

BIG DATA EUROPE

Support Action

# Big Data Europe – Empowering Communities with Data Technologies

Project Number: 644564

Start Date of Project: 01/01/2015

Duration: 36 months

## Deliverable 6.6 Pilot Deployment III

<b>Dissemination Level</b>	Public
<b>Due Date of Deliverable</b>	30 Dec, 2017
<b>Actual Submission Date</b>	31 Dec, 2017
<b>Work Package</b>	WP6, Real-life Deployment & User Evaluation
<b>Task</b>	T 6.2
<b>Type</b>	Other
<b>Approval Status</b>	Approved
<b>Version</b>	1.0
<b>Number of Pages</b>	22
<b>Filename</b>	D6.6-final.pdf

**Abstract:** This document is the reference to D6.6 classified as status "Other" which in this case means the implementation and deployment efforts on the pilots for the 7 Societal Challenges. The source code, scripts, recorded demonstrations and manuals for deploying the pilots are the core of this deliverable. This report serves as an index for these various online sources on the first cycle of pilots.

The information in this document reflects only the author's views and the European Community is not liable for any use that may be made of the information contained therein. The information in this document is provided "as is" without guarantee or warranty of any kind, express or implied, including but not limited to the fitness of the information for a particular purpose. The user thereof uses the information at his/ her sole risk and liability.



## History

Version	Date	Reason	Revised by
0.1	18/10/2017	First draft	Ronald Siebes
0.2	11/12/2017	Final draft	Ronald Siebes and SC partners
0.3	14/12/2017	Review	Alexandra Garatzogianni
1.0	30/12/2017	Final draft corrected according to review comments	Ronald Siebes and SC partners

## Author List

Organisation	Name	Contact Information
Open PHACTS Foundation	Bryn Williams-Jones	bryn@openphactsfoundation.org
VU University Amsterdam	Victor de Boer	v.de.boer@vu.nl
VU University Amsterdam	Ronald Siebes	rm.siebes@few.vu.nl
NCSR-D	S. Konstantopoulos, A. Charalambidis, I. Mouchakis, G. Stavrinos	konstant@iit.demokritos.gr
TenForce	Aad Versteden, Erika Pauwels	aad.versteden@tenforce.com
Fraunhofer IAIS	Alexandra Garatzogianni Luigi Selmi	Alexandra.Garatzogianni@iais.fraunhofer.de luigi.selmi@iais.fraunhofer.de
SWC	Martin Kaltenboeck	m.kaltenboeck@semantic-web.at



## Executive Summary

This document serves as an index for references to the implementation and deployment efforts that realized the second and partially the third cycle of pilots for the seven Societal Challenges. The source code, scripts, recorded demonstrations and manuals for deploying the pilots are the core of this deliverable. The good collaboration between the technical and domain partners combined with deliverance of a working infrastructure, generic Big-Data components, user interfaces and documentation according to internal deadlines resulted in a versatile but coherent set of demonstrators. Various webinars, hangouts and presentations during the last year are recorded and serve as excellent reference material in this document together with the public code repositories where the more technically skilled reader can get more insight into the details.

The pilots demonstrate how relevant large-scale datasets or data-streams for the respective seven SC communities can be processed by the BigDataEurope infrastructure and provide novel insights that are promised by the Big Data community.

This document refers to online demonstrations, presentations, instructions and code-bases that form the content of D6.6.

## Abbreviations and Acronyms

<b>LOD</b>	Linked Open Data
<b>SC</b>	Societal Challenge
<b>BDE</b>	Big Data Europe

## Table of Contents

1. Introduction.....	5
2. Planning.....	6
3. SC 1 - Health - pilot .....	7
4. SC 2 - Agriculture - pilot.....	9
5. SC 3 - Energy - pilot.....	11
6. SC 4 - Transport - pilot.....	12
7. SC 5 - Climate - pilot.....	15
8. SC 6 - Social Sciences - pilot.....	17
9. SC 7 - Security - pilot.....	18
Conclusion .....	20

# 1. Introduction

Implementation and instantiation are the two main aspects of the pilot deployment. These consist of having a code-base, a CPU/GPU cluster to test and deploy the code, creating modules by the various partners either from scratch or, in most cases modifying existing code into Docker components. Close collaboration with the technical partners (TenForce, SWC, NCSR-D and FhG) that are responsible for creating the BDE infrastructure and the generic components is essential. It is the role of WP6 to facilitate the communication between the technical partners and the domain partners (those who have the specific knowledge for each Societal Challenge) and guide the pilot implementation process. This report serves as an index referencing the current implementation and deployment work for the second

and partially the third cycle of pilots for the seven Societal Challenges which are available online and which are part of this deliverable.

The best way to get a concise technical overview of the development and deployment status of the Big Data Europe platform:

<https://www.big-data-europe.eu/webinar/#launch>

The best way to get a written overview of each pilot and the relation to the generic BDE components and the infrastructure is reading deliverable D5.5.

The best way to dive into the source code and deployment scripts is to browse through the sub-repositories starting with 'pilot-SCxxx' on the main BDE GitHub repository:

<https://github.com/big-data-europe>

## 2. Planning

Figure 3 shows the initial planning for the implementation and deployment of the pilot cycles as described in deliverable D6.1 and D6.4.

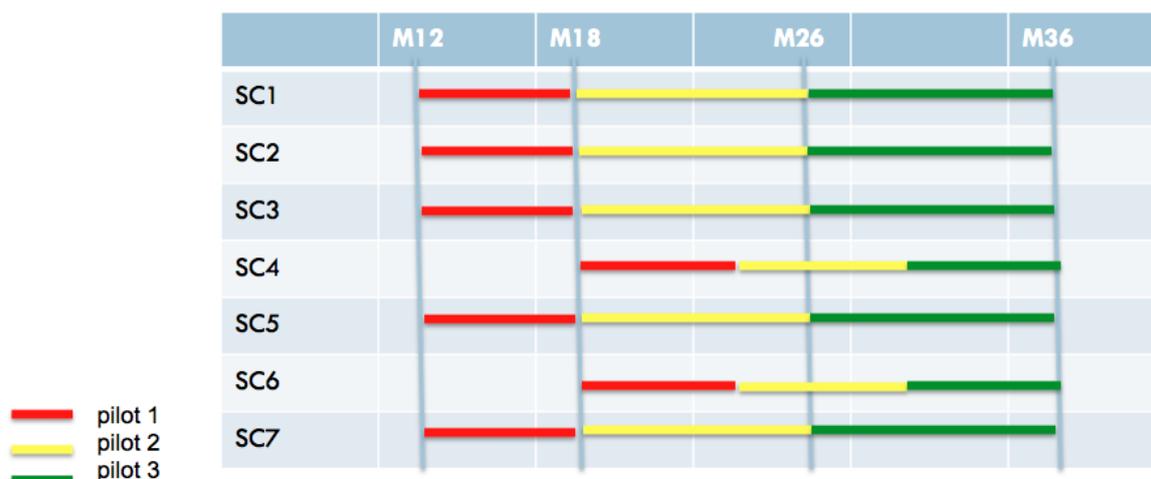


Figure 1: pilot planning

Currently the development and deployment is progressing according to schedule and we finalized the evaluation phase (deliverable D6.8).

### 3. SC 1 - Health - pilot

The pilot is carried out by OpenPHACTS and VUA in the frame of SC1 *Health, Demographic Change and Wellbeing*. NCSR-D (extending 4Store) and the University of Bonn (deploying the SANSA stack) provide the technical effort on testing various distributed RDF storage solutions.

The pilot is described in section 2 from deliverable D5.4.

The pilot implements the workflow of reproducing the functionality of an existing data integration and processing system (the Open PHACTS Discovery Platform) on BDI.



The most important challenge for this pilot is to replace the commercial cluster RDF<sup>1</sup> store, Virtuoso, with an open source variant. There is currently only one promising candidate, 4Store<sup>2</sup>, which which has received virtually no updates in the past year. Therefore the VUA, OpenPHACTS and NCSR-D have decided to adopt the code and improve it in such a way that it can serve as a generic component on the BDE infrastructure. This component will not only serve SC1 but also SC2 (Agriculture) and SC6 (Social Sciences) because the *veracity* and *variety* aspects also apply to them. Linked-Data is the likely candidate to deal with this for which a distributed RDF datastore is required when dealing with Big Data. The ongoing implementation work on the 4Store BDE docker component can be followed here: <https://github.com/big-data-europe/docker-4store>

The first test results were demonstrated at the FLINK workshop part of the Int. Semantic Web Conference in October 2016 in Kobe, Japan <sup>3</sup>

SC1 - Health - Pilot - Cycle 2 references	
<b>Presentations</b>	<ul style="list-style-type: none"> <li>• <a href="https://www.big-data-europe.eu/the-final-big-data-europe-workshop/">https://www.big-data-europe.eu/the-final-big-data-europe-workshop/</a></li> <li>• <a href="https://www.big-data-europe.eu/sc1-hangout-the-challenges-of-updating-public-databases">https://www.big-data-europe.eu/sc1-hangout-the-challenges-of-updating-public-databases</a></li> <li>• <a href="https://www.big-data-europe.eu/bde-at-ehealth-week-2017/">https://www.big-data-europe.eu/bde-at-ehealth-week-2017/</a></li> <li>• <a href="https://www.big-data-europe.eu/bde-sc1-third-hangout-open-phacts-re-engineered-with-big-data-europe/">https://www.big-data-europe.eu/bde-sc1-third-hangout-open-phacts-re-engineered-with-big-data-europe/</a></li> <li>• <a href="https://www.big-data-europe.eu/hands-on-bde-health-at-ict-open-2017/">https://www.big-data-europe.eu/hands-on-bde-health-at-ict-open-2017/</a></li> <li>• <a href="https://www.big-data-europe.eu/a-look-back-at-the-2nd-workshop-on-big-data-in-health-demographic-change-and-wellbeing/">https://www.big-data-europe.eu/a-look-back-at-the-2nd-workshop-on-big-data-in-health-demographic-change-and-wellbeing/</a></li> <li>• <a href="https://www.big-data-europe.eu/benchmarking-semantic-query-processing-from-real-world-pharmacological-workflows/">https://www.big-data-europe.eu/benchmarking-semantic-query-processing-from-real-world-pharmacological-workflows/</a></li> </ul>

<sup>1</sup> <http://virtuoso.openlinksw.com/features-comparison-matrix/>

<sup>2</sup> <https://github.com/garlik/4store>

<sup>3</sup> <http://project-hobbit.eu/events/blink-2016/>



	<ul style="list-style-type: none"><li>• <a href="https://www.big-data-europe.eu/the-open-phacts-pilot-second-hangout-for-the-health-societal-challenge/">https://www.big-data-europe.eu/the-open-phacts-pilot-second-hangout-for-the-health-societal-challenge/</a></li><li>• <a href="https://www.big-data-europe.eu/installing-and-running-the-first-health-sc1-pilot/">https://www.big-data-europe.eu/installing-and-running-the-first-health-sc1-pilot/</a></li><li>• <a href="https://www.big-data-europe.eu/event/webinar-pilot/">https://www.big-data-europe.eu/event/webinar-pilot/</a></li></ul>
<b>Instructions, data, deployment scripts and source code</b>	<ul style="list-style-type: none"><li>• <a href="https://github.com/big-data-europe/pilot-sc1-cycle1">https://github.com/big-data-europe/pilot-sc1-cycle1</a></li><li>• <a href="https://github.com/openphacts/ops-docker">https://github.com/openphacts/ops-docker</a></li><li>• <a href="https://docs.google.com/document/d/1gO4qI1hfM_TPt4_XKKc96bRUxDbKSYwbShlq7z8b1IY/edit">https://docs.google.com/document/d/1gO4qI1hfM_TPt4_XKKc96bRUxDbKSYwbShlq7z8b1IY/edit</a></li></ul>

## 4. SC 2 - Agriculture - pilot

The pilot is carried out by AgroKnow, FAO, and SWC in the frame of SC2 *Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy*.

The pilot is described in section 3 of deliverable D5.5.

One of the key challenges for this pilot is the automatic data extraction from heterogeneous scientific publications and tables. SWC took the lead here and worked hard on PoolParty<sup>4</sup> code to extract data from viticulture publications, to develop queries based on real-life research questions and to deploy efficiently on one of the BDE RDF storage components which are accessed via one of the graphical web interfaces which are still under development. The third pilot cycle focused on providing a demonstration system which communicates the BDE message in a user-friendly, community oriented mean towards lowering the SC2 community boundaries. To this end, the third pilot extends the first and second cycle (cf. D5.2, Section 2) by providing an engaging, intuitive graphical web interface

---

<sup>4</sup> <https://www.poolparty.biz/>



addressing key data-oriented questions relevant to the Viticulture Research Community. The functionalities (and data) remain the same with the previous pilot version (cycle 2).

<b>SC2 - Agriculture - Pilot - Cycle 2 references</b>	
<b>Presentations</b>	<ul style="list-style-type: none"><li>• <a href="https://www.big-data-europe.eu/2nd-european-policy-perspectives-on-data-intensive-agriculture-food-joint-workshop-of-big-data-europe-e-rosa/">https://www.big-data-europe.eu/2nd-european-policy-perspectives-on-data-intensive-agriculture-food-joint-workshop-of-big-data-europe-e-rosa/</a></li><li>• <a href="https://www.big-data-europe.eu/vitis-big-data-demonstrator-agricultural-university-of-athens/">https://www.big-data-europe.eu/vitis-big-data-demonstrator-agricultural-university-of-athens/</a></li><li>• <a href="https://www.big-data-europe.eu/six-challenges-for-agriculture/">https://www.big-data-europe.eu/six-challenges-for-agriculture/</a></li><li>• <a href="https://www.big-data-europe.eu/internet-of-food-farm-iof2020/">https://www.big-data-europe.eu/internet-of-food-farm-iof2020/</a></li><li>• <a href="https://www.big-data-europe.eu/joint-workshop-of-big-data-europe-and-godan-for-societal-challenge-food-and-agriculture/">https://www.big-data-europe.eu/joint-workshop-of-big-data-europe-and-godan-for-societal-challenge-food-and-agriculture/</a></li><li>• <a href="https://www.big-data-europe.eu/big-data-europe-platform-what-for-whom-and-how/">https://www.big-data-europe.eu/big-data-europe-platform-what-for-whom-and-how/</a></li><li>• <a href="https://www.big-data-europe.eu/the-open-phacts-pilot-second-hangout-for-the-health-societal-challenge/">https://www.big-data-europe.eu/the-open-phacts-pilot-second-hangout-for-the-health-societal-challenge/</a></li><li>• <a href="https://www.big-data-europe.eu/event/webinar-pilot/">https://www.big-data-europe.eu/event/webinar-pilot/</a></li></ul>
<b>Instructions, deployment scripts and source code</b>	<ul style="list-style-type: none"><li>• <a href="https://github.com/big-data-europe/pilot-sc2-cycle1">https://github.com/big-data-europe/pilot-sc2-cycle1</a></li><li>• <a href="https://docs.google.com/document/d/1UtOfVs9O5whfwFa9SE-kvgwv6DCLfQckKu-k9wBdQ-c/edit">https://docs.google.com/document/d/1UtOfVs9O5whfwFa9SE-kvgwv6DCLfQckKu-k9wBdQ-c/edit</a></li></ul>

## 5. SC 3 - Energy - pilot

The pilot is carried out by CRES in the frame of SC3 *Secure, Clean and Efficient Energy*.

The pilot is described in section 4 of deliverable D5.5.

The following are the supported scenarios:

- A. Monitoring of distributed systems with on-line modules. The online capabilities will be implemented with protocols that are widely used for sensor data, thus increasing the pilot applicability to other domains (transport, industrial applications etc)
- B. Perform long term monitoring of gearbox or blades with acoustic emission and support the research for preventive maintenance applications. This research will be complementary to the results of the first cycle of the pilot.
- C. Inclusion of Non Destructive Testing for WT blades with Acoustic Emission module (high volume, research oriented)
- D. Inclusion of 'real time' component (simulate SCADA-like data, investigation for OPC UA)
- E. Extending the functionalities of the web app
- F. Adaptations for application to other (stakeholder) data

<b>SC3 - Energy - Pilot - Cycle 2 references</b>	
<b>Presentations</b>	<ul style="list-style-type: none"> <li>• <a href="https://www.big-data-europe.eu/bde-at-wind-power-industry-big-data-and-iot-forum-amsterdam-30-3132017/">https://www.big-data-europe.eu/bde-at-wind-power-industry-big-data-and-iot-forum-amsterdam-30-3132017/</a></li> <li>• <a href="https://www.big-data-europe.eu/bde-presentation-to-wind-europe-wind-resource-assessment-workshop-2017/">https://www.big-data-europe.eu/bde-presentation-to-wind-europe-wind-resource-assessment-workshop-2017/</a></li> <li>• <a href="https://www.big-data-europe.eu/presentation-of-bde-at-windeurope-thematic-workshop/">https://www.big-data-europe.eu/presentation-of-bde-at-windeurope-thematic-workshop/</a></li> <li>• <a href="https://www.big-data-europe.eu/2nd-sc3-workshop-full-report-released/">https://www.big-data-europe.eu/2nd-sc3-workshop-full-report-released/</a></li> <li>• <a href="https://www.big-data-europe.eu/bde-pilot-case-in-energy-system-monitoring-in-wind-energy-production-unit/">https://www.big-data-europe.eu/bde-pilot-case-in-energy-system-monitoring-in-wind-energy-production-unit/</a></li> </ul>



	<ul style="list-style-type: none"><li>• <a href="https://www.big-data-europe.eu/big-data-europe-on-line-hangout-in-energy-domain/">https://www.big-data-europe.eu/big-data-europe-on-line-hangout-in-energy-domain/</a></li></ul>
<b>Instructions, deployment scripts and source code</b>	<ul style="list-style-type: none"><li>• <a href="https://github.com/big-data-europe/pilot-sc3-cycle1">https://github.com/big-data-europe/pilot-sc3-cycle1</a></li></ul>

## 6. SC 4 - Transport - pilot

The pilot is carried out by FhG and CERTH in the frame of SC4 *Smart, Green and Integrated Transport*.

The pilot is described in section 5 of deliverable D5.5.

A fleet of 1200 taxis generate Floating Car Data containing GPS location, speed and orientation of each vehicle. This data is collected in real time by a local taxi association for dispatching purposes and transferred in real-time to CERTH-HIT. After filtering and processing the data, traffic speeds for various streets are calculated in real time and provided to the citizens through the [Mobithess](#) and [TrafficThess](#) info-mobility portals.

The aim of the SC4 pilot is to address the scalability and fault-tolerance issues of those services using open source Big Data frameworks and evaluate new algorithms for monitoring and forecasting.

The pilot demonstrates how to implement the workflow for the ingestion, processing and storage of near real-time and historical floating car data (FCD) in a distributed setting. The pilot demonstrates

the following workflows:

- The *monitoring* of the current traffic conditions in the city of Thessaloniki using the near real-time floating car data available for 1200 vehicles.
- The *forecasting* of future traffic conditions based on a model trained from the historical and the near real-time FCD data.

The data from each vehicle contains the vehicle's identifier, valid for only 24 hours, speed, orientation, latitude and longitude. In order to be used as a proxy for the traffic flow in each road segment the location of the vehicle must be matched with the road segment in which the vehicle is being driven. The near real-time Floating Car Data (FCD) stream is generated by the taxi fleet and is provided via web services. The historical data is provided via FTP and contains 40 GB of data. The road network is extracted from the OpenStreetMap database. The map matching can be performed in parallel and is based on R scripts and stored procedures that make queries on a geographical database using topological rules. The matched records are aggregated in time windows in order to compute the average flow (number of vehicles) and speed within each time window. The result of the aggregation are records containing the identifier of a road segment, the traffic flow (number of vehicles in the time window), the average speed and the timestamp. The result data is stored in a distributed database.

The 1st pilot showcased the implementation of a traffic monitoring service using the BDE components and the FCD web service. The objective of the second pilot was on one hand to implement a traffic forecasting service and on the other hand to deploy the pilot in a distributed setting using Docker swarm. The forecasting service is based on a machine learning algorithm. The historical data is used to train a model for each road segment that can learn the pattern of the traffic flow. The algorithm has been developed in R and integrated within a Flink application. In developing the code for the pilot we had to mediate between two opposing constraints. On one hand the knowledge of the domain experts that use R as their main programming language and on the other hand the need to integrate the R scripts in a distributed Java application. The solution was to deploy on each node a component with PostGis and R server with all the scripts. Another issue was the difficulty of integrating and deploying many services in a Docker swarm. The technology is still quite new and subject to many changes. In order to test the deployment of docker containers and run them using a docker compose file we have developed a simplified version of the pilot that uses a subset of the containers and HDFS for the storage of the FCD data and the result of the processing.



<b>SC4 - Transport - Pilot - Cycle 2 references</b>	
<b>Presentations</b>	<ul style="list-style-type: none"><li>• <a href="https://www.big-data-europe.eu/sc4-traffic-status-evolution-during-a-snow-event-in-thessaloniki/">https://www.big-data-europe.eu/sc4-traffic-status-evolution-during-a-snow-event-in-thessaloniki/</a></li><li>• <a href="https://www.big-data-europe.eu/big-data-and-transport-where-can-it-take-us-presentations-from-the-hangout-available/">https://www.big-data-europe.eu/big-data-and-transport-where-can-it-take-us-presentations-from-the-hangout-available/</a></li><li>• <a href="https://www.big-data-europe.eu/behind-the-scenes-of-the-bigdataeurope-transport-pilot-recap-of-our-hangout/">https://www.big-data-europe.eu/behind-the-scenes-of-the-bigdataeurope-transport-pilot-recap-of-our-hangout/</a></li><li>• <a href="https://www.big-data-europe.eu/more-big-data-less-traffic-congestion/">https://www.big-data-europe.eu/more-big-data-less-traffic-congestion/</a></li><li>• <a href="https://www.big-data-europe.eu/big-data-for-transport-webinar-wrap-up-the-tech-the-business-and-the-policy/">https://www.big-data-europe.eu/big-data-for-transport-webinar-wrap-up-the-tech-the-business-and-the-policy/</a></li></ul>
<b>Instructions, deployment scripts and source code</b>	<ul style="list-style-type: none"><li>• <a href="https://github.com/big-data-europe/pilot-sc4-fcd-applications">https://github.com/big-data-europe/pilot-sc4-fcd-applications</a></li><li>• <a href="https://github.com/big-data-europe/pilot-sc4-flink-kafka-consumer">https://github.com/big-data-europe/pilot-sc4-flink-kafka-consumer</a></li><li>• <a href="https://github.com/big-data-europe/pilot-sc4-kafka-producer">https://github.com/big-data-europe/pilot-sc4-kafka-producer</a></li><li>• <a href="https://github.com/big-data-europe/pilot-sc4-pipeline">https://github.com/big-data-europe/pilot-sc4-pipeline</a></li><li>• <a href="https://github.com/big-data-europe/pilot-sc4-mapmatcher">https://github.com/big-data-europe/pilot-sc4-mapmatcher</a></li><li>• <a href="https://github.com/big-data-europe/pilot-sc4-docker-r">https://github.com/big-data-europe/pilot-sc4-docker-r</a></li><li>• <a href="https://github.com/big-data-europe/pilot-sc4-rscripts">https://github.com/big-data-europe/pilot-sc4-rscripts</a></li><li>• <a href="https://github.com/big-data-europe/pilot-sc4-postgis">https://github.com/big-data-europe/pilot-sc4-postgis</a></li></ul>

## 7. SC 5 - Climate - pilot

The pilot is carried out by NCSR-D in the frame of SC5 *Climate Action, Environment, Resource Efficiency and Raw Materials*.

The pilot is described in section 6 of deliverable D5.5.

In the domain of nuclear disasters, the timely and reliable prediction of the release origin, as well as its consequences, offers added value to facilitate decision making and response actions. The pilot for this second cycle deals with the problem when no information is known about the release itself but the only available measurements are in the form of time series of the substance level along with current and past weather conditions. The measurements are assumed to be derived from one or more of the monitoring stations located within Europe and the emergency is also assumed to occur within Europe. The usual computational approaches in these cases involve working backwards from the current atmospheric conditions in order to estimate the source location, a process known as inverse modeling. However, large computational times are usually required, especially for cases where complex topography and weather conditions are involved. This is problematic for emergency response actions, where time is of an essence. On the other hand, if the hardest part of the problem is pre-computed, the release point may be identified in only a fraction of the time required for inverse modeling. In particular, the pilot relies on historical weather data in order to create a set of climatological regimes that represent the European climate. These are subsequently employed to pre-compute the substance dispersion patterns. Then, a match between the representative atmospheric conditions and the current weather data, in line with the substance dispersion patterns, can lead to the estimation of the source location.

In the above framework, the present pilot builds upon the weather data management and searching toolkit of the 1<sup>st</sup> SC5 pilot and creates a pattern matching toolkit to facilitate the process of identifying similar weather with the support of tools aggregated on the BDE platform.

### Purpose

Building on the BDE platform and on the 1st SC5 pilot, this work aims to demonstrate the following:

1. Usefulness and potential of big data technologies in nuclear emergency management.



2. An alternative methodology to the state-of-the-art inverse modelling currently used.
3. A methodology for rapid estimation of the release location of a hazardous substance.

<b>SC5 - Climate - Pilot - Cycle 2 references</b>	
<b>Presentations</b>	<ul style="list-style-type: none"><li>• <a href="https://www.big-data-europe.eu/ncsr-demokritos-presented-the-2nd-sc5-pilot-at-egu17/">https://www.big-data-europe.eu/ncsr-demokritos-presented-the-2nd-sc5-pilot-at-egu17/</a></li><li>• <a href="https://www.big-data-europe.eu/3rd-sc5-online-hangout/">https://www.big-data-europe.eu/3rd-sc5-online-hangout/</a></li><li>• <a href="https://www.big-data-europe.eu/description-and-evaluation-of-1st-climate-pilot-use-case-2nd-online-hangout-wrap-up/">https://www.big-data-europe.eu/description-and-evaluation-of-1st-climate-pilot-use-case-2nd-online-hangout-wrap-up/</a></li><li>• <a href="https://www.big-data-europe.eu/1st-pilot-to-be-developed-in-the-frame-of-bigdataeurope-under-societal-challenge-5-climate-action-environment-resource-efficiency-and-raw-materials/">https://www.big-data-europe.eu/1st-pilot-to-be-developed-in-the-frame-of-bigdataeurope-under-societal-challenge-5-climate-action-environment-resource-efficiency-and-raw-materials/</a></li><li>• <a href="https://www.big-data-europe.eu/sc5-bde-presentation-egu-general-assembly-vienna-17-22-april-2016/">https://www.big-data-europe.eu/sc5-bde-presentation-egu-general-assembly-vienna-17-22-april-2016/</a></li><li>• <a href="https://www.big-data-europe.eu/report-2nd-sc5-workshop-on-climate-action-environment-resource-efficiency-and-raw-materials/">https://www.big-data-europe.eu/report-2nd-sc5-workshop-on-climate-action-environment-resource-efficiency-and-raw-materials/</a></li><li>• <a href="https://www.big-data-europe.eu/big-data-transport-workshop-presentations-are-now-online/">https://www.big-data-europe.eu/big-data-transport-workshop-presentations-are-now-online/</a></li><li>• <a href="https://www.big-data-europe.eu/big-data-in-the-climate-domain-online-hangout-wrap-up/">https://www.big-data-europe.eu/big-data-in-the-climate-domain-online-hangout-wrap-up/</a></li></ul>
<b>Instructions, deployment scripts and source code</b>	<ul style="list-style-type: none"><li>• <a href="https://github.com/iaklampanos/bde-climate-1">https://github.com/iaklampanos/bde-climate-1</a></li></ul>

## 8. SC 6 - Social Sciences - pilot

The pilot is carried out by SWC together with Cessda and with support by NCSR-D in the frame of SC6 *Europe in a changing world - inclusive, innovative and reflective societies*.

The pilot is described in detail in section 7 of deliverable D5.5.

Like in SC2, the biggest challenge for this pilot is to extract the data for the various heterogeneous sources (a ‘variety issue’), transform it to RDF and write efficient queries that implement the required returned aggregations that are presented via a graphical web interface defined by the use case. Here, SWC is the responsible technical partner and uses for example their PoolParty Semantic Suite (<https://www.poolparty.biz>) to achieve an important part of this goal (namely schema mapping and data linking, and thereby support in data transformation).

A new / improved feature of the third cycle, will allow us to easily add new data sources and show more analysis & comparisons of municipality budget data (of European municipalities) in addition to financial ratio data (dashboard) - whereby the financial ratio dashboard will be improved continuously.

Furthermore, such data available in other languages will be mapped between each other to enable efficient use and comparison.

Finally the Pilot will be updated to the latest BDE Integrator / BDI instance / components and help and documentation (for users and for operators of the Pilot system) will be created and provided to the respective target groups.

SC6 - Social Sciences - Pilot - Cycle 3 references	
<b>Pilot System</b> (publicly available with SLA as possible in the project)	<ul style="list-style-type: none"> <li>• SC6 Pilot System: <a href="https://bde.poolparty.biz/GraphSearchSC6/">https://bde.poolparty.biz/GraphSearchSC6/</a></li> <li>• SC6 Pilot SPARQL endpoint (data API): <a href="https://bde-virtuoso.poolparty.biz/sparql">https://bde-virtuoso.poolparty.biz/sparql</a></li> </ul>
<b>Presentations</b>	<ul style="list-style-type: none"> <li>• <a href="https://www.big-data-europe.eu/event/big-data-europe-sc6-">https://www.big-data-europe.eu/event/big-data-europe-sc6-</a></li> </ul>



	<p><a href="#">hangout-from-big-data-to-trusted-smart-statistics/</a></p> <ul style="list-style-type: none"> <li>• <a href="https://www.big-data-europe.eu/3rd-big-data-europe-workshop-on-social-societies-at-semantics2017-was-big-success/">https://www.big-data-europe.eu/3rd-big-data-europe-workshop-on-social-societies-at-semantics2017-was-big-success/</a></li> <li>• <a href="https://www.big-data-europe.eu/bde-sc6-5th-hangout-30-05-2017-european-open-science-agenda-quo-vadis/">https://www.big-data-europe.eu/bde-sc6-5th-hangout-30-05-2017-european-open-science-agenda-quo-vadis/</a></li> <li>• <a href="https://www.big-data-europe.eu/report-sc6-4th-hangout-insight-into-virtual-currency-ecosystems/">https://www.big-data-europe.eu/report-sc6-4th-hangout-insight-into-virtual-currency-ecosystems/</a></li> <li>• <a href="https://www.big-data-europe.eu/bde-sc6-workshop-on-5-12-2016-in-cologne-report/">https://www.big-data-europe.eu/bde-sc6-workshop-on-5-12-2016-in-cologne-report/</a></li> <li>• <a href="https://www.big-data-europe.eu/3258-2/">https://www.big-data-europe.eu/3258-2/</a></li> <li>• <a href="https://www.big-data-europe.eu/3rd-sc6-bde-hangout/">https://www.big-data-europe.eu/3rd-sc6-bde-hangout/</a></li> <li>• <a href="https://www.big-data-europe.eu/recording-of-the-sc6-bde-hangout-webinar/">https://www.big-data-europe.eu/recording-of-the-sc6-bde-hangout-webinar/</a></li> </ul>
<b>Instructions, deployment scripts and source code</b>	<ul style="list-style-type: none"> <li>• <a href="https://github.com/big-data-europe/pilot-sc6-cycle1">https://github.com/big-data-europe/pilot-sc6-cycle1</a></li> <li>• <a href="https://github.com/big-data-europe/pilot-sc6-cycle2">https://github.com/big-data-europe/pilot-sc6-cycle2</a></li> </ul>

## 9. SC 7 - Security - pilot

The pilot is carried out by SatCen, UoA, and NCSR-D in the frame of SC7 *Secure societies – Protecting freedom and security of Europe and its citizens*.

The pilot is described in section 8 of deliverable D5.5.

The third phase of the Societal Challenge 7 (SC7) “Secure Societies” pilot improved and added new functionalities to the second version.

### Change Detection



- Adding Sentinel 2 data, to add the possibility to visualize RGB images on Sextant. Sentinel 2 data constituting a support to the ground truth identification of changes from the Sentinel 1 processing workflow.

**Event Detection**

- Adding geotagged pictures to the source of open data, to increase the amount of open source information related to an investigated event.

**Whole pilot**

- Improvement of Sextant functionalities, to improve the user experience, where current and new functionalities (derived by the third pilot phase) are tested.

<b>SC7 - Security - Pilot - Cycle 3 references</b>	
<b>Presentations</b>	<ul style="list-style-type: none"> <li>• <a href="https://www.big-data-europe.eu/big-data-for-secure-societies-webinar/">https://www.big-data-europe.eu/big-data-for-secure-societies-webinar/</a></li> <li>• <a href="https://www.big-data-europe.eu/satcen-participated-to-the-3rd-edition-of-the-big-data-from-space-conference/">https://www.big-data-europe.eu/satcen-participated-to-the-3rd-edition-of-the-big-data-from-space-conference/</a></li> <li>• <a href="https://www.big-data-europe.eu/3rd-workshop-on-big-data-in-secure-societies-outcome/">https://www.big-data-europe.eu/3rd-workshop-on-big-data-in-secure-societies-outcome/</a></li> <li>• <a href="https://www.big-data-europe.eu/fourth-hangout-big-data-in-secure-societies-outcome/">https://www.big-data-europe.eu/fourth-hangout-big-data-in-secure-societies-outcome/</a></li> </ul>
<b>Instructions, deployment scripts and source code</b>	<ul style="list-style-type: none"> <li>• <a href="https://github.com/big-data-europe/pilot-sc7-image-aggregator">https://github.com/big-data-europe/pilot-sc7-image-aggregator</a></li> <li>• <a href="https://github.com/big-data-europe/pilot-sc7-geotriples">https://github.com/big-data-europe/pilot-sc7-geotriples</a></li> <li>• <a href="https://github.com/big-data-europe/pilot-sc7-change-detector">https://github.com/big-data-europe/pilot-sc7-change-detector</a></li> <li>• <a href="https://github.com/big-data-europe/pilot-sc7-lookup-service">https://github.com/big-data-europe/pilot-sc7-lookup-service</a></li> </ul>



# Conclusion

This report provides references to the online material that describes the implementation and deployment efforts making up this deliverable. It also provides a very brief overview of the current technical approaches used in each Societal Challenge. Managing to have an interesting pilot for each Societal Challenge being deployed on the BDE infrastructure within the provided internal deadlines was an ambitious goal which due to the good synergy between the partners was achieved satisfactory.