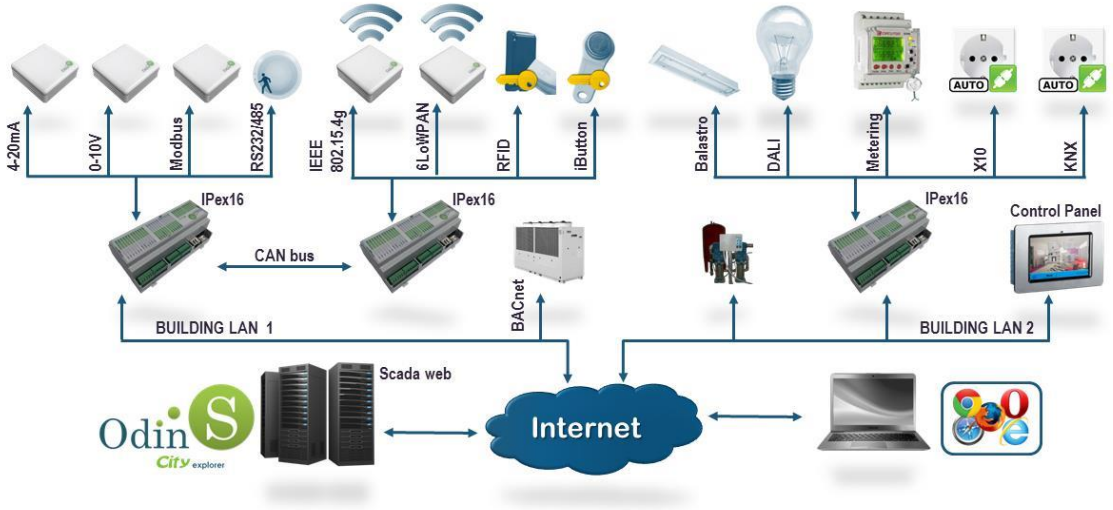

Figure 1: Schema of integration of all components in City explorer

As we can see in Figure 1, City explorer can be in charge of the monitoring and control of the infrastructures of more than one building, with the final aim of ensuring energy efficiency in the target scenarios. To date, all data processing for energy efficiency is carried out in the City explorer platform. Thus, final users of our system can communicate with City explorer to assess the system performance in terms of energy saving, as well as define their own strategies to save energy. For this, users can use the control panels of the system or access through a web access to the Scada, and if any incident or problem is detected, users are notified receiving an alarm by email or/and message.

The products of OdinS have a high level of integration with sensors, actuators and platforms of third parties, as well as such coming from the commercial market. They integrate CoAP/6LoWPAN resource discoveries and privacy based on Capability based Access Control (capBAC). Our actual solution of sensors, actuators and Scada Web (City Explorer) is unique in the market due to its high level of integration of different technologies of City explorer, sensors from third parts can be also integrated. Currently, all sensed data by the sensors are gathered by the Scada web of City explorer, using in some cases the IPex16 nodes of OdinS as gateways between sensors and the City explorer platform. This capability of integration of sensors from different vendors and protocols by means of the IP gateway allow a level of openness that it is one of the more relevant aspects of the solution. Also City explorer has a flexible and user oriented interfaces accessible by mobile, PC and tablets providing easy rules and actuation definitions on an event based model.

This platform it is the product that OdinS envision to be evolved within CPaaS.io for applicability in Smart City environment with integration of FIWARE based components.

Within the strategy of OdinS CPaaS.io is an important step towards several main areas:

- Design/update sensors and gateways with advanced functionalities as defined in this project in order to cover security and privacy aspects
- OdinS will leverage the results of this project to extend and improve the service development for smart city as well as the service creation framework of the platform that is constantly being improved by OdinS, thus improving usability of the platform and extending potential groups of users.
- It will also open up opportunities for extending the said platform in such a way that it can successfully address a niche IoT market (end users as opposed to enterprise) which represents an excellent business opportunity.

The exploitation objectives for OdinS are to expand its solution for sensors, gateways and Data Management platform with advanced security features and support integration and interoperability with FIWARE. The objective will include the design new sensors and gateways with advanced functionalities as defined in this project in order to cover new scenario where security is a first class object. OdinS will leverage the results of this project to extend and improve the service development as well as the service creation framework of the platform that is constantly being improved by OdinS, thus improving usability of the platform and extending potential groups of users. It will also open up opportunities for extending the said platform in such a way that it can successfully address a niche IoT market (end users as opposed to enterprise) that represents an excellent business opportunity.

The business model envision by OdinS could be in the case of the sensors and gateways a one-time price. In case of the platform it can be both a one time in case the client wants to manage by himself the deployment and solution, or it can be a model as a service based on providing on the cloud the access to the data monitored based on the evolution of the City Explorer platform.

5.2.2 Exploitation in Consulting Services

OdinS will also exploit the knowledge from the experience of this project for improving its expertise on security, privacy, IoT and how they can be applied in smart cities scenarios, in order to get benefits of the possibility of working in cooperation with other SMEs, industrial partners very active on current research activities in this field and its application to services. This experience will help them make OdinS position stronger in the consulting service are, and will help in creating new employment possibilities for engineers. The adaptation of existing applications, used during the trials, will create competencies to support industrial partners and SMEs.

In that sense it is expected that based on this experience OdinS could be in a relevant position to collaborate in the MiMurcia project. MiMurcia is a 8Meuro smart city project developed by the Murcia City Council aimed at making an efficient use of its available resources. It has been approved in the II Call for Smart Cities Project at national level and funded by Red.ES on behalf of the Ministry of Economy and Competitiveness1.

The cornerstone of this project is a FiWARE based Smart City (SC) platform which provides the heartbeat of the city by integrating information and measurements from all the available municipal services and concession companies as well as from a great heterogeneity of devices. Let us explain the different layers following a bottom-up approach. Sensors (lower layer) provide information to the platform, which in turn provide such information to other application (upper layer) through a well-known REST interface.

5.2.3 Exploitation in other R&D Projects

1. *H2020:* ANASTACIA http://anastacia-h2020.eu/: OdinS is working on this project on security and privacy aspects of sensors, and how to manage the security threats will reuse some of the results of the CPaaS.io requirement analysis.

[1] http://www.laverdad.es/murcia/ciudad-murcia/201608/01/murcia-recibira-millones-para-20160801200019.html?ns_campaign=APPWA&ns_source=BT&ns_linkname=Bottom&ns_fee=0&ns_mchannel=EM

2. IoT@AS: Spanish industrial Project: where the idea of using a FIWARE based platform for sensor and actuation management for irrigation is being deployed. Concepts and ideas from the work on CPaaS.io related to sensor using LoRA and the integration on FIWARE components will be exploited

5.3 Actions towards exploitation

Table 4 lists the current activities that OdinS has carried out towards exploitation

Date	Event/Location	Activity	Target Audience	Result
25 May 2017	Meeting with City Council of Murcia	Presenting the Smart city based platform and how it is related to EU projects	Modernization department	Initial discussion on a tentative pilot
July 2017	Workshop organized by Murcia Municipality	Presentation of Smart city concepts and experience	Regional City IT officers	ongoing

Table 4: Overview of OdinS exploitation activities

6 Exploitation by The Things Industries

6.1 Organisation Profile

The mission of The Things Industries is to make LoRaWAN easy to get started with. With a full stack of software it enables its clients to setup operator grade networks with a high level of developer usability.

The Things Industries provides an integrated chain of products and services start working on the Internet of Things. With a LoRa Network Server, Hardware & Support, customers can start building end-to-end solutions for yourself or for your customers. The Things Industries holds a prominent name amongst the Internet of Things developers. We are allowing people and companies to build a global, long range and low power data network in an easy, cost effective way. Our technology further allows easy deployment of private networks for situations demanding enterprise level reliability and security.

The Things Industries was founded mid 2015 and currently caters for a global network of 20.000 IoT developers, spread across 85 countries and 500 communities. The team consists of 15 hardware and software engineers and community managers. Clients include global technology integrators such as Accenture, Atos and McKinsey, as well OEMs such as Microchip, Semtech and Asus.

6.2 Exploitation Plans and Activities

The exploitation of CPaaS.io project revolves around the commercialisation of the Waterproof Amsterdam application. In a nutshell, the application aims to give insight to and control over water buffering mechanisms in both the private and public domains of a city. Recently, more properties are

required to assume a 'rain water buffer' functionality, because existing infrastructure gets cluttered due to increased volatility in weather conditions. By collecting data from these buffers, preventive and corrective measures can be taken by to limit the effects of the changing climate.

The application is currently being developed for its launching customer Waternet. Waternet is the local Amsterdam based water and water infrastructure management company. The user requirements have been determined in close collaboration, and Waternet is taking on activities to actually develop the entire ecosystem, such as involving citizens into the decision making, and manufacturers of rain water buffers to build and connect their products to the Waterproof Amsterdam application.

Exploitation of the application is based on offering the software tool under license to water management companies in general, Waternet being the first. But many more cities deal with the same issue, so after successful pilots for Waternet in 2017 and 2018, we will take the proposition to other cities as well, starting with large Dutch cities, moving on to cities in other countries. CPaaS.io will serve as a driver for pushing this service, as we regard it as an 'app in the app store' of CPaaS.io.

6.3 Actions towards exploitation

Table 5 lists the current activities that The Things Industries has carried out towards exploitation.

Date	Event/Location	Activity	Target Audience	Result
October 2016	Waternet HQ stakeholder sessions	Presentation to show added value of Waterproof Application	Waternet senior management & decision makers	Statement of Work drafted and signed. Waternet internal resources allocated.
May 2017	Co-creation session PlantageLab Ams	Ecosystem partners brought together to discuss product development	Hardware manufacturers of water buffer mechanisms (Studio Bas Sala, Optigroen, Dakdokters)	User requirements of Waterproof application further detailed out
Ongoing	Commercialisation activities	Business developments meetings for early inclusion of ecosystem partners	Hardware manufacturers, water management companies (Waternet, Hoogheemraadschap Delfland), IoT platform providers (Munisense), etc.	Commitment of pilot rain buffer locations to share data. Commitment of three hw bffer manufacturers to participate in project

Table 5: Overview of TTI exploitation activities

7 Exploitation by UoS

7.1 Organisation Profile

University of Surrey (UoS) is an academic institution with excellent academics whose mission is to lead pioneering research and innovation to create new thinking around, and to provide practical solutions for, some of the world's main technological and societal challenges. It works in partnership with international academia, industry, policy makers and commerce. Innovative and dynamic, and with around 15,000 students, UoS was the Times and Sunday Times University of the Year 2016. It ranked fourth in the Guardian University Guide and eighth in the Complete University Guide 2016. In the 2015/2016 QS World University Rankings, it is awarded five stars, the highest rating achievable, and is placed within the top one per cent of global higher education institutions. Involved in EC projects for more than 25 years, including around 190 funded from the FP7 and ongoing Horizon2020 programmes, UoS has extensive experience of acting as both coordinator and beneficiary. It excels at multidisciplinary and cross border research and benefits from excellent professional and administrative support.

The UoS team, is based in the Institute for Communication Systems (ICS) which is a leading centre for mobile communication research in the EE department of the Faculty of Engineering and Physical Sciences (FEPS) at the University of Surrey (UoS / UNIS), UK. From an industrial perspective, ICS has been recently awarded with over 35 Million GBP public and private funding to research and deliver new 5G technologies by 2020. The Internet of Things (IoT) also represents an area in which the centre research activity is very prominent from its dawn, with leading participation in numerous EU and UK (EPSRC and TSB/Innovate UK) projects awarded in the last 10 years for a turnover of over 15 Million GBP funds. Among past projects the following EU ones worth mentioning, some of them joined with coordinator and/or technical manager role: IST FP6 e-SENSE, FP7 ICT SENSEI (Technical Manager), IoT-A, IoT-i, EXALTED, FI-PP FI-WARE, i-CORE (Technical Manager), FP7 mCiudad, FP7 IoT.est (Coordinator), PROBE-IT, SmartSantander, FI PPP OUTSMART, FP7 SocIoTal (Coordinator), FP7 COSMOS and most recently H2020 iKaaS (Coordinator), H2020 TagItSmart, FIRE FIESTA-IoT and H2020 CPaaS.io.

7.2 Exploitation Plans and Activities

UoS as an academic institution expects that the knowledge developed during the CPaaS.io project will greatly help it improve its academic standings, establish further collaborations with academia and industry; this knowledge can also be used in follow up research projects. In addition, the University has, over the last few years, gradually started to establish a more entrepreneurial culture, training students and researchers to spin out their ideas and findings. The support of this track ranges from developing ideas and inventions into innovations, developing business models, facilitating potential contributors to cover nontechnical aspects of the business setup process, and finally to link the researchers up with investors. A "hub" in the University research park provides free office and meeting space for the initial phases of such start-ups. The possibility for such ventures based on the findings of the project will be thoroughly investigated.

The University of Surrey has implemented large test-beds on the Campus and in some buildings respectively called SmartCampus and SmartBuilding deploying large number of RFIDs and sensors. In the 5G Innovation Centre we have also developed a –so-called- egg (see Figure 2 below) which provides a sensor-pack that is used for various purposes including sociology studies and user behaviour analysis. We have also bought and deployed a device used for monitoring energy consumption. Both eggs and energy devices are deployed in SmartBuildings (e.g. ICS and Centre for Research in Social Simulation (CRESS) buildings).

In the context of CPaaS.io project we intend to reuse the platform and use our various devices in order to feed data to the platform. The CPaaS.io platform will be then used by PhD and MSc students for 1/ conducting various experiments, playing with different enablers provided by the CPaaS.io platform like semantic integration, analytics and machine learning and also 2/ for hosting new components or algorithms and finally 3/ to get familiar with the FIWARE eco-system.

Figure 2: IoT Egg

8 Exploitation by YRP

8.1 Organisation Profile

Yokosuka Telecom Research Park, Inc, (YRP, Inc.) is a third sector (semi-public) company established on 1 April 1993 as a central operating body of YRP.

It owns "YRP Centre No.1 Building," the core facility of YRP, and is in charge of its maintenance, lease of office rooms, laboratory spaces, and meeting rooms. The company is also working on the whole management and operation of YRP area while engaging in testbed business, human resources development, and support for film shooting at YRP.

Besides, a series of consigned research by national government, etc. is conducted by YRP Ubiquitous Networking Laboratory.

Furthermore, YRP, Inc. serves as the secretariat for YRP R&D Promotion Committee and YRP Liaison Committee. Through these Committees, YRP, Inc. supports the R&D activities, research exchange, and consigned research conducted in YRP and provides recreation programs for the researchers and employees working in the YRP area.

YRP has a laboratory called YRP Ubiquitous Networking Laboratory (YRP UNL). YRP UNL was established with the aim of achieving a ubiquitous computing environment that supports our lives in a sophisticated manner by embedding microcomputers with communication capabilities, sensors, actuators, etc. in all physical objects around us and having them operate in a concerted manner by exchanging information with each other. Establishing next-generation protocols for the communication as the infrastructure of ubiquitous computing is another major goal of YRP UNL. YRP Ubiquitous Networking Laboratory (YRP UNL) is a research laboratory that promotes the IoT (Internet of Things) and ubiquitous computing. Through research contracts or collaborative projects, YRP UNL provides "IoT solutions", "open data solutions", "smart city solutions", and "ICT infrastructure solutions". It also offers “ICT consulting” service where new ICT solutions are developed together with the clients.

YRP UNL leads IoT solutions for smart cities like CPaaS.io projects.

8.2 Exploitation Plans and Activities

YRP exploitation plans and activities are primarily focusing on the following areas:

- Assessment of potentials of deployment in cities of emergency medical care platforms.
- Assessment of potentials of deployment in cities of public transportation platforms.
- Prepare field tests of emergency medical care and public transportation in city use cases.

Our emergency medical care platform in Yokosuka is expanded in Miura city, Kanagawa Prefecture in April 2017.

We operate NPO called “Association for Open Data of Public Transportation” (ODPT) joined over 50 of public transportation companies, ICT companies, and organizations. We promote CPaaS.io architecture in ODPT members to provide public transportation information services based on CPaaS.io architecture.

8.3 Actions towards exploitation

Table 6**:** lists the current activities that YRP has carried out towards exploitation.

Date	Event/Location	Activity	Target Audience	Result
March 2017	Miura City	Setting up our emergency medical care system in ambulances	Operators	Our emergency medical care platform is expanded in Miura city

Table 6: Overview of YRP exploitation activities

9 Exploitation by Microsoft Japan

9.1 Organisation Profile

Founded in 1975, Microsoft (Nasdaq "MSFT") is the worldwide leader in software, services, devices and solutions that help people and businesses realize their full potential. Microsoft Japan (internally called as "MSKK") is the subsidiary of Microsoft Corporation and it has about 2,200 employees and its main business is sell and promote Microsoft product and services in Japan with our vision "Mobile First, Cloud First". We provide Azure cloud services that cover from IaaS to SaaS, IoT to BigData and AI or other advanced IT services. Our roll in CpaaS.io project is realizing city platform services using our technology and services.

9.2 Exploitation Plans and Activities

Microsoft exploitation plans and activities are primarily focusing on the following areas:

- Assessment of potentials of deployment in cities of information service for foreign tourist via beacon and open data of Sapporo City.
- Add new data on Sapporo Open Data catalogue and examine usability on smart phone devices.
- Expand services to other platform that support foreign country tourist include Omotenashi services.
- Use Azure platform service that includes Big Data and IoT features.

We will drive open data activity and align and integrate other project that is funded by MIC. VLED (Vitalizing Local Economy Organization by Open Data & Big Data) event will be held in October 2017, we will plan a joint activity with VLED and CPaaS.io.

9.3 Actions towards exploitation

Table 7 lists the current activities that Microsoft has carried out towards exploitation.

Date	Event/Location	Activity	Target Audience	Result
November 2016	100 Resilient City (RC100) Summit / Toyama City	Exhibition Booth of CPaaS.io that explain Sapporo City experimental project	Policy makers and influencers of RC100	100 or more foreign participant related smart city
February 2017	Snow Festival / Sapporo City	Update beacons in Sapporo and renew data related Snow Festival 2017	Foreign tourists	Gathered new response and data from foreign tourist
May 2017	CityNext Forum / Tokyo	Introduced CPaaS.io project in Microsoft Japan private event for government	Government officials and partners	Impressed over 200 attendee with Prof. Koshizuka session

Table 7: Overview of Microsoft exploitation activities

10 Exploitation by ACCESS

10.1 Organisation Profile

ACCESS is a public company, listed in Tokyo Stock Exchange, and based in Tokyo. ACCESS is a R&D-based software technology company, which initiated mobile Internet evolution by its micro-browser during the pre-smart-phone period in 1999-2008. ACCESS has more-than-20-years of expertise in embedded software engineering with speciality in network software (TCP/IP, HTTP, and web technologies in embedded browsers). ACCESS provides browser solutions (for digital TV, game consoles and automotive), IoT solutions using beacon, electronic publishing solutions, smart meter solutions, IoT-based senior care solutions, and IoT closed-based service platform solutions.

CPaaS.io relates its IoT software solutions in smart cities. ACCESS is actively engaged in various industry projects for IoT-empowered solutions.

10.2 Exploitation Plans and Activities

ACCESS exploitation plans and activities are primarily focusing on the following areas:

- Assessment of potentials of deployment in cities of vehicle management platforms.
- Assessment of potentials of edge computing in city-problem-solving use cases
- Prepare field tests of vehicle management in city use cases.

ACCESS is engaged in city-garbage-problem-solving using vehicle management platform with location capabilities.

In order to prepare of an initial field test plan, we are involved in exploratory information gathering for ICT-empowered city-problem-solving using vehicle management. We also investigate possible crow recognition for edge computing use cases.

10.3 Actions towards exploitation

Table 8 lists the current activities that ACCESS has carried out towards exploitation.

Date	Event/Location	Activity	Target Audience	Result
April 2017	Sumida-Ward, Shinagawa-Ward, Bunkyo-Ward Tokyo/email and phone	Hearing of IoT-empowered city-garbage-solutions	Operational staff	Identification of relationship among planning, IT, and cleaning departments.
May 2016	Katsushika-Ward, Bunkyo-Ward, Koto-Ward, Chiba City, Tokyo Bureau of Environment /phone and email	Hearing of IoT-empowered city-garbage-solutions	Operational staff	Identification of issues of vehicle management and crow problems.

Table 8: Overview of ACCESS exploitation activities

11 Exploitation by UCT

UCT is interested in using the approach (concepts and methodology) of CPaaS.io project in its future work. Of course, it is ready to adopt concrete technology coming out of CPaaS.io for its future development in commercial activity if appropriate. However, we are still before the mid-project milestone yet. So we reserve our judgement on the technology to commercialize for now.

We shall definitely try to make the technological outcome of CPaaS.io interesting so that it will be adopted not only by ourselves, but other Japanese stakeholders.

Regarding the promotion of CPaaS.io work in trade media and the industry, UCT will participate in exhibitions such as annual TRON Symposium where the result of CPaaS.io and the related technology is presented to the visitors with wide-ranging background. Also, through the prototypes in the 2nd year of the project, we hope to make CPaaS.io known in Japan.

12 Exploitation by U Tokyo

At UoT, the result of CPaaS.io shall be used in a few ways that are fit for the university environment detached from the commercial activities of private sector partners.

One is releasing some components of the CPaaS.io architecture in open source manner (Not all the components can be open-sourced, but there are components that can be published as open source.)

Second is the standardization activities based on the result of CPaaS.io, especially on the basic IoT-related infrastructure.

Third is the use of CPaaS.io itself, and its architecture and applications for education and training purposes on campus. UoT personnel has also offered various seminars/trainings to off-campus audience with regard to RTOS, IoT, open data in collaboration with an NPO called TRON Forum (Chair, Dr. Ken Sakamura, now a Dean of Faculty, INIAD, Information Networking for Innovation and Design, Toyo University) and will continue to do so to exploit the knowledge gained via CPaaS.io.

13 Exploitation of the platform as a whole

The goal of the CPaaS.io consortium is to also enable an exploitation of the platform as a whole. For this different use-cases were selected and several trials at different places are in the planning phase. Those trials should give sufficient experience and insights for a successful exploitation of the platform as a whole. Based on them, the consortium will develop a strategy for joint exploitation during the second half of the project.

First joint activities are ongoing with respect to the IoT-EPI, the European Platforms Initiative. Another joint activity has been performed during CeBIT 2017 with a joint exhibition on the booth of the Smart City Forum.

One focus in the upcoming strategy planning will be put on joint exploitation with European and Japanese partners together.

14 Summary

In this first version of the series of exploitation plan reports, the consortium members specified their initial exploitation plans and described their first activities towards the implementation of them. They reflect the business focus of the CPaaS.io partners, their portfolio and the relationship to the organizations mid- and long term planning. The partners have already undertaken significant effort to work towards an exploitation of the results and approached potential stakeholders via different channels. This led to an already quite concrete view on the exploitation possibilities.

Once the project results become more mature and the feedback and validation from the use case activities become available, the exploitation plans will progress as well and a joint exploitation can be elaborated.