

BIG DATA EUROPE

Coordination and Support Action

Big Data Europe – Empowering Communities with Data Technologies

Project Number: 644564

Start Date of Project: 01/01/2015

Duration: 36 months

Deliverable 2.6: Report on Interest Groups Workshops III

Dissemination Level	Public
Due Date of Deliverable	M26, 18/11/2016
Actual Submission Date	M26, 18/11/2016
Work Package	WP2, Community Building & Requirements
Task	T2.1
Type	Report
Approval Status	Approved
Version	1.0
Number of Pages	42
Filename	D2.6_Report_on_Interest_Groups_Workshop_III.pdf

Abstract: This report summarises the organization and derived results from the five Interest Group workshops organized during the reporting period M12-M26 (Societal Challenges 2 - Food Security, Agriculture, Water Research & Bioeconomy, 4 - Transport, 3 - Energy, 5 - Climate, Environment, Resources & Materials, 7 - Security) and carried out by each group associated with each societal challenge.

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Project funded by the European Union's Horizon 2020 Research and Innovation Programme (2014 – 2020)



History

Version	Date	Reason	Revised by
0.0	01.10.2016	Placeholders	Simon Scerri
0.1	03.11.2016	SC4 Report	Andrea Toth, Luigi Selmi
0.2	28.10.2016	SC2 Report	Valeria Pesce, Nikos Manouselis
0.3	03.11.2016	SC7 Report	Sergio Albani, Michele Lazzarini
0.4	11.11.2016	SC5 Report	Iraklis Angelos Klampanos
0.5	11.11.2016	SC3 Report	Fragiskos Mouzakis, Andreas Androutsopoulos
0.6	16.11.2016	Cross-check with contributors	Simon Scerri, Thomas Thurner

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Executive Summary

In this deliverable we provide an in-depth report and material associated with the second round of BDE workshops that have taken place between M12 and M26 (5 out of a total of 7 for 2016). The reports include information about the participants, the sessions organised, the talks and discussions as well as the gathered results (input for requirement elicitation). In addition, material associated with the workshop, such as the agenda and the original invitation letter, is also included. These reports supplement the reports of the 1st series of workshops covered in the first two deliverable in this series (D2.2 Report on Interest Groups Workshop I and D2.5 Report on Interest Groups Workshop II) and will be followed-up by a fourth deliverable covering the last two workshops held in 2016 (D2.7 Report on Interest Groups Workshop IV) .



Abbreviations and Acronyms

SC	Societal Challenge
EC	European Commission
RE	Requirement Elicitation
RS	Requirement Specification
WP	Work Package



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1. Introduction

This deliverable contains five reports for the second round of BigDataEurope workshops held in the second year of the project:

1. [SC4.2: Second Community Workshop for Societal Challenge 4 - Smart, Green and Integrated Transport](#)
2. [SC2.2 Second Community Workshop for Societal Challenge 2 – Food Security, Agriculture, Water Research & Bioeconomy](#)
3. [SC3.2 Second Community Workshop for Societal Challenge 3 – Secure, Clean and Efficient Energy](#)
4. [SC5.2 Second Community Workshop for Societal Challenge 5 – Climate Action, Environment, Resource Efficiency and Raw Materials](#)
5. [SC7.2 Second Community Workshop for Societal Challenge 7 – Secure Societies](#)

A summary and a copy of a detailed workshop report (including secondary requirements to improve the Big Data aggregator platform prototype) is provided in the next Section. The report has, or will be circulated to all participants and other identified stakeholders. The communication will take place via multiple channels, including directly by email, project website and newsletter.

2. Second Round of Societal Workshops (I)

The five below-described workshops are the first to be held in the second round of BDE workshops in 2016. The workshops Invitations were sent to the identified stakeholders, in multiple rounds. The workshops were designed around an updated blueprint which was originally provided in Deliverable 2.1, with minor adjustments to reflect the 2nd round’s focus on the pilots being realised. A summary of workshop details, plus the full workshop report, are included below.

2.1 SC4.2: Second Community Workshop for Societal Challenge 4 - Smart, Green and Integrated Transport

The following table includes a summary of the workshop:

Date	22.09.2016
Venue	ERTICO-ITS Europe, Blue Tower Brussels, Avenue Louise 326 Brussels, Belgium



Invitations Sent	14,000
Invitations Accepted (Registrants)	70
Attendees (Total)	45
Attendees (Project Consortium & Project Officer - Replacement)	7
Attendees (Other)	38
Sessions	4, including 2 parallel sessions

2.1.1 Agenda

<ul style="list-style-type: none">⦿ 10:00 - Welcome⦿ 10:00-10:15 Introductions (Paul Kompfnert, ERTICO-ITS Europe)⦿ 10:15-11:30 Morning Session<ul style="list-style-type: none">○ 10:15-10:45 Keynote speech (Pieter Colpaert, iMinds)○ 10:45-11:00 Big Data and MaaS (Martin Howell, Cubic)○ 11:00-11:30 The BigDataEurope Mission and Data Aggregation Platform: An update on the Big Data Platform Architecture (Sören Auer, Fraunhofer IAIS; Erika Pauwels, TenForce; Hajira Jabeen, University of Bonn)⦿ 11:30-12:30 Pilot Demonstration<ul style="list-style-type: none">○ 11:30-11:45 Big Data Europe Transport Pilot: Introducing Thessaloniki (Josep Maria Salanova, CERTH)○ 11:45-12:10 Technical background of the pilot (Luigi Selmi, Fraunhofer IAIS)○ 12:10-12:30 Demonstration (Luigi Selmi, Josep Maria Salanova)⦿ 12:30-13:30 Lunch⦿ 13:30-15:30 Afternoon session (Parallel breakout sessions: Interactive discussions moderated by: ERTICO-ITS Europe; MaaS Alliance; CERTH, Fraunhofer IAIS.)<ul style="list-style-type: none">○ Session 1: Big Data for Transport Users and additional Societal Needs○ Session 2: Technical Requirements and additional Transport Use Cases⦿ 15:30-15:45 Coffee break⦿ 15:45-16:00 Wrap up session from rapporteurs⦿ 16:00 Closing note and summary (Paul Kompfner, ERTICO-ITS Europe)

2.1.2 The Potential of Big Data Technologies in Transport

We were pleased to host our keynote speakers, Pieter Colpaert (iMinds) and Martin Howell (Cubic) who provided insight into the many challenges (such as open data) but even more possibilities and opportunities (e.g. MaaS) awaiting transport today and the action we need to



take to exploit the full potential of the technologies already available. Both speakers highlighted the importance of solving the issue of interoperability before we could truly exploit the potential of big data in transport.

Pieter Colpaert (Researcher at University of Ghent – iMinds) started off by emphasizing that transport today is a data sharing problem more than anything else and proposed ways of fixing that. By sharing data on the web we could maximise data re-use, which then of course pulls the issue of interoperability with it.

The second keynote speech was made by Cubic's Director of External Affairs, Martin Howell who delved deeper into one of the most exciting areas revolutionising transport today: Mobility as a Service (MaaS). He started off by emphasizing that improving transport already requires big data solutions but the technology has a lot more potential than what it is currently used for. According to Mr Howell, the next step to making MaaS a reality is to deal with interoperability: a key factor for a service which combines multiple transport services for both public and private providers.

The morning session continued on with a presentation from the project co-ordinator, Sören Auer who gave a detailed overview on what the BigDataEurope project is looking to achieve and the 6 other societal challenges it seeks to solve.

2.1.3 The Current State of the BigDataEurope Platform and the Transport Pilot

The next session was dedicated to the big data platform itself (released just a few weeks prior to the workshop), showcasing first the general architecture, presented by Hajira Jabeen from the University of Bonn followed by presentations providing further detail on the transport-specific pilot.

Josep Maria Salanova (CERTH) the project's pilot partner represented the case of the pilot site of Thessaloniki, the existing infrastructure and the enhancements achieved by employing the big data platform. His presentation was followed by Luigi Selmi (Fraunhofer IAIS) who gave a detailed overview on the technical background and the further potential of the pilot accompanied. The presentation concluded with a quick demo showing some of the queries the platform can handle at this stage.

The project provides a set of components, based on open source frameworks, that can be used to design and build software architectures that are scalable, fault tolerant, flexible and easy to deploy in different environments, on a single machine for the development and testing of new applications to virtual machines in a distributed environment for production. The data sources in the transport domain are characterized by the time dimension and the spatial dimension and most of the data comes as streams of records whose value decreases quickly over time. There is indeed little interest in knowing that a street is congested or closed for maintenance when people are already stuck on that street. The components chosen for the transport pilot are currently in use in companies that provide transport services.



The architecture is based on the concept of microservices where an application or service is implemented using different loosely coupled components for data ingestion, communication, processing and storage. In the workshop we have presented the architecture of the pilot in the first development cycle. Apache Kafka is used as a message broker and allows the components to communicate asynchronously. Apache Flink is used to process the stream data, like the taxi data provided by our partner CERTH, and also batch data. Elasticsearch, a document database based on the open source search engine Apache Lucene, is used to store the records after the processing. All these components and others specific to our pilot are provided by the project in Docker images that can be deployed in a single host where a Docker engine has been installed or in a distributed environment with nodes that are member of a Docker swarm. The BDE platform also provides a tool to orchestrate and start the components according to their dependencies and user interfaces to monitor the components used by an application.

2.1.4 Societal Needs and Transport Users – The Potential of Big Data

To better understand the additional needs and requirements and gather extensive feedback on the current pilot from both a technical and more holistic domain perspectives the participants were asked to choose between two breakout sessions during the afternoon.

The breakout session on additional societal needs and transport use cases was moderated by Paul Kompfner (ERTICO-ITS Europe). The afternoon discussion touched on multiple interesting points and further aspects that are awaiting further debate and a common stand. One of the key points was discussing the concept of big data itself: what it is, do we even need it? The common understanding was that in fact we should not be looking merely at big data at all: we should look at the need and ultimately the value they can generate and match the data accordingly. This concept is called smart data. At the same time we need to take into account data generated by multiple sensors, arriving from various sources (in various formats) and have the ability to consolidate and form a common information and knowledge base from them.

This also implies that we may need to consider all the data we gather as in many cases it may be more efficient to not collect big data at all and instead of post process filtering, focus solely on the data that generate value already from the beginning.

The potential of big data in generating better models, enabling high precision results was mentioned as a value across numerous domains. In the area of transport this can mean tailored offerings such as with the concept of MaaS (Mobility as a service); the ability to match demand and supply (e.g. public transport) or the value of demonstrating business cases with simulations.

What these data can also do is enable individuals to make better choices, socially responsible choices and incentivise or penalise the decisions they opt for. From such an angle the data that would enable such processes can be regarded as serving the public good.



At this point the conversation shifted to the legal aspects: data ownership, data re-usability – how to maximise the potential while avoiding infringement on privacy and ensuring security. These are of course ongoing discussions in multiple domains and it seems reaching a common stand will require many more debates and extensive talks. Several aspects need to be considered and most participants agreed that a fine balance needs to be found or perhaps even use data on a case by case basis under a form of fair licencing scheme. This would make sense if we could clearly identify what data are useful in what context; the next step could then be to determine the costs and pricing.

The end of the session drifted to more specific aspects of the platform itself on potential new use cases for further pilots, or pilot improvements and the capacity of the current platform. One of the most often quoted use cases mentioned was the potential of big data in logistics: the enhancement of the platform to accommodate the needs of European port authorities to grow their capabilities and expand their service offerings with the help of big data technologies.

2.1.5 Feedback on the First Pilot Prototype - What Should the Platform Do Better?

During the more technical pilot implementation breakout session, led by Luigi Selmi and Josep Maria Salanova, participants had the chance to engage in discussions on how to further improve the existing pilot and get a deeper understanding of the technical background and expertise of its development.

Some questions concerned the future support of the BDE components after the end of the project. We could answer that the support of the platform will depend on the requests that will come from the communities of users of transport data and of the other societal challenges. Other questions concerned the data used in the pilot, the format and the availability of transport data. The users of transport data are well aware of the importance of being able to manage huge data sets to provide competitive services but they are not yet ready to move from their legacy systems to Big Data platforms if the data is not yet always available and reliable.

2.1.6 Appendices

2.1.6.A Slides & Presentations

1. Pieter Colpaert (iMinds) – [Linked Open Transport Data](#)
2. Martin Howell (Cubic) – [Big Data and MaaS](#)
3. Sören Auer (Fraunhofer IAIS) – [Overview of the BigDataEurope project](#)
4. Hajira Jabeen (University of Bonn) – [Big Data Platform Architecture](#)
5. Josep Maria Salanova (CERTH) – [BDE Transport Pilot: Introducing Thessaloniki](#)
6. Luigi Selmi (Fraunhofer IAIS) – [Technical background of the Transport pilot](#)



2.1.6.B Photos

Photos are available in the respective workshop folder [here](#).

2.1.6.C Follow-up Post

A follow-up blogpost/message was shared on the BDE [website](#).

2.1.6.D Attendees

The following table is the list of registered attendees for the workshop:

Title	First Name	Last Name	Institution/Company
Mr.	Osama	Al-gazali	transport engineer
Ms.	Harbil	Arregui	Vicomtech-IK4
Mr	Sören	Auer	Fraunhofer IAIS
Mr.	Daniel	Barker	FIGIEFA
Mr.	Axel	Barkow	fka
Mr.	Michael	Bauer	VDV eTicket Service GmbH & Co. KG
Mr.	Abraham	Beckers	3bmanagementconcepts
Dr.	Davide	Brizzolara	ERTICO ITS Europe
Mr.	Wolfgang	Brueckler	Kapsch TrafficCom AG
Mr	Pieter	Colpaert	iMinds
Ms	Anne	Deltour	EUROPEAN COMMISSION
Mr	William	Denous	IRU
Mr.	Mark	Dyne	Cubic Transport Systems
Mr.	Martin	Howell	Cubic Transportation Systems
Mr	Martin	Huska	CER
Ms	Dana	Ivanova	Ku leuven
Ms.	Hajira	Jabeen	University of Bonn
Mr.	Luc	Jansseune	France / Continental
Mr.	Sytze	Kalisvaart	TNO



Dr.	Aseem	Kinra	Copenhagen Business School
Mr	Paul	Kompfner	ERTICO-ITS Europe
Mr	Stephen	Lynch	Arup
Dr.	Stefano	Mainero	EPN Consulting Limited
Mr.	Mann	Matthias	PTV AG
Mrs.	Corina	Mitrohin	Robert Bosch GmbH
Ms.	Efthymia	Ntivi	Cambre Associates
Mr.	Marco	Ongaro	UCL - FJE
Ms.	Erika	Pauwels	TenForce
Ms	Pnina	Plaut	Technion, Israel
Mr.	Janne	Poikolainen	University of Jyväskylä
Mr	Josep Maria	Salanova	CERTH
Dr.	Norbert	Seibel	IBM
Mr	Luigi	Selmi	Fraunhofer IAIS
Mr	Jean	Seng	French DOT
Ms.	Elisa	SETIEN	European Association of Chemical Distributors
Dr.	Dalit	Shach-Pinsky	Technion
Ms	Ingrid	Skogsmo	European Commission
Miss	Aida	Spisso	Toyota Motor Europe
Ms.	Andrea	Toth	ERTICO-ITS Europe
Mr.	Stephen	T'Siobbel	TomTom
Mr.	Frank	van Eck	CGI
Mr.	Frans	Van Waes	Vialis bv
Mrs.	Isabelle	Vandoorne	EC-MOVE
Mr.	Nigel	Wall	Climate Associates Ltd
Mr	Aad	Versteden	Tenforce



2.2 SC2.2 Second Community Workshop for Societal Challenge 2 – Food Security, Agriculture, Water Research & Bioeconomy

The following table includes a summary of the workshop:

Date	30.09.2016
Venue	CLORA headquarters, Brussels, Belgium
Special Invitations (Invitation-only Meeting)	22
Invitations Accepted (Registrants)	17
Attendees (Total)	22
Attendees (Project Consortium & Project Officer)	6
Attendees (Other)	16
Sessions	4, no parallel session

2.2.1 Agenda

<ul style="list-style-type: none">© 09:30-10:00 - Welcome & Introduction (Kimmo Rossi, Nikos Manouselis)© 10:00-11:00 Session 1. Towards a Data Ecosystem<ul style="list-style-type: none">o 10:00-10:10 Big Data & IoT actions in DG CONNECT: policy context and EC expectations (Kimmo Rossi, Project Officer)o 10:10-10:20 Report from DG AGRI data events & consultation process (Iman Boot)o 10:20-10:30 GODAN status & report from 2016 Summit (Martin Parr)o 10:30-10:40 Open Data Charter Agricultural Sector Package (Andre Jellema)o 10:40-10:50 Syngenta/GODAN Data Ecosystem Paper & WG (Graham Mullier)o 10:50-11:00 The Chania Declaration & what's next (Johannes Keizer)o 11:00-11:10 Q & A Session© 11:10-11:30 Coffee break for networking & discussion© 11:30-12:30 Session 2. Scientific communities & open research data<ul style="list-style-type: none">o 11:30-11:40 DG RTD, the European Science Cloud (EOSC) & H2020 Open Research Data (Wim Haentjens)o 11:40-11:50 Towards an e-infrastructure roadmap for open science in agriculture (e-ROSA) (Odile Hologne)



- o 11:50-12:00 CGIAR Big Data in Agriculture Platform (Medha Devare)
- o 12:00-12:10 The GODAN Action project (Sander Janssen)
- o 12:10-12:20 Positioning Europe in the global context (Nikos Manouselis)
- o 12:20-12:30 Q & A Session
- © 12:30-13:30 Light lunch break
- © 13:30-14:30 Session 3. Tools & services
 - o 13:30-13:40 The EU Open Data Portal (Agnieszka Zajac)
 - o 13:40-13:50 Publications Office semantic repository (Cellar) (Marc Kuster)
 - o 13:50-14:00 VocBench and its use in Eurovoc (Willem Van Gemert)
 - o 14:00-14:10 The Global Agricultural Concept Scheme (GACS) (Johannes Keizer)
 - o 14:10-14:20 The Big Data Europe initiative (Simon Scerri)
 - o 14:20-14:30 Q & A session
- © 14:30-15:00 Coffee break for networking & discussion

- © 15:00-16:00 Session 4. Where do we want to go for a data revolution in agriculture & food?
 - o Views & position statements collected from the participants
- © 16:00-17:00 Wrap up & action points

2.2.2 Expectations and Background

The first BDE workshop for Societal Challenge 2 “food and agriculture” gathered mainly the research community (Bioversity, CYMMIT, CRA Italy, INRA, Wageningen University, Global Plant Council) and some representatives from international organizations (FAO) and the industry (Bayer).

Based on lessons learnt from the first workshop, especially the weak involvement of EC Units, the objective of this second workshop was to get together a selected group of EC representatives that are working on agendas or initiatives of relevance (from DG AGRI, [DG CONNECT](#), [DG RTD](#) as well as the [EU Publications Office](#)) to meet a number of experts from key non-EC organizations and companies working on data for food and agriculture (FAO, CGIAR, GODAN, INRA, Alterra Wageningen, TNO, Syngenta, AgroKnow) to share recent developments.

Therefore, the Big Data Europe Consortium, with its partners for societal challenge 2 [FAO](#) and [AgroKnow](#) and with support from the Global Open Data in Agriculture & Nutrition ([GODAN](#)) initiative and the Institut National de la Recherche Agronomique ([INRA](#)), organized the second workshop on big data for food and agriculture in Brussels, with a strong focus on sharing experiences with EC representatives as well as providing some input for their agendas.

The one-day workshop took place at the CLORA premises in Brussels on 30/09/2016 and followed the [DG AGRI](#) “Digitising the Agri-food Sector” meeting that had taken place the



previous two days also in Brussels. Organizing the workshop back-to-back with the DG AGRI meeting gave us the opportunity to have some members of the BDE project and some key partners invited to the DG AGRI meeting and to get a full report of the meeting by Iman Boot during the BDE workshop (more on this in the conclusions).

Some of the key expectations we had for this workshop were:

- Making our EC colleagues aware of key initiatives at the global level that involve several actors from different stakeholder groups (inter-governmental organizations, research institutes and academy, research networks, industry and SMEs) on data infrastructures and data sharing in the field of food and agriculture;
- Learning from our EC colleagues about the most recent developments in terms of their funding agendas and projects relevant to big and open data in agriculture and food;
- Discussing how the community is building a common roadmap for the data infrastructure elements that the agri-food sector needs (covering aspects such as physical structures, software, standards, and governance) and highlighting the commitment of major sector representatives to support coordination and collaboration, in a way that represents international perspectives and includes both the public and private sector.

2.2.3 Setting the Scene

The agenda (see above) was organized around three main sessions:

1. ***Towards a Data Ecosystem***, where participants from DG CONNECT, DG AGRI, GODAN, Syngenta and FAO presented their latest endeavors to involve their respective stakeholders in envisioning what a data ecosystem for food and agriculture should look like and what has to be done to get there.

Kimmo Rossi (DG CONNECT) and Iman Boot (DG AGRI) presented the policy context and the funding agendas of their respective Directorates, including a report of the results of the recent DG AGRI workshop. Martin Parr and Andre Jellema (GODAN) presented some key activities of the GODAN initiative both in advocacy and convening the stakeholders and in designing an “open data charter” for our sector for the [ODC initiative of the G20](#). Graham Mullier (Syngenta UK) presented the results of Syngenta’s collaboration with GODAN partners on what components should make up a data ecosystem for our sector and Johannes Keizer (FAO) presented the “Chania declaration”, the latest commitment to a common agenda signed by several organizations in May 2016.

2. ***Scientific communities & open research data***, where participants from the research community presented their current activities under different funding schemes (EC and beyond).



Wim Haentjens (DG RTD) and Odile Hologne (INRA) presented two projects on research data funded by the EC: the already advanced European Open Science Cloud and the now-starting eROSA project (“Towards an e-infrastructure roadmap for open science in agriculture”). Medha Devare ([CGIAR](#)) and Sander Janssen ([Alterra](#), [WUR](#)) presented publicly funded activities for the improvement of global and institutional opening up of data: the efforts and aspirations of the CGIAR in opening up their data (also learning from other domains) and the GODAN Action project, funded by the Department for International Development of the UK government (DfID). Nikos Manouselis (AgroKnow) then gave his perspective on how European initiatives can guide / lead the changes in the food and agriculture data industry, through already existing mechanisms, like the alignment between public and private sectors, the approach of having different infrastructures communicate, the attention given to business models and SMEs. EC projects and GODAN can also help coordination in order to avoid duplication.

3. **Tools & services**, where participants presented relevant global and regional infrastructural components for data management and data sharing.

Agnieszka Zajac and Marc Kuster (EU Publications Office) presented respectively the EU Open Data Portal, illustrating the technologies implemented to make EU datasets open, and the CELLAR semantic repository to make legal documents from the EC semantically accessible. Willem Van Gemert (EU Publications Office) and Johannes Keizer (FAO) presented two platforms for vocabularies: the vocabulary management tool VocBench (used for both AGROVOC and Eurovoc) and the vocabulary framework Global Agricultural Concept Scheme (GACS), a common environment for hosting, linking, referencing and publishing vocabularies for food and agriculture.

2.2.4 Discussions

Presentations were followed by Q&A sessions and a final discussion took place at the end of the workshop.

Among the most relevant issues raised by presentations and questions asked and discussed at Q&A time were:

- Importance of public-private partnerships
- DG AGRI included “combining and exchanging data” among the five priority areas for the next biennium work program
- Beyond technical difficulties (formats, connectivity, storage), the very important issue of privacy (interesting note: there will be a workshop dedicated to data ownership and privacy early next year)
- Other reason for reluctance to share: lack of incentives; besides the “stick”, study more the carrot options? Need for reward mechanisms, business models; incentive schemes; consider also the value of analytics platforms (example of sequence data): being able to use these platforms incentivates the sharing of data



- Learning from other sectors (e.g. health: example of idea of algorithms moving over the internet instead of data...)
- Challenges: a) open data benefits only the big actors? b) new monopolies and bigger digital divide?
- There doesn't seem to be a mature ecosystem with which to interlink data: so far, work with data is ad hoc, not systematic and routinely repeatable
- Thinking beyond Europe, as agricultural data is a global issue
- The opportunity of the European Open Science Cloud, high priority for the Commissioner and also discussed in the broader community with Barend Mons to see what role they can have in the EOSC (e.g. CGIAR will try and bring their data to the EOSC to see what can be done)
- Issues of integration / interaction between the EOSC and other platforms: OpenAire, CORDIS, aginfra+; possible DG CONNECT project to build an infrastructure for the EOSC?
- The upcoming eROSA CSA project as an opportunity to collectively shape a data infrastructure / ecosystem for food and agriculture
- Standards still an issue, very fragmented landscape, too many standards, need for recommendations; need for a clearinghouse?
- Role of the private sector: data from science is something where government has an easier role; the role of government with private sector is weaker; the industry sees the point in collaborating, but the public sector has to make sure that the industry doesn't govern
- Complexity, need for multi-dimensional analysis
- Comparison of investments between the EC and the big industry; comparison of investments in different domains: Food 2030 (about the challenges in food production and safety): recognized investment gap with respect with other fields (and e.g. regarding food much lower investment than in US or other areas)
- Issue of how to involve member countries in these initiatives
- Can Europe lead the changes in this industry? We have a culture of collaboration, we have some world-class research institutions on board, some elements of the infrastructure exist; some standards (if not data standards) exist. How? Alignment between public and private sectors; to have different infrastructures communicate; to do business; to coordinate to avoid duplication
- EU Open Data Portal for data published by the EC: possible to extend / re-use the platform for broader data sharing? Explore synergies with similar initiatives at the global level

The final discussion collected feedback from all participants and brought forward some more details on the issues already discussed:

- On incentives: open data linked to open evidence
- On public-private: importance of pre-competitive spaces
- On unfair benefits: corrective measures to avoid open data benefitting big actors more
- On coordination / consultation: Importance of having these priorities in the DG AGRI program
- On infrastructure and standards: need for reference frames



- On coordination / consultation: good to see so many initiatives having so much in common (standards, tools...)
- On coordination / consultation: importance for the broader community of having an audience in the EC, and of having something useful to contribute to the EC
- On standards: we are still banging our heads against the same issues: standards, identifying the gaps, interoperability. Why are we not making more progress?
- On coordination / consultation: importance of this learning exercise between EC and other actors; Importance of having the three relevant DGs together
- On incentives: more focus on impact
- On public-private: GODAN can have a role on negotiating pre-competitive spaces
- On coordination / consultation: GODAN needs to do more to engage and have a solid partnership with the DGs; DG RTD ready to hear specific recommendations from this community; importance of widening the scope for those who work within/for Europe; convene a broader group around these issues? GODAN offers its convening power; also consider the upcoming call under Food2030, there is an action around convening.

In the end, grouping the key observations raised in the final discussion, a few broad areas clearly emerged as priority for all participants:

1. Convening mechanisms for making these consultations systematic (and seeing if the EC can also build the case for further systematic investment); also to help align the technology investments (avoiding duplication)
1. New incentives and business models for data sharing (think of automated mechanisms besides “stick and carrot” incentives)
2. Work still needed on interoperability and standards, especially on demonstrating impact and collecting use cases and stories to more clearly understand what is needed / missing; think of evolution of standards into Standards-as-a-Service.
3. Need for shared data services (big data platforms, e.g. big-data empowered learning mechanisms) and agreed reference datasets (as standards and for learning mechanisms)

2.2.5 Conclusions

A first conclusion is about the important results achieved thanks to the fact that the workshop was organized back-to-back with the DG AGRI meeting:

- we managed to have some members of the BDE project and some key partners invited to the DG AGRI meeting (Johannes Keizer from FAO, Odile Hologne from INRA, Sander Janssen from Alterra) to influence the agenda for the next biennium;
- we could have a full report of the meeting during the BDE workshop, from which it appeared that our main objective had been achieved: open data (more precisely “combining and exchanging data”) is one of the 5 identified priorities for DG AGRI for the next biennium (the others being: farm optimization, food traceability, environmental issues / sustainability, creating new businesses).

The workshop itself met the expectations that we had (as set out in the background chapter), in that:



- We managed to make our EC colleagues aware of key initiatives at the global level on data infrastructures and data sharing in the field of food and agriculture, and comments from the EC representatives confirmed that they appreciated the sharing of information and agreed that there should be some regular convening mechanism for these consultations.
- We learned a lot from our EC colleagues about the most recent developments in terms of their funding agendas and projects relevant to big and open data in agriculture and food.
- Many elements of the “common roadmap” for a data infrastructure / ecosystem that the global community is trying to build (from physical structures to software, standards and governance) came up in the discussion and there was a general agreement on the need for coordination and collaboration, in a way that represents international perspectives and includes both the public and private sector.

In particular, as concerns the impact of this workshop on our work in the Big Data Europe project, the areas of priority n. 3 and especially n. 4 above show how the project has relevance for both the EC DGs and the broader food and agriculture community, and we will make sure that the pilots and the big data platform instance for SC2 are built bearing in mind all the observations of participants in this workshop.

2.2.6 Appendices

2.1.6.A Slides & Presentations

All slides are available on the BDE project’s Slideshare account, tagged with [BDESC2W2](#).

2.1.6.B Photos

Photos are available in the respective workshop folder [here](#).

2.1.6.C Follow-up Post

A follow-up blogpost/message was shared on the BDE [website](#).

2.1.6.D Attendees

The following table is the list of registered attendees for the workshop:

Name	Organisation
Iman Boot	DG AGRI
Christopher Brewster	TNO
Ana Cuadrado Galvan	DG AGRI
Medha Devare	CGIAR



Wim Haentjens	DG RTD
Odile Hologne	INRA
Sander Janssen	Alterra (WUR)
André Jellema	Data-Impact
Pythagoras Karampiperis	Agroknow
Johannes Keizer	FAO / GODAN Secretariat
Marc Kuster	Publications Office of the EU
Nikos Manouselis	Agroknow
Graham Mullier	Syngenta UK
Pilar Ocon-Garces	DG CONNECT
Martin Parr	CABI / GODAN secretariat
Valeria Pesce	FAO / GFAR
Jane Richardson	EFSA
Kimmo Rossi	DG CONNECT
Simon Scerri	Fraunhofer IAIS
Derek Scuffell	Syngenta UK
Willem Van Gemert	Publications Office of the EU
Agnieszka Zajac	Publications Office of the EU
Panagiotis Zervas	Agroknow

2.3 SC3.2 Second Community Workshop for Societal Challenge 3 – Secure, Clean and Efficient Energy

The following table includes a summary of the workshop:

Date	04.10.2016
Venue	Representation of the State of North-Rhine Westphaliader for the European Union, Brussels, Belgium



Invitations Sent	163
Invitations Accepted (Registrants)	28
Attendees (Total)	23
Attendees (Project Consortium & Project Officer Replacement)	6
Attendees (Other)	17
Sessions	3, no parallel sessions

2.3.1 Agenda

- ⊙ 10:00-10:20 - Welcome & Introduction
 - Introducing attendees, workshop goals (BDE consortium,
 - BigDataEurope: Scope and opportunities (Dr. Simon Scerri, Fraunhofer IAIS, coordinators)
- ⊙ 10:20-11:20 Session 1. Smart Grids
 - 10:20-10:40 Policy and Legislation developments in Energy (Dr. Mark van Stiphout, EC ENER.C.2 - New energy technologies, innovation, clean coal)
 - 10:40-11:00 Data management in demand side, metering and retail (Dr. Maher Chebbo, ETP SmartGrids/SAP)
 - 11:00-11:20 Data management and analytics in smart grids, comprising distributed generation (Mr Alberto Bernardo, EFACEC)
- ⊙ 11:20-11:30 Coffee break for networking & discussion
- ⊙ 11:30-12:15 Session 2. Big Data Europe Platform & System monitoring in the SC3 Pilot
 - 11:30-11:50 Architecture and implementation (Dr. Aad Versteden, BDE consortium/ TENFORCE)
 - 11:50-12:00 Data acquisition challenges in System monitoring (F. Mouzakis, BDE/CRES)
 - 12:00-12:15 BDE Pilot case in system monitoring in Energy (F. Mouzakis, BDE/CRES)
- ⊙ 12:15-12:40 Light lunch break
- ⊙ 12:40-14:50 Session 3. Energy efficiency
 - 12:40-13:00 Energy Efficiency in Buildings Challenge: data related challenges and opportunities (Dr. Jens Laustsen, Concerted Action Energy Performance of Buildings Directive)
 - 13:00-13:20 BEMS: System design and data requirements (Mr. A. Androutsopoulos, BDE/CRES)



- o 13:20-13:40 Smart Data Platform: Big Data for energy efficiency projects (Dr. Tatsiana Hubina, CSI Piemonte Energy Expertise Unit, Turin)
- o 13:40-14:00 Data management in energy efficiency systems: A case study (Dr. Maja Skrjanc, Center for Knowledge Transfer in Information Technologies, Jozef Stefan Institute, Ljubljana, Slovenia)
- o 14:00-14:30 Data requirements in Energy efficiency domain
- o 14:30-14:50 Discussion on BDE platform application
- © 14:50-15:00 Summary, Outreach & Farewell

2.3.2 Workshop Scope and Structure

The aim of the workshop, the second of a scheduled series on the domain, is the continuation of the identification of current and future challenges for data management and analysis in the energy domain; challenges to be tackled with the evolving Big Data technology. In the second workshop the discussion was focused in energy distribution (smart grids) and in energy efficiency (building sector). In the workshop real examples of the challenges and complexities of using big data in these fields were discussed.

In parallel the technical advances in BDE were presented in terms of the platform development and the pilot application in energy domain.

The workshop addressed an audience composed by organisation representatives, EC officials, service providers, researchers and IT engineers.

The outcome of the workshop will support the design and realisation of the necessary ICT infrastructure on which the deployment and use of the BigDataEurope platform will be based. Furthermore, the presentation of data related challenges in the discussed fields will facilitate the identification of next pilot cases for BDE platform.

The workshop was divided in four parts, described in the following paragraphs.

1. Part I: The general introduction to the BDE background, objectives and targets, as well as an overview of the tools and technologies envisaged within the project was presented by BDE coordinator (Dr. S. Scerri, Fraunhofer IAIS).
2. Part II: Keynote presentations on data management challenges in domain fields.
 - a. Topic A: Electricity Industry

A review of the EU Commission activities and priorities in the energy domain was presented by Dr. Marc van Stiphout (EC ENER C.2). The views of the European Smart Energy Association and ETP platform were presented by Dr. M. Chebbo (ETP SmartGrids/SAP). The presenter, being a senior executive in SAP, also presented related research projects and the commercial side of the available technological solutions.



A review of the data management challenges in distributed electricity generation and smart grids was presented by Mr. A. Bernardo (EFACEC), representing a systems and service provider for the energy generation and distribution industry.

b. Topic B: System Monitoring

The data acquisition challenge in System Monitoring of energy systems was presented by BDE partner (CRES).

c. Topic C: Energy Efficiency in Buildings

The data management challenges in the energy efficiency in buildings were presented by Dr. J. Laustsen (EPBD/2peach), the coordinator of Energy Performance on Buildings Concerted Action. The design and data requirements for BEMS (Building Energy Management Systems) were presented by A. Androutsopoulos (CRES).

Use cases, related research projects and IT applications in the field were presented by Dr. M. Skrjanc (Jozef Stefan Institute, Slovenia) and Dr. T. Hubina (CSI Piemonte).

3. Part III: BDE advances

The BDE platform (i.e. architecture, implementation, guidelines) was presented by the BDE technical partner A. Versteden (TENFORCE), whereas the developing pilot in the domain was presented by F. Mouzakis (CRES).

The next two sections are dedicated to more details about Parts II and III above.

2.3.3 Domain Topic Review (Part II)

Topic A: Electricity Industry

Dr. M. Chebbo (Digital Energy 4.0 leader, president of ESMIG, GM Europe SAP) presented the views of the European Smart Energy Association and the ETP SmartGrids platform.

The presentation addressed the evolution of the energy market towards a “customer centric smart energy system” and the importance of the needed supporting new technology advances (Big Data, IoT, sensing etc), with the predictions being that by 2020~25 90% of the commercial and industrial and 70% of the residential consumers will be engaged in “smart energy” processes. The Smart Grids functional levels were analysed with respect to R&D (according to EEGI European Electricity and Grid Initiative and ETP SmartGrids).

Following a review of the recent technology trends (i.e. in hyperconnectivity, supercomputing, data science etc) the evolved new business models and the importance of customer data were discussed. The Digital Energy System 4.0 (by ETP SmartGrids) was presented, with reference to digital use cases at the level of power generation, transmission and distribution networks, retailers and aggregators. The cases regarded asset management, network planning and operation, customer participation, balancing and market facilitation.



In the sequel, several projects were presented (involving commercial IT provider) regarding load forecasting for a regional grid operator, benchmarking of energy efficiency of residential customers and smart city street light control. The EC funded projects FLEXICIENCY, INTEGRID and FutureFlow were also presented.

In the concluding messages the following were pointed out:

- ICT infrastructures need empowerment using digital simulation and forecasting models
- Well-guided data confidentiality accelerates the digital transformation
- Digital well designed Energy Management can successfully integrate massive renewables
- Leveraging Digital technologies will also enable a well-functioning, open and flexible market
- Digital home technologies can shift residential consumption during peak demand
- Keep investing in disruptive digital technologies while thinking first your digital use cases

Mr. A. Bernardo (representing an energy engineering systems and services provider, EFACEC) presented a review of data management and analytics in smart grids.

The following were addressed:

- Smart grid concept
- On-going development and current challenges in Smart Grids field
- Domain data content
- Advantages of smart grid applications enabled by data management and analytics

In the concluding messages the following were pointed out:

- Lack of data model has become a bottleneck for efficient data integration and application deployment (note for utility related data)
- Smart grid community will exploit related Big Data developments
- EFACEC as a stakeholder will investigate the application of BDE platform

In Appendix 2.3.5.a the link for the presentations are given for full and accurate reference.

Topic B: System Monitoring

The data acquisition challenge for high data volume and sampling rate system monitoring was presented by F. Mouzakis (BDE domain partner CRES). The presentation covered:

- Requirements in system monitoring
- Typical DAQ (data acquisition) core components
- FPGA technology
- Distributed architecture for data collection
- File formats

The presented data acquisition architecture was implemented for the support of the BDE pilot in Energy.



Topic C: Energy efficiency

Dr. J. Laustsen (coordinator of Energy Performance on Buildings Concerted Action EPBD; 2peach) presented a review of the energy efficiency in buildings domain.

In the first place the structure of the Concerted Action EPBD IV was presented, in relation to technical elements, policy implementation and compliance capacity impact. The new structure of the CA (reflecting the EPBD policies such as the nZEB: near zero energy consumption by buildings), includes data related advances specifically in data collection and management. The various data involved (in policy making level) were described.

In the concluding messages the following were pointed out as gaps to be filled in relation to data management:

- Better combination / connection between data on buildings and on energy use
- Better data on results of change – before and after
- Better connection between measured and calculated energy use
- More data on consumer influence on consumption

Mr A. Androutsopoulos (CRES) presentation focused on the design and data requirements for BEMS (Building Energy Management Systems). The objectives, structure and applications of BEMS were presented followed by the predictions for the growth of the BEMS market. In the sequel, the BEMS related services in visualization and reporting, fault detection and diagnostics, predictive maintenance, adaptation and optimization were discussed; the common ground being data acquisition, management and analytics.

The technical aspects of BEMS were described, focusing in system configuration, communication protocols, physical communication media and sensor networks. A use case of an operating BEMS system was presented.

In the concluding remarks the following were pointed out:

- Customer interest for energy efficiency and EU Directives drive the demand for installation of BEMS
- Data management and real time monitoring are the key elements for the efficient use of BEMS
- A high growth in BEMS applications is predicted, along with IT supportive services
- BDE platform capabilities will be assessed for BEMS cases

Dr. T. Hubina (CSI Piemonte) presented various use cases in the field of energy efficiency that used for demonstration of smart data platforms (developed for EU projects NRG4CAST, DIMMER). The use cases are descriptive of the energy efficiency domain and include:

- Electric car smart charging
- Street lighting management
- Thermal energy production and tele-heating
- BEMS systems
- Smart city scenario

Various descriptive dashboards and system workflows were presented.

In the sequel the CSI SmartDataNet project was presented along with reference to its available platforms.



Dr. M. Skrjanc (Jozef Stefan Institute, Slovenia) presented the Big Data challenges form Energy Efficiency case studies.

A brief introduction in the challenges in energy conservation, the environment monitoring and the sustainable energy management systems was followed by the presentation of two EU research projects (NRG4CAST for energy efficiency and SUNSEED for grid management).

The presentations focused on the technical implementation of the IT solutions namely:

- System architecture
- Data flows
- Multimodal stream data analytics
- Textual pipelines
- Forecasting pipelines

The challenges in the development of the IT solutions were discussed (grid monitoring):

- Various communication protocols
- H/W development and cost, communication cost
- Minimal set of measurement nodes at locations to maintain whole grid observability
- Integration of different security levels

In the concluding remarks the following were pointed out:

- Domain knowledge is the key (also in solving tech challenges)
- Input from business perspective necessary to push and drive product development
- Cyclic technical development (one prototype each year) turned out to be winning combination
- Intensive dissemination activities are necessary

In Appendix 2.3.5.a the link for the presentations is given for full and accurate reference.

2.3.4 Technical Topics Review (Part III)

A.Vesteden and E. Pauwels (BDE technical partners, TENFORCE) presented the technical overview of BDE platform.

In the first place the BDE platform main design aspects were presented to the community; design aspects serving specific goals related to the low cost of ownership, low starting learning rate, simplicity of integration with custom components, applicability and capability of adopting new technologies.

In the sequel the following were presented in detail:

- Platform architecture
- Semantic Big Data
- Support layer
- Platform installation and deployment
- Pipeline demonstration



The attending community members were given the basic information for investigating the content of the platform and acquiring the technical details for its installation and possible use. Contacts were made between the technical attendants and BDE partners.

In the concluding remarks the following were pointed out:

- The platform is being used in practice
- It is easy to get started for application development
- It is under improvement cycles
- Support is available within the framework of BDE

F. Mouzakis (CRES) presented the BDE pilot case in the field of system monitoring in Energy. A brief introduction for the monitoring use case problem definition and scenario was followed by the pilot technical aspect presentation.

The pilot addresses the case of system monitoring with high volume and sampling rate data streams. The following were presented:

- Description of the monitored system (wind turbine)
- The sensor network
- The distributed data acquisition system
- Data description (type, format, volume etc)
- Base analytics
- Pilot concept and structure

The specific aspects of the pilot, namely the volume of the data, the analysis requirements and the need of incorporating third party analytics modules were presented.

The current status of the pilot development was presented, announcing the presentation of the operating instance in the forthcoming webinars and thematic workshop.

2.3.5 Appendices

2.3.5.A Slides & Presentations

1. [Workshop Agenda](#)
2. [BDE: Empowering Communities with Data Technologies](#) (BDE coordinator, Fraunhofer IAIS)
3. [Big Data and Future Energy](#) (M. Chebbo, ETP Smartgrids/SAP)
4. [Data Management and Analytics in Smart Grids comprising distributed generation](#) (A. Bernardo, EFACEC)
5. [BDE Platform: Technical overview](#) (A. Versteden, TENFORCE)
6. [System monitoring: Data acquisition challenge](#) (F.Mouzakis, CRES)
7. [Pilot case in System Monitoring in Energy](#) (F. Mouzakis, CRES)
8. [Energy Efficiency in Buildings. Data related challenges and opportunities](#) (J. Laustsen, EPBD)
9. [Building Energy Management Systems: System design and data requirements](#) (A. Androutsopoulos, CRES)



10. [Smart Data Platform: Big Data for Energy Efficiency projects](#) (T. Hubina, CSI Piemonte)
11. [Energy efficiency: Big Data challenges from case studies](#) (M. Skrjanc, Jozef Stefan Institute, Slovenia)

2.3.5.B Photos

Photos are available in the respective workshop folder [here](#).

2.3.5.C Follow-up Post

A follow-up blogpost/message was shared on the BDE [website](#).

2.3.5.D Attendees

The following table is the list of registered attendees for the workshop:

Last Name	First Name	Institution/Company
Androutsopoulos	Andreas	CRES
Laustsen	Jens	EPBD (Energy Performance Directive CA)
Bernardo	Alberto	EFACEC, Portugal
Mouzakis	Fragiskos	CRES
Bollinne	Denis	OPINUM
Boelman	Eliza	EC JRC
Bornas Cayuela	Damian	EC - Smartcities
Pauwels	Erika	TENFORCE
Chebbo	Maher	Smartgrids ETP/SAP
Scerri	Simon	Franhauser IAIS
Van Stiphout	Marc	EC ENER C.2
Skrjanc	Maja	Jožef Stefan Institute, Slovenia
Foursa	Maxim	PDS
Van Hove	Patrick	EC DG-RTD
Stantcheva	variana	EC INEA
Versteden	Aad	TENFORCE
Pinault	Margot	EC ENER C.3



Wuopulos	Katharina	RECP/EVEI PDI
Hubina	Tatsiana	CSI Piemonte
Serra	Fabrizio	-
Folkmanis	Janis	EC DG RTD D.1
Nolf	Marie-Therese	-
Clement	Nadine	-

2.4 SC5.2 Second Community Workshop for Societal Challenge 5 – Climate Action, Environment, Resource Efficiency and Raw Materials

The following table includes a summary of the workshop:

Date	11.10.2016
Venue	Bedford Hotel & Congress Centre, 135-137 Rue du Midi, Brussels, B-1000 Belgium.
Invitations Sent	619
Invitations Accepted (Registrants)	27
Attendees (Total)	16
Attendees (Project Consortium & Project Officer Replacement)	7
Attendees (Other)	9
Sessions	3, no parallel sessions

2.4.1 Agenda

- © 09:00-09:30 - Welcome
- © 09:30-10:15 Session 1: Introductions
 - o 09:30-09:55 EC Big Data Policy (Saila Rinne, European Commission)



- o 09:55-10:15 Status of the BDE project (Simon Scerri, Deputy Coordinator, Big Data Europe, Fraunhofer IAIS)
- © 10:15-12:05 Session 2: Invited Talks
 - o 10:15-11:05 Data Analytics and Downscaling for Climate Research in a Big Data World: Status and Perspectives (Christian Pagé, Research Engineer and Project Manager, Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique - CERFACS)
 - o 11:05-11:25 Big Data in the Research Life Cycle: Technologies, Infrastructures, Policies (Yannis Ioannidis, President & General Director at ATHENA RIC and Professor at University of Athens)
 - o 11:25-11:45 Coffe and networking break
 - o 11:45-12:05 Big Data for Environmental Monitoring, Public Health and Verifiable Risk Assessments – New Technologies with Innovative Handling with Data Gaps (Andreas N. Skouloudis, Principal Scientific Officer, Institute for Environment and Sustainability, EC Joint Research Centre)
- © 12:05-14:00 Session 3: BDE and the SC5 Pilot
 - o 12:05-12:25 The initial SC5 pilot, components and rationale (Iraklis Klampanos, Research Associate, Institute of Informatics and Telecommunications, NCSR Demokritos)
 - o 12:25-12:45 The Physics Background of the BDE SC5 Pilot Cases (Spyros Andronopoulos, Research Director, Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety, NCSR Demokritos)
 - o 12:45-13:30 Lunch break
 - o 13:30-14:00 SC5 Pilot #2: Plans and the role of Big Data in SC5 (Andreas Ikononopoulos, Senior Researcher, Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety, NCSR Demokritos)
- © 14:00-14:45 Open discussion & Wrapup
 - o 14:00-14:45 Open discussions, feedback and priorities
 - o 14:45-15:00 Conclusions and farewell

2.4.2 Summary of Workshop, Invited Talks and Discussions

2.4.2.1 Summary

The 2nd SC5 Big Data Europe workshop took place in Brussels, on 11 October 2016. 17 participants attended in total, including 3 invited speakers and 2 EC Officials, spanning different areas of the societal challenge, from climate research and climate change impact assessment, to atmosphere and emergency response. In this report, we provide a quick run-through of the half-day SC5 event, with links to relevant presentations.

2.4.2.2 Invited Talks

Saila Rinne (EC Commission Programme Officer, CNECT.G1) opened the workshop, giving [an overview of the policy context behind Big Data and Public-Private Partnership \(PPP\)](#).



Interesting discussions took place regarding the value big and open data bring to different aspects of the European economy, also according to the [Big Data Value Association Strategic Research and Innovation Agenda \(SRIA\)](#).

Simon Scerri (Enterprise Information Systems, University of Bonn), representing the Big Data Europe (BDE) coordinator, gave [an introduction to the Big Data Europe project and platform](#). The BDE core platform, software aggregator and outreach actions communicate and find solutions to a number of societal challenge domains pertaining to the acquisition, management and use of big data.

Christian Pagé (Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique – CERFACS), discussed issues regarding [data analytics and downscaling for climate research within the context of big data](#). Material covered included the climate data lifecycle, as well as core infrastructures, such as the ESGF (future) computing node, bringing closer data and computation, as well as current advances in EUDAT, EGI, etc.

Yannis Ioannidis (Athena Research Center and University of Athens), discussed the [role of big data in the research lifecycle and in particular in terms of research infrastructures within the European context](#). Following a logical division between data infrastructures, processing and analytics, this talk covered infrastructures such as OpenAIRE and environment ESFRI RIs, such as ICOS (<https://www.icos-ri.eu>) and EPOS (<https://www.epos-ip.org>), dataflow engines, such as EXAREME, distributed elastic execution, etc. Example applications and projects primarily concerned with medical and health data.

Andreas Skouloudis (EC, Joint Research Centre) discussed the [role and usefulness of big data for environmental monitoring, public health and risk assessment, connecting climate and the environment with emergency response](#). This presentation discussed real-time processing for short-term acute events, such as tsunamis, nuclear accidents, and how sensor data, IoT and monitoring are important in such use-cases.

Iraklis Klampanos (NCSR Demokritos, BDE SC5 team) presented the [1st BDE SC5 pilot, the rationale behind it and the technological components developed](#). Components such as the ingestion and exporting of NetCDF files, into and from the BDE platform, as well as the downscaling orchestration components will be reused for the 2nd SC5 pilot.

Spyros Andronopoulos (NCSR Demokritos, BDE SC5 team) provided a much needed [physics background for the SC5 pilot use-cases](#). This introduction covered the basics regarding the study of the atmosphere for weather prognosis, climate projection, air pollution abatement, etc. Having covered the scientific rationale behind both the 1st and the upcoming, 2nd, BDE SC5 pilot, it provided a logical ramp leading up to the following presentation.

Andreas Ikonopoulos (NCSR Demokritos, BDE SC5 team) introduced the [2nd planned SC5 pilot, that will address the problem of identifying the unknown release location of a substance](#). This presentation provided rationale for the upcoming SC5 pilot by explaining concepts such as the environmental contamination and how it affects fauna and flora, the examples of



Chernobyl, Algeciras and Fukushima and the definition of the problem addressed by the BDE. The upcoming SC5 pilot will make efficient use of big data and the BDE platform to support emergency response during a nuclear or radiological event.

2.4.2.3 Discussions

The presentations were followed by a discussion on the utilization of the BDE platform and issues related to the planned 2nd SC5 Pilot case. In particular there were discussions regarding the BDE platform and how easy (or not) it would be for a third party to acquire, deploy and use it. Another matter that was discussed was related to the NetCDF format, its integration to the BDE platform and ways to enable analytics to be drawn from relevant data. With respect to the upcoming SC5 pilot, the discussion revolved around current practices for identifying the location of a source using inverse modelling and the need for a complementary quicker solution which could be enabled via the use of big data.

2.4.3 Appendices

2.4.3.A Slides & Presentations

Links to the set on BDE's Slideshare account are embedded in the descriptions of the talks and presentations above.

2.3.5.B Photos

Not available.

2.3.5.C Follow-up Post

A follow-up blogpost/message was shared on the BDE [website](#).

2.3.5.D Attendees

The following table is the list of registered attendees for the workshop:

Last Name	First Name	Organisation
Vangelis	Karkaletsis	NCSR-D
Christian	Pagé	CERFACS
Andre	Gemuend	Fraunhofer SCAI
Alessandro	Spinuso	KNMI
Iraklis	Klampanos	NCSR-D
Andreas	Ikonomopoulos	NCSR-D
Yannis	Ioannidis	Athena RIC, University of Athens



Andreas	Skouloudis	JRC
Spyros	Andronopoulos	NCSR-D
Fabio	Dalan	EC (EASME)
Ahmed	Nagy	SCKCEN
Andrej	Mihajlovski	KNMI
Barbora	Tothova	Slovak Liaison Office for R&D
Aad	Versteden	TenForce
Manolis	Koubarakis	University of Athens
Simon	Scerri	Fraunhofer IAIS

2.5 SC7.2 Second Community Workshop for Societal Challenge 7 – Secure Societies

The following table includes a summary of the workshop:

Date	18.10.2016
Venue	Spanish Office for Science and Technology Rue de Trone, 62, Brussels, Belgium
Invitations Sent	310
Invitations Accepted (Registrants)	100
Attendees (Total)	59
Attendees (Project Consortium & Project Officer)	9
Attendees (Other)	50
Sessions	3, no parallel sessions

2.5.1 Agenda

- © 09:30-10:10 - Registration & Coffee
- © 10:00-11:00 Morning Session



- o 10.10 – 10.30: Welcome and Workshop presentation (Sergio Albani, Responsible for RTDI, European Union Satellite Centre)
- o 10.30 – 10.50: The BigDataEurope project (Simon Scerri, BigDataEurope Deputy Project Coordinator, Fraunhofer IAIS)
- o 10.50 – 11.10: Big Data, Societal Challenges and the Policy Context (Kimmo Rossi, Head of Sector R&I Execution in the DVC, EC CNECT.G3)
- o 11.10 – 11.30: Big Data and Secure Societies (Pascal Legai, Director, European Union Satellite Centre)
- o 11.30 – 11.50: Big Data Challenges in building GEOSS (Barbara Ryan, Secretariat Director, GEO)
- o 11.50 – 12.10: Space Data for Secure Societies (Daniel Quintart, Policy Officer, EC GROW.I3)
- o 12.10 – 12.30: Big Data Challenges in Cybersecurity (Pierre Chastanet, Dep. HoU Cybersecurity & Digital Privacy, EC CNECT.H1)
- © 12:30-14:00 Lunch
- © 14:00-15:40 Afternoon Session
 - o 14.00 – 14.20: Industry view of Big Data Challenges for Secure Societies (Geoff Sawyer, Secretary General, EARSC)
 - o 14.20 – 14.40: Space-based applications and Big Data (Roberto Cossu, Application Engineer, ESA TIA-APS)
 - o 14.40 – 15.00: Big Data Technologies and Scenarios (Vangelis Karkaletsis, Research Director, NCSR Demokritos)
 - o 15.00 – 15.20: Big Data pilots for Secure Societies (Sergio Albani, Responsible for RTDI, European Union Satellite Centre)
 - o 15.20 – 15.40: Demo of the BigDataEurope pilot for Secure Societies (Manolis Koubarakis, Professor, University of Athens)
- © 15:40-16:10 Interactive Q&A Session (Chaired by Manolis Koubarakis, Professor, University of Athens)
- © 16:10-16:30 Summary and Closing
 - o 16:10-16:20 Summary, Outreach and Feedback (Simon Scerri, BigDataEurope Deputy Project Coordinator, Fraunhofer IAIS)
 - o 16.20-16.30 Closing Note and Farewell (Kimmo Rossi, Head of Sector R&I Execution in the DVC, EC CNECT.G3)

2.5.2 Workshop Description

2.5.2.1 Background

The Horizon 2020 “Secure Societies” Societal Challenge refers to the protection of freedom and security of Europe and its citizens. The primary aims of the Secure Societies Societal Challenge (SC) are:

1. To enhance the resilience of our society against natural and man-made disasters;
2. To develop novel solutions for the protection of critical infrastructure;



3. To improve border security;
4. To support the Union's external security policies;
5. To fight crime and terrorism;
6. To provide enhanced Cybersecurity.

An example of major activity within the Secure Societies SC is the provision of geospatial products and services, mainly resulting from satellite data. In fact, the datasets used in the Space & Security domain comply with the definition of Big Data in terms of Variety (Earth Observation data, aerial imagery and collateral data), Volume (several governmental and commercial satellites are currently in orbit), Velocity (24/7 availability to users requiring fast responses), Veracity (decision making and operations require reliable sources) and Value (provision of useful and clear information).

2.5.2.2 Workshop aims

By dedicated interactive sessions on specific topics, the workshop aimed to:

1. Go into current and future Big Data needs and challenges in Secure Societies;
2. Contribute to the building of a community sharing Big Data requirements and strategies;
3. Discuss real user scenarios and use cases, e.g. related to the provision of products and services in the Space & Security domain;
4. Present and have feedback on the BigDataEurope pilot for Secure Societies currently under implementation and dealing with the integration of remote and social sensing data for change detection;
5. Offer the opportunity to participate in the BigDataEurope project and in the Big Data platform development.

2.5.2.3 Workshop general information

The workshop was organised by the European Union Satellite Centre at the Spanish Office for Science and Technology in Brussels (Rue de Trone, 62) on the 18th of October 2016 with speakers coming from EC (DG CNECT, DG GROW), EARSC, ESA, EU SatCen, GEO and BigDataEurope project partners. The workshop had 100 registered participants and an actual number of 59 attendees coming from EC (DG AGRI, DG CNECT, DG EAC, DG ECHO, DG GROW, DG HOME, DG RTD, EASME, Eurostat), CDTI, EARSC, EDA, ESA, Frontex, GEO and a number of key stakeholders, data users, service providers, private companies and other entities from a variety of domains (see Fig.1) in Secure Societies such as Space & Security and Cybersecurity. Working sectors were represented as follows: 32% Data & Technology, 29% Space & Security, 16% Cybersecurity, 7% Fight against Crime and 16% other sectors such as Resilience against disasters, Protection of critical infrastructures, Border Security or Support to EU external policies. Organisation types were represented as follows: 34% EU/EC entities, 27% Industries (including SMEs), 8% Public authorities, 8% Universities and 23% other types such as international, private, public, research or non-governmental organisation.

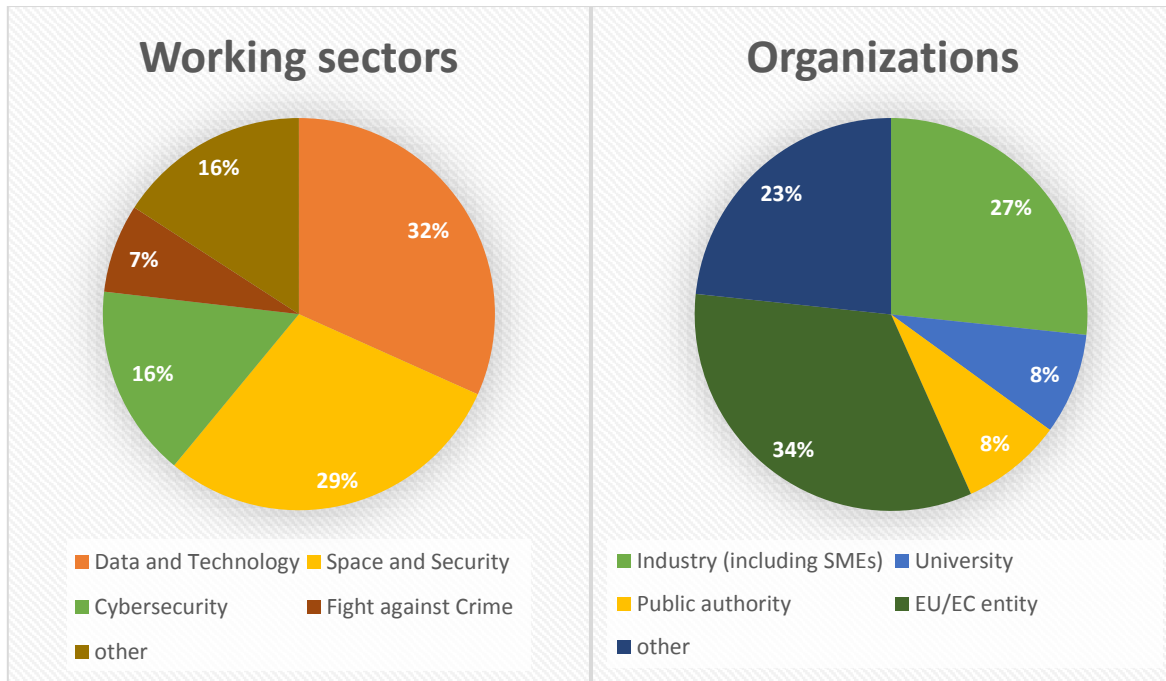


Figure 1. Participants represented by Working sectors and Organizations (*multiple domains allowed*)

2.5.3 Invited Talks and Presentations

The welcome to participants was given by Sergio Albani, Responsible for RTDI (Research, Technology Development and Innovation) at EU SatCen. The presentation mainly aimed at illustrating the objectives of the workshop, also recalling the 1st workshop on Big Data in Secure Societies (held in Brussels the 30th of September 2015).

The next presentation was given by Simon Scerri, BigDataEurope Deputy Project Coordinator (Fraunhofer IAIS). A general overview of the BigDataEurope project was provided, describing the aims and the participants of the project as well as the community building activities (e.g. the series of workshops) and the technological achievements (e.g. the first release of the BigDataEurope platform).

The workshop continued with the presentation of Kimmo Rossi, EC Project Officer for BigDataEurope and Head of Sector R&I Execution in the Data Value Chain of the European Commission (DG CNECT.G3). The importance of Big Data for Europe was highlighted, describing the EU policy context for Big Data and the related enormous possibility of European economy growth; the Big Data Public Private Partnership and a number of ICT calls were also presented.

The fourth presentation was given by Pascal Legai, EU SatCen Director. The presentation described the structure, mission and activities of the EU SatCen (focusing on the Big Data activities performed by the RTDI group). The presentation also illustrated the Big Data challenges in the Space & Security domain as well as a number of current European initiatives on Big Data.



The following speaker was Barbara Ryan, GEO Secretariat Director. A general introduction to the GEO vision, societal benefit areas, members and participating organisations was given. The current and foreseen activities of the GEO Space and Security Community Activity, led by the EU SatCen, were also presented.

The sixth presentation was given by Daniel Quintart, EC Policy Officer (DG GROW.I3). After a general introduction to the Copernicus Programme, particular attention was given to the Copernicus service for Security applications (as recently EC entrusted the EU SatCen with the operations of the Copernicus service in Support to EU External Action with the signature of a Delegation Agreement). The presentation also described the Copernicus Big Data Challenge and how Copernicus is going to deal with the increasing amount of Sentinel data.

The morning session ended with Pierre Chastanet, Deputy Head of the Cybersecurity & Digital Privacy Unit of the European Commission (DG CNECT.H1). The presentation highlighted the role of Cybersecurity as backbone of the digital society and economic growth in Europe. Moreover a description of several EU actions to strengthen the EU Big Data in Secure Societies – 2nd Workshop 18th October 2016, Brussels, Belgium Cybersecurity industry and boost the overall sector was provided; one of the initiatives described was the contractual Public-Private Partnership (cPPP) on Cybersecurity.

The afternoon session started with Geoff Sawyer, Secretary General of the European Association of Remote Sensing Companies (EARSC). After having introduced EARSC structure and network, the presentation illustrated the new opportunities, threats and barriers related to the EARSC vision on a European marketplace for EO services.

The workshop continued with the presentation of Roberto Cossu, Application Engineer at ESA. The presentation began with an overview of the ESA ARTES Integrated Applications Promotion (IAP) programme, explaining its funding scheme for space-based downstream applications. The presentation also illustrated the ESA IAP Invitation to Tender “Big Data applications to boost preparedness and response to migration” as well as some successful stories of IAP projects in the Security domain.

The tenth presentation was given by Vangelis Karkaletsis, Research Director at NCSR Demokritos. The presentation described the BigDataEurope architecture and the pilots under implementation for each Horizon 2020 Societal Challenge, from SC1 (pilot on pharmacology research for Life Sciences and Health) to SC7 (pilot on change detection and verification for Secure Societies).

The next presentation was given by Sergio Albani, Responsible for RTDI (Research, Technology Development and Innovation) at EU SatCen. The presentation illustrated the EU SatCen RTDI activities on Big Data and Cloud Computing, aiming at improving the capabilities of the Space and Security Community. A number of relevant Horizon 2020 projects, with focus on the pilots being implemented by the EU SatCen, were also presented: BigDataEurope, EVER-EST and NextGEOSS.



The last presentation was given by Manolis Koubarakis, Professor at the University of Athens. The BigDataEurope pilot for Secure Societies was presented in detail, illustrating the pilot architecture, data used, achievements and future activities. The presentation ended with a live demo of the pilot, showing its main functionalities. After the last presentation, a Q&A session took place aiming at addressing the audience questions and at receiving further feedback and requirements as input for the next phases of the BigDataEurope pilot for Secure Societies.

The workshop was closed by Simon Scerri, Kimmo Rossi and Pascal Legai, who remarked the success of the event and the key role of the BigDataEurope Secure Societies activities in showing the importance of Big Data solutions to face Societal Challenges.

2.5.5 Appendices

2.3.5.A Slides & Presentations

1. [Welcome and Workshop presentation](#) (Sergio Albani, Responsible for RTDI, European Union Satellite Centre)
2. [The BigDataEurope project](#) (Simon Scerri, BigDataEurope Deputy Project Coordinator, Fraunhofer IAIS)
3. [Big Data, Societal Challenges and the Policy Context](#) (Kimmo Rossi, Head of Sector R&I Execution in the DVC, EC CNECT.G3)
4. [Big Data and Secure Societies](#) (Pascal Legai, Director, European Union Satellite Centre)
5. [Big Data Challenges in building GEOSS](#) (Barbara Ryan, Secretariat Director, GEO)
6. [Space Data for Secure Societies](#) (Daniel Quintart, Policy Officer, EC GROW.I3)
7. [Big Data Challenges in Cybersecurity](#) (Pierre Chastanet, Dep. HoU Cybersecurity & Digital Privacy, EC CNECT.H1)
8. [Industry view of Big Data Challenges for Secure Societies](#) (Geoff Sawyer, Secretary General, EARSC)
9. [Space-based applications and Big Data](#) (Roberto Cossu, Application Engineer, ESA TIA-APS)
10. [Big Data Technologies and Scenarios](#) (Vangelis Karkaletsis, Research Director, NCSR Demokritos)
11. [Big Data pilots for Secure Societies](#) (Sergio Albani, Responsible for RTDI, European Union Satellite Centre)
12. [Demo of the BigDataEurope pilot for Secure Societies](#) (Manolis Koubarakis, Professor, University of Athens)

2.3.5.B Photos

Photos are available in the respective workshop folder [here](#).

2.3.5.C Follow-up Post

A follow-up blogpost/message was shared on the BDE [website](#).



2.3.5.D Attendees

Notes: Sector & Org. Type refer to Fig.1. Two participants refused publication of name.

Name	Organisation	Sector	Org. Type
Sergio Albani	EU Satellite Centre	1	4
Fabio Annibali	Telespazio	1, 4, 5	1
Jérôme Béquignon	European Space Agency	1	5
Katrien Berbers	DG AGRI R.6 European Commission	4, 5	4
Rastislav Bilik	SLORD	1, 2, 3	5
Laurent Bonanséa	DG HOME B.3 European Commission	2, 4, 5	4
Michel Bosco	DG HOME B.4 European Commission	5	4
Angelo Charlaftis	ePAPHOS Advisors Teamwork	1, 3, 4	5
Pierre Chastanet	DG CNECT H.1 European Commission	3	4
Jarka Chloupkova	WIP as well as MIZZOU	2, 4	2
Sergiu Conovalu	DG RTD.H.3 European Commission	1,2,3,4,5	4
Damien Conroy	Espion	3, 4	1
Maria Michela Corvino	E-geos	1	1
Roberto Cossu	European Space Agency	1	5
Liana Anca Costea	Terrasigna	4	1
Polydoros Demetriades	DG EAC D.3 European Commission	5	4
Juan Escalante	DG ECHO A.1 European Commission	5	4
Izabela Freytag	EASME B.2.2 European Commission	4	4
Nuno Grosso	Deimos Engenharia	1	1



Lydia Hutin	CS - Communication et Systemes	1, 3, 4	1
Karin Hyldelund	creoDK	3	2, 5
Pascal Jacques	DG ESTAT - Eurostat B.2 European Commission	4	4
Vangelis Karkaletsis	NCSR Demokritos	4	5
Rob Kloots	TrustingtheCloud	3	1
Manolis Koubarakis	University of Athens	4	2
Michele Lazzarini	EU Satellite Centre	1	4
Pascal Legai	EU Satellite Centre	1	4
Daniel López	Spanish National Police	3	3
Jean Marchal	European Defence Agency	1	4
J. Carlos Martinez	CME	5	3
Marina Martinez -Garcia	CDTI-SOST	3	3
Sandra Mezzadri	IABG	1	1
Alicja Miodonska	EU Satellite Centre	1	4
Emmanuel Mondon	AdviceGEO / Copernicus World Alliance	1	1
Michael Murphy	Enterprise Ireland	4	3
Filipe Paisana	Frontex	5	4
George Papadakis	University of Athens	4	2
Ellas Papadopoulou	DG RTD E.1 European Commission	4	4
Raoul Penneman	1Spatial	4	1
Pablo Perez-Illana	DG RTD H.3 European Commission	1, 3, 4, 5	4
Yuri Ponzani	Recycle2Trade LTD	4	5
Daniel Quintart	DG GROW I.3	1	4



	European Commission		
Pacôme Revillon	Euroconsult	1	1
Tamsin Rose	Tamarack Ltd	5	5
Kimmo Rossi	DG CNECT G.1 European Commission	4	4
Barbara Ryan	Group on Earth Observations	1	5
Geoff Sawyer	EARSC	1, 4	5
Simon Scerri	Fraunhofer IAIS	4	5
Benjamin Schreiber	Information Risk Management Consultancy		
MC2 ASBL	1	5	
Florin Serban	Terrasigna	4	1
Martina Sindelar	DG GROW I.3 European Commission	1	4
Emmanouil Thanos	University of Athens	4	2
Dinand Tinholt	Capgemini Consulting	4	1
Kirsten Van Camp	Pulse Lab Kampala -UN Global Pulse	5	5
Aad Verstedden	TenForce	4	1
Edward Yu	Advalvas - Information Risk Management Consultancy	3	1
Alessandro Zanasi	Zanasi & Partners	1, 2, 3	1

3. Summary

The reports provided in this deliverable cover the related BDE WP2 workshop taking place between M12 and M26 (5). These reports supplement the reports of the 1st series of workshops covered in the first two deliverable in this series (D2.2 Report on Interest Groups Workshop I and D2.5 Report on Interest Groups Workshop II).