Connected Smart Cities Conference
Committee of the Regions
Brussels

12th January 2017

DIGITAL WATER PARALLEL SESSION

REPORT

Connected Smart Cities Conference
DIGITAL WATER PARALLEL SESSION
REPORT

EXECUTIVE SUMMARY

In the context of the OASC Connected Smart Cities conference held on the 12th of January 2017, WssTP organized the break-out session dedicated "Digital Water: Water management is one of the biggest existing deployments of sensors in urban areas".

The session was made up of 3 thematic panels (European Commission Panel made by the DG RTD and CONNECT, City and Utility Panel, Technology Center, Industry and AIOTI panel) and which participants offered their viewpoints about opportunities and needs of digital solutions for addressing the current and future global water challenges. In this framework, WssTP opened the session and stressed the pivotal role of Digital Water in water management as stated in its new Vision "The Value of Water".

The Digital Water Parallel Session intended to gather priorities, needs and challenges from EU Institutions, cities, utilities and the private sector, to outline a perspective for a workable development of digital technology and IoT towards the sustainable management of water.

A future proof European model for the water-smart society entails a paradigm shift in the way our future society will be organised and managed about water. This requires new digital and water technologies that can deploy advanced digital solutions for water in a capillary network of sensors in water distribution systems, capturing and using this new information to manage them in real time. Digital water solutions can drive advanced water-treatment solutions to achieve good status of European water bodies, enable synergies between centralised and decentralised treatments, as well as economically viable extraction and valorisation of valuable substances and energy in water.

Europe has the opportunity to leverage on the huge potential that the recent "digital revolution" is making available to enable a much more efficient and "smart" management of our water. On the one hand, new digital paradigms are ready to be used for data retrieval and analysis, real-time and quasi real-time data collection, processing, efficient data storage and sharing and exchange at various scales between systems. On the other hand, recent advancement in modelling, simulation, control and optimisation techniques can be further pushed forward for improving overall efficiency in water utilities supply and distribution systems. New system-wide computing and measuring tools are required that allow informed decision making on varying scales in space and time concerning water, food, energy, biodiversity and other water-related nexuses.

Digital Water shows an impact on technology that is already bringing forward promising results but this needs to be further and stronger developed and new solutions explored and scaled-up through effective actions and tools. This could be attained through actions that requires challenging measures, such fostering at a large extent the Pre-Commercial Procurement approach and a wider opening to Living Labs to advance from prototypes to large scale experiments that requires the involvement of multilevel stakeholders, to facilitates the testing and experiment in live settings, the scaling-up, and the replication of the solutions.

Digital water solutions can drive the infrastructure renewal, combination of water grey and green infrastructure and natural system, retrieve the true value of water, boost new water management models and make cities resilient to climate change and security threats. In addition, new technological and non-technological solutions and associated services for digital water management developed in Europe will find an important and growing market, strengthening Europe's position in the global market.

Connected Smart Cities Conference
DIGITAL WATER PARALLEL SESSION
REPORT

In the context of the OASC Connected Smart Cities conference held on the 12th of January 2017, WssTP organized the break-out session dedicated "Digital Water: Water management is one of the biggest existing deployments of sensors in urban areas".

AGENDA of the Digital Water Session:

13:30 13:45 **Welcome and introduction** (Mr. Andrea Rubini, Scientific and Policy Manager, WssTP)
13:45 14:15 **Short presentations and interview to the European Commission thematic panel** (moderated by WssTP)
- Mr. Panagiotis Balabanis, European Commission, DG RTD, Climate Action and Resource Efficiency
- Mr. Olavi Luotonen, European Commission, DG CONNECT, Internet of Things

14:15 14:45 **Short presentations Interview to the "City and Utility" thematic panel** (moderated by WssTP)
- Mr. Joan Carles Guardiola &D Engineer at Grupo Aguas de Valencia
- Mr. Jakob Møller Nielsen, Director for Urban Development, City of Copenhagen

14:45 15:20 **Short presentations and interview to the "Technology Center, Industry and AIOTI thematic panel** (moderated by WssTP)
- Ms. Montserrat Mussons Olivella, Digital Roadmap Manager, CETaqua
- Mr. Jesper Kjelds, Senior Vice President, Heat Cooling Water Systems Division Kamstrup
- Mr. Juergen Sturm, member of the management board of the Alliance for Internet of Things Innovation (AIOTI)

15:20 15:30 **Wrap up and outcomes reporting to the plenary session** (Rapporteur Mr. Durk Krol, Executive Director, WssTP)

The session was opened by Mr. Andrea Rubini, Scientific and Policy Manager of the WssTP, who introduced the speakers and presented the new WssTP Vision, which has a pivotal focus on the Digital Water domain. In this regard, Mr. Rubini stressed on how the WssTP envisions a European water sector that will be significantly transformed with respect to the current situation, where new concepts such as "Multiple Waters" and "Digital Water" will be driving decision makers and new water-smart economics. In this regard, he stressed that new digital technologies will have a dramatic impact on the water sector that will be connected into the emerging cyber-physical world by smartening water services and cycles, and benefit from new water governance and management capabilities. He mentioned that during a meeting hosted by MEP Esther DE LANGE in her capacity as chair of the EP Water Group, for which WssTP is the management body, Commissioner MOEDAS envisioned the future of water on the intersection of the physical and digital world with cities of the future connecting services, infrastructures and people; and in a circular economy requiring more efficient use of water in industry, the recovery of resources and energy, and lower levels of water pollution.
Mr. Rubini outlined that new digital solutions, as an overarching component of innovations, and that are based on the elaboration of specific digital models, hardware tools and software service systems can ensure smooth optimisation of water (re)use and integrated management various water cycles at urban, rural, industrial, and peri-urban levels, as well as have a systemic impact on the current and future concerns given by the water food, energy, biodiversity and other water-related nexuses.

Mr. Panagiotis Balabanis, Deputy Head of "Eco-Innovation" Unit of the European Commission DG Research & Innovation, took the floor and he highlighted on the fact that Water is again in the centre of current political debate, since water affects and it is affected by the climate and other

environmental changes while the increasing demand and water use competition is alarming. He also stressed the connection and the function of water in the Circular Economy and the role of water in the process for the achievement of the Sustainable Development Goals.

He completed his intervention by showing the Horizon 2020 SC5 WP 2018-2020 Water and ICT related priorities: Water for our environment, economy and society (Digital solutions, new marketing concepts and business models help realising the true value of water), Innovating cities for sustainability and resilience (Water in cities), Climate action in support of the Paris Agreement (Integrated approaches to address the water/energy/food nexus), and within the Circular economy (Wastewater, industry and municipalities).

The second speaker the EC panel, Mr. Olavi LUOTONEN, Programme Officer – EU Policies, European Commission, DG CONNECT, Internet of Things, introduced the Emerging Topics and Technology Roadmap for ICT for Water Management issued by the DG Connect in August 2016.

Climate change, increased urbanization and increased world population are several of the factors driving global challenges for water management. This roadmap was finalised by the European Commission in August 2016, with inputs gathered from 20 FP7/H2020 research projects -grouped in the ICT4Water cluster- and considering other relevant reports.

Mr. Olavi introduced the new IoT Unit: DG CONNECT, E4, which has the role to define & implement the EU's policy, research, standardisation, adoption and take up strategy for IoT and the new business models stemming from it, ensuring the competitiveness of the European industry. Recently the EC has published a communication on Building a European Data economy: it is important to understand what we can earn out of this new horizon.
Mr. Olavi presented the 3 Pillars of the IoT action plan, namely the "Single market for the IoT", "Thriving IoT ecosystem", and "Human centered IoT", the objectives and the next steps of the action. He showed the examples of leading and meaningful projects (characterized by being based on PCP or large scale demonstration approach, able to co-create, test and experiment in live settings (living labs) as follows:
OrganiCity, that offers a new paradigm to European digital city making, and seeks to build a strong foundation for future sustainable cities through co-creation by a wide range of stakeholders. Globally, Europe is a champion of sustainable, inclusive and open societies. The digital age enables us to push this position further and to rethink the way we create cities and facilitate living by integrating many complex systems.
Select for Cities, which is a Pre-Commercial Procurement (PCP) Competition
Helsinki, Antwerp, and Copenhagen as large scale Internet of Everything labs
Aimed a design, prototype and pilot a platform capable of linking cities' IoT infrastructure in order to allow for new IoE scalable products and services
SynchroniCity that represents the first attempt to deliver a Single Digital City Market for Europe by piloting its foundations at scale in 11 reference zones - 8 European cities & 3 more worldwide cities - connecting 34 partners from 11 countries over 4 continents.

The first speaker of the second Panel (The Problems Owners: City and Utility), Mr. Joan Guardiola of Aguas de Valencia, showed that the use of smart meters in urban water management leads to reduce leaks, customer satisfaction, reduction of water bills, facilitates the quick intervention in case of service disruption through the real-time monitoring, which effectiveness is based on the capacity of analysing massive volume of data coming from the sensor network and smart meters. Nevertheless, there are challenges for the future, such as the need for new policies and technological solutions.
In facts, through new Digital Water solution utilities can become big-data related service providers, with high-quality forecasting capabilities, using new mathematical modelling systems and visualisation applications, and able to provide unforeseen levels of real-time knowledge and decision support. This will allow a much smarter, more dynamic and adaptable near real-time water allocation

management and governance system that is robust, more resilient and less vulnerable against external events.

The second speaker Mr. Jakob Møller Nielsen, Director for Urban Development, City of Copenhagen provided the audience with the lessons from Copenhagen on Digital Water, where cloudburst management is being developed in a programme made of 300 projects with 1,3 billions budget to be implemented in 20 years. The overall principles of the strategy of Copenhagen are: to retain rainwater in the upper catchment; to provide robust and adaptable drainage of lower lying areas; and to focus on implementing green and blue solutions in existing projects. A "finger strategy" has been adopted – cloudburst "fingers" to convey runoff are located between the major roads into the city centre. Various roads which connect to these cloudburst fingers are thereby transformed into green retention roads.

The underlying modelling has been undertaken using an integrated hydraulic model of the sewers and watercourses, and it employs a digital elevation model of the city. Each catchment has been further subdivided by topography and sewer network to assess practical solutions on a local scale.

Monitoring systems and online modelling that can capture pollutants leaks in the waters from the urban sewage systems and from boats passing beside the harbour.

The development of new infrastructure to handle cloudburst rain on the surface will in the future call for integration of digital monitoring systems such as rainwater management and intelligent traffic steering systems.

Ms. Montserrat Mussons from CETaqua took the floor as first speaker of the third panel (the "Solutions Providers") and introduced CETaqua,a technological center of reference at national and international level, and contributes value within the Suez Group in the creation of knowledge and development of technologies related to the water cycle. Digital water is a key part of CETaqua's R&D mission, which the center expects to take a more prominent role in the years to come as digital technologies are employed to resolve challenges such as resiliency, transparency, efficiency, reliability and security.
CETaqua is working to provide solutions to challenges for Smart Cities and Digital Water such as information for cities and citizens, water resources management, and resilience of critical infrastructures. First, leveraging water utilities' current infrastructure to capture more and better information about assets and cities is an issue with high priority on CETaqua's projects. Second, analyzing and extracting value from the data captured is crucial to manage water, from both the demand and the supply side. More tools will need to be developed in the future to adjust the available supply and infrastructure capacity of our urban water systems as demand grows and water scarcity become more prominent in the future. Finally, helping cities and their water systems adjust to the increasing climate-related events will need not only the data captures and the analysis, but also an integrated view to blue, green and grey infrastructure. Digital technologies can help the environment with solutions for circular economy, resource recovery and management of floods & droughts.

She introduced the example of the RESCCUE H2020 project, which aims to deliver a framework enabling city resilience assessment, planning and management by integrating into software tools new knowledge related to the detailed water-centred modelling of strategic urban services performance into a comprehensive resilience platform. All along this project, data availability and quality, analysis and integrated management of infrastructure are key enabling technologies to achieve its goal.

Mr. Jesper Kjelds, Senior Vice President, Heat Cooling Water Systems Division Kamstrup, second speaker of the third panel, said that his company believes that intelligent metering solutions are fundamental to ensure sustainable use of water resources. Kamstrup is market leading technology-based company developing innovative metering solutions for utilities worldwide.

Mr Kjelds provided a detailed description for intelligent water metering and network Solutions, and how these can support an effective water management at large scale. Today many utilities have yet to start deploying smart metering where all parts of the distribution network are transparent and where consumer behavior is known down to the smallest drop. The information available about the last miles of pipe leading to the individual consumers might often still be based on one yearly reading only.

The digital water utility is rapidly evolving - not in the least due to the technological development providing utilities with new resources and tools that are radically changing possibilities for obtaining a real-time overview of the entire distribution network - all the way from the water works to the consumers.

The utilities potentially have a world of knowledge available at the fingertips, and can achieve a level of accuracy and efficiency that was unthinkable just a few years ago. It is no longer just a matter of increased accuracy and metering of water consumption. It is also about strengthening consumer relations and optimizing operations. About quality management, revenue protection, asset management and so much more. It is about being able to make the right choices and chose the right investments.

Mr. Juergen Sturm, member of the management board of the Alliance for Internet of Things Innovation (AIOTI) concluded this panel discussion by introducing AIOTI and its features. He explained how Digital Water represents a holistic term and a social perspective. It is important to take into account that Digital Water is goes far beyond smart metering, but in a city context includes urban horticulture, predictive maintenance of infrastructure and sustainable sewage systems. AIOTI outlook for 2017 will define collaboration with other AIOTI WGs, since smart water is as much a vertical as it can be a horizontal issue, extend collaboration with WssTP, the develop the thematic preparation of a panel on smart water in IoT Week 2017, enhance collaboration with German Water Platform, and take international issues on board.

The three speakers were requested by the moderator to make a choice and communicate the principal concern they might have about the implementation of Digital Water at large extent. Ms. Montserrat Mussons said Renewing infrastructures, Mr. Jesper Kjelds about giving the true value (cost) of water and Mr. Juergen Sturm replied cyber and physical security.

Conclusions

The session demonstrated that Digital Water is a cross-cutting issue in the overall water management. It gives the opportunity to better respond to water quality and quantity concerns and enables utilities to fix problems more quickly as well as they can optimize fresh and waste water management full cycle, that has an impact on the climate change. To address water challenges, Europe has the opportunity to leverage on the huge potential that the recent "digital revolution" is making available to enable a much more efficient and "smart" management of our water

This requires new and low-cost sensor and key-enabling water treatment technologies to be developed and tested with a subsequent wider deployment in real life environments such as Living Labs. This counts equally for new big-data generation, processing, modelling and analyses methodologies and (software) technologies for water, which have to study how we will be able to capitalise on the "Internet of everything" in the water-world.

Digital water emerging enabling technologies will enable Europe to reach previously unimaginable levels of control, manageability, and exploitability of our society with regard to water.

The Session was closed and the outcomes delivered to the plenary by the rapporteur Mr. Durk Krol, Executive Director of WssTP.