



Big Data for Mobility Tracking Knowledge Extraction in Urban Areas

D7.4 Liaison and Clustering

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¹ According to Track & Know's Quality Assurance Process:

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Glossary of terms and abbreviations used

Abbreviation / Term	Description
BDVA	Big Data Value Association
FFoD	Free flow of non-personal Data
GDPR	General Data Protection Regulation
OSA	Obstructive Sleep Apnoea
STKH	Stakeholder
Mtg	Meeting
WKSH	Workshop

1 Introduction

Track&Know has carried out a strategic stakeholder engagement activity to maximise external user involvement and general acceptance of the technical developments of the Track&Know project. The goal has been to raise awareness of the project in general and engage with those stakeholders who are likely to benefit from and actively make use of the open source code and Track&Know platform.

A key part of this strategy has been liaison activities with other related research projects, this has been carried out with a view to identifying common areas of interest and promoting key outcomes. The goal has been to collectively raise the projects' profiles, promote knowledge transfer, identify where the partnerships can work collaboratively on developing common data governance and increase the uptake of results.

This document (D7.3) provides a report on the liaison and clustering activities carried out by Track&Know, namely a) the collaborative dissemination activities carried out by Track&Know and partner projects and b) the activities carried out with partner projects on the development of a common data governance framework, including guidelines for data privacy and security.

1.1 Mapping Track&Know Outputs

Purpose of this section is to map Track&Know's Grant Agreement commitments within the formal Deliverable and the Task description, against the project's respective outputs and work performed.

Table 1-1: Adherence to Track&Know's GA Deliverable & Tasks Descriptions

Track&Know GA component title	Track&Know GA component outline	Respective document chapter(s)	Justification
DELIVERABLE			
D7.3 Liaison and Clustering	Report on undertaken liaison actions with other projects and initiatives, (apart from the ICT-15 Lighthouse projects TT and DataBio that will be covered in deliverable D6.5) including interesting outcomes of the collaboration.	CH 1-3	The report provides details of the methodology and selection process for identifying suitable collaboration partners. It also provides details of the collaboration activities.
TASKS			
Task 7.3 Liaison and Clustering	This task focuses on establishing dialogue and collaboration with related projects, in order to identify commonalities and important outcomes that will provide input to several tasks. (The progress and outcomes of these projects will be monitored through the knowledge observatory that will be developed in T1.1.)	CH 1-4	The report includes details of the methodology and selection process for identifying suitable collaboration partners and describes the outputs linked to the Track&Know tasks. Reports on the knowledge observatory are included in the public report 'Track&Know Observatory' (D1.1) and revisions thereof.

Task 7.3 Liaison and Clustering	Track&Know will also investigate the possibility of collaboration actions especially in dissemination level, to reach wider audience.	CH 3	This report provides an overview of the collaboration activities including the type and number of audiences reached.
Task 7.3 Liaison and Clustering	..and develop a common data governance framework, including guidelines for data privacy and security.	CH 3	This report explains the collaborative effort made toward development of a common data governance framework.

1.2 Deliverable Overview and Report Structure

The report is structured as follows:

- Chapter 1 - 'Introduction', introduces the report and its relation to the broader dissemination activities of the project.
- Chapter 2 - 'Liaison and Clustering methodology', provides the approach taken in the identification, selection and engagement with projects suitable for the activity.
- Chapter 3 - 'Collaborative activities', provides an overview of the activities undertaken to collaboratively promote the results of the projects and the impact of that activity.
- Chapter 4 - provides the conclusions to this report.

2 Liaison and Clustering methodology

The purpose of the liaison and clustering activity is to engage with related H2020 projects and develop collaborative relationships in order to identify common themes and results which will inform the development of the Track&Know outcomes. The goals of this activity were as follows:

- To establish a dialogue and collaboration with related projects, in order to identify commonalities and important outcomes that will provide input to several tasks.
- To monitor the projects via the knowledge observatory.
- To investigate the possibility of dissemination collaboration to reach wider audience.
- To develop a common data governance framework, including guidelines for data privacy and security.

2.1 Approach

This section of the report defines the approach taken to identify suitable projects for the engagement activity and the selection process followed to ensure a good fit with research objectives and domain application of the Track&Know project.

2.1.1 Identification of projects

In order to identify current H2020 projects which have commonalities with Track&Know, the domain areas and ICT development themes were classified as follows:

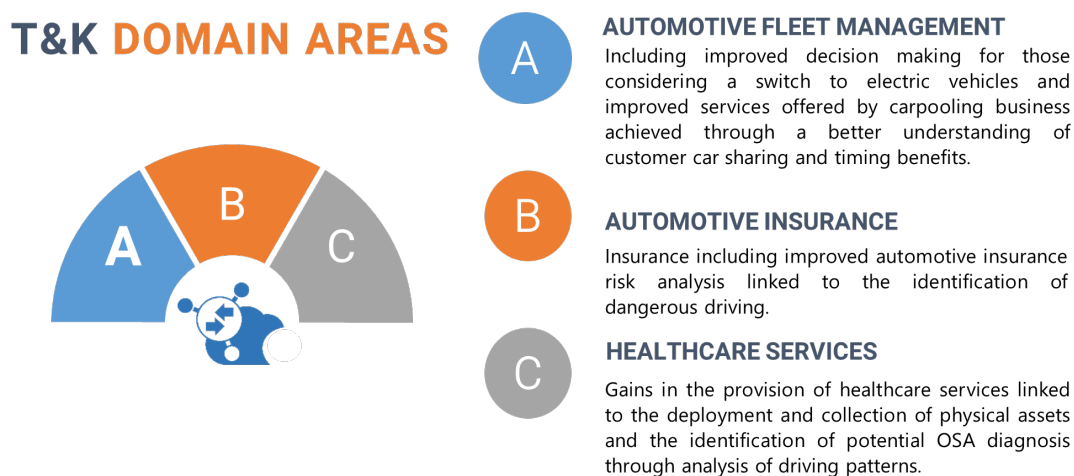


Figure 2-1 – Track&Know domain areas

T&K BIG DATA THEMES



Figure 2-2 – Track&Know Big Data Themes centred on the toolbox development

A full list of H2020 projects was obtained from the Cordis H2020 project database² (Annex 3) and those that aligned with either the ICT development themes and/or the domain areas were shortlisted.

2.1.2 Selection process P1

The H2020 shortlist was then focused by converging on those projects that were also identified through participation in the Big Data Value Public-Private Partnership³ shown in Figure 2-3 below (Annex 1).

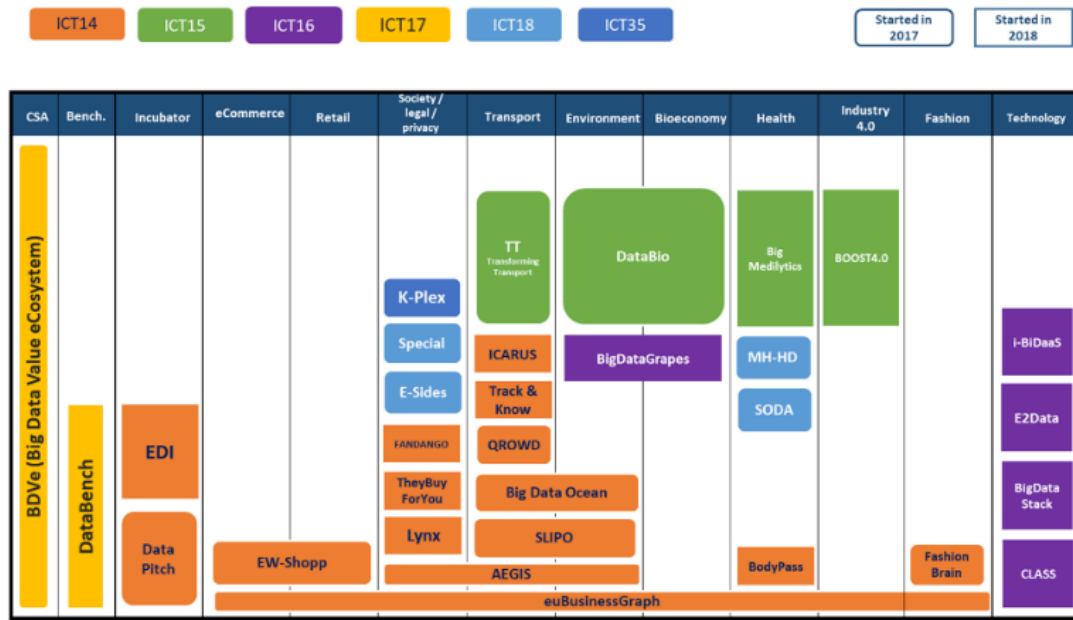


Figure 2-3 - Projects identified and classified by the Big Data Value Association (BDVA)

The projects listed in Table 2-1 were selected as target projects for the first period of the project covering January 2018 to June 2019.

Table 2-1 : H2020 projects selected for liaison activities 2018 - Q2 2019

Project	Domain	BD Theme	Title	Topic	Website
DataBench	Oth.	1,2,3	Evidence Based Big Data Benchmarking to Improve Business Performance	ICT-17-2016-2017	databench.eu
e-Sides	Oth.	1,2	Ethical and Societal Implications of Data Sciences	ICT-01-2016	e-sides.eu
DataBio	Oth.	1,2,3,4	Data-Driven Bioeconomy	ICT-01-2016	databio.eu
TT	A B	1,2,3,4	Transforming Transport	ICT-15-2016	transformingtransport.eu/
BigMedilytics	C	1,2	Big Data for Medical Analytics	ICT-15-2016-2017	bigmedilytics.eu

² EU Open Data Portal, CORDIS - EU research projects under Horizon 2020 (2014-2020) available at <https://data.europa.eu/euodp/en/data/dataset/cordish2020projects>


³ Big Data Value Association, Big Data PPP available at <http://bdva.eu/ppp>

The Transforming Transport (TT) and DataBio ICT-15 Lighthouse projects were both identified in the Track&Know contract⁴ as partner projects who would be directly involved in the development and validation of the Track&Know toolboxes and therefore their engagement with the project is presented in the public report 'D6.5 Cross-validation with ICT14 and ICT15 projects'.

2.1.3 Selection process P2

In the second phase of the Track&Know project, liaison activities continued with those projects identified in P1 that were still active. The process was also repeated taking into consideration new projects and those ending in 2019. A list of relevant projects was compiled (Annex 2) which met either the domain and/or the ICT areas identified in section 2.1.1. Of the 21 projects that were contacted, responses were received from 4 projects which indicated an interest in collaboration as show in the table below. In addition, Track&Know was contacted by the I-BiDaas and BigDataStack projects directly to participate in a joint dissemination activity. Again ICT 14 and ICT 15 projects will be presented in the public report 'D6.5 Cross-validation with ICT14 and ICT15 projects'.

Table 2-2 Liaison request responses

Track&Know Area	ICT	Acronym	Topics	Title	End Date	URL
	1,2	BodyPass	ICT-14-2016-2017	API-ecosystem for cross-sectorial exchange of 3D personal data	20-12-31	bodypass.eu
Oth.	1,2	Extreme Earth	ICT-12-2018-2020	From Copernicus Big Data to Extreme Earth Analytics	21-12-31	earthanalytics.eu
Oth.	1,2	Musketeer	ICT-13-2018-2019	Machine learning to augment shared knowledge in federated privacy-preserving scenarios	21-11-30	musketeer.eu
Oth.	1,2	SmartDataLake	ICT-12-2018-2020	Sustainable Data Lakes for Extreme-Scale Analytics	21-12-31	smartdatalake.eu
Oth.	1,2, 3,4	I-BiDaas	ICT-16-2017	Industrial-Driven Big Data as a Self-Service Solution	20-12-31	ibidaas.eu
Oth.	1,2, 3,4	BigDataStack	ICT-16-2017	High-performance data-centric stack for big data applications and operations	20-12-31	bigdatastack.eu

2.2 Engagement methodology

This section of the report provides an overview of the liaison projects, their objectives and the method used to establish connection. Where possible connections were made via a direct link between consortium partners or through networking events at conferences and workshops. Where this was not possible, project coordinators were contacted directly via email followed up with telephone conference calls to explore synergies.

2.2.1 Databench

DataBench 'Evidence Based Big Data Benchmarking to Improve Business Performance', is a three-year project which runs from 1st January 2018 to the 30th December 2020. It has a total budget of c€ 2,24m and is coordinated by IDC ITALIA SRL. DataBench has a consortium of research partners which includes ATOS Spain SA, Politecnico di Milano, Institut Jozef Stefan, Johann Wolfgang Goethe-Universitat Frankfurt am main and Sintef AS.

The purpose of the project is to design a benchmarking process to help European organizations developing BDT to reach for excellence and constantly improve their performance, by measuring their technology development activity against parameters of high business relevance. The project will investigate existing Big Data

⁴ Track & Know contract, Amendment-AMD-780754-2 Annex 1part A

benchmarking tools and projects, identify the main gaps and provide a robust set of metrics to compare technical results coming from those tools. The project will provide a framework to associate those technical results with the economic processes that are imperative to a company and will provide a robust set of benchmarks to assess which tools respond best and provide the most pertinent information for organisation's economic planning and respond to their current and emerging industrial needs.

Track&Know connected with DataBench through a request to engage in liaison activities and added a link to the DataBench papers on the observatory and participated in a number of joint dissemination events as presented in section 3.1.4.

2.2.2 eSides

eSides 'Ethical and Societal Implications of Data Sciences', is a three-year project which runs from 1st January 2017 to the 30th December 2019. It has a total budget of €1m and is coordinated by IDC ITALIA SRL with FRAUNHOFER and the Universiteit Leiden as partners.

The main objective of the project is to identify and map the main societal and ethical challenges emerging from the adoption of big data technologies, conforming to the principles of responsible research and innovation. The project will engage with stakeholders and develop a clear conceptual framework showing the potential trade-offs between conflicting needs and providing a basis to validate privacy-preserving technologies. It will prepare and widely disseminate community shared conclusions and recommendations highlighting the best way to ultimately build confidence of citizens and businesses towards big data and the data economy.

Track&Know connected with e-Sides through FRAUNHOFER, who are partners in both projects. Track&Know added a link to the e-Sides papers on the observatory and participated in a number of joint dissemination events as presented in section 3.1.4.

2.2.3 BigMedilytics

BigMedilytics 'Big Data for Medical Analytics' is a three-year project running from 1st January 2018 to 28th February 2021. It has a budget of c€17m and is led by PHILIPS Electronics Nederland B.V. and has a large consortium of partners.

The main objective of the project is to transform Europe's healthcare sector by enhancing patient outcomes and increasing productivity in the health sector by applying big data technologies to complex datasets while ensuring security and privacy of personal data.

Track&Know connected with BigMedilytics through the National Center for Scientific Research 'Demokritos' who are partners in both projects. Track&Know added a link to the BigDataMedilytics' papers on the knowledge observatory and participated in a number of joint dissemination events as presented in section 3.1.4.

2.2.4 SmartDataLake

SmartDataLake 'Sustainable Data Lakes for Extreme-Scale Analytics' is a three-year project running from 1st January 2019 to 31st December 2021. It has a budget of c€4m and is led by the Athens Research Centre for Innovation Information Technologies, Communication and Knowledge.

The project aims to enable extreme-scale analytics over sustainable big data lakes. It provides an adaptive, scalable and elastic data lake management system that offers: (a) data virtualization for abstracting and optimizing access and queries over heterogeneous data, (b) data synopses for approximate query answering and analytics to enable interactive response times, and (c) automated placement of data in different storage tiers based on data characteristics and access patterns to reduce costs.

Track&Know connected with SmartDataLake via email to the coordinating partner who agreed to provide papers for the knowledge observatory (Section 3.2).

2.2.5 BodyPass

Bodypass ‘API-ecosystem for cross-sectorial exchange of 3D personal data’ is a three-year project running from 1st January 2018 to the 31st December 2020. It has a budget of €3m and is led by the Biomechanical institute of Valencia with an international consortium of 7 partners.

The project aims to foster exchange, linking and re-use, as well as to integrate 3D data assets from the two sectors. For this, BodyPass must adapt and create tools that allow a secure exchange of information between data owners, companies and subjects (patients and customers).

Track&Know connected with BodyPass via email to the coordinating partner who agreed to provide papers for the knowledge observatory (Section 3.2).

2.2.6 ExtremeEarth

ExtremeEarth ‘From Copernicus Big Data to Extreme Earth Analytics’ is a three-year project running from 1st January 2019 to 31st December 2021. It has a budget of c€6m and is led by the National and Aristotle University of Athens with an international consortium of 11 partners.

The project aims to revolutionize Europe's capability to predict and monitor environmental extremes and their impacts on society enabled by the imaginative integration of edge and exa-scale computing and beyond, and the real-time exploitation of pervasive environmental data.

Track&Know connected with ExtremeEarth via email to the coordinating partner who agreed to provide papers for the knowledge observatory (Section 3.2).

2.2.7 MUSKETEER

MUSKETEER ‘Machine learning to augment shared knowledge in federated privacy-preserving scenarios’ is a three-year project running from 1st December 2018 to the 30th November 2021. It has a budget of c€4.3m and is led by IBM Ireland with a consortium of 11 international partners in total.

The project aims to create a validated, federated, privacy-preserving machine learning platform tested on industrial data that is inter-operable, scalable and efficient enough to be deployed in real use cases. MUSKETEER aims to alleviate data sharing barriers by providing secure, scalable and privacy-preserving analytics over decentralized datasets using machine learning. Data can continue to be stored in different locations with different privacy constraints but shared securely.

Track&Know connected with MUSKETEER via email to the coordinating partner who agreed to provide papers for the knowledge observatory (Section 3.2).

2.2.8 I-BiDaas

I-BiDaas ‘Industrial-Driven Big Data as a Self-Service Solution’ is a three-year project running from 1st January 2018 to the 31st December 2020. It has a budget of c€5m and is led by IDRYMA TECHNOLOGIAS KAI EREVNAS with a consortium of 12 international partners.

I-BiDaaS aims to empower users to easily utilize and interact with big data technologies, by designing, building, and demonstrating, a unified solution that: significantly increases the speed of data analysis while coping with the rate of data asset growth, and facilitates cross-domain data-flow towards a thriving data-driven EU economy.

Track&Know were contacted by the coordinator of the I-BiDaas project to participate in a number of dissemination activities these included the Big Data Demo Days webinar series and the EBDVA event held in November 2020. Further details of this activities are provided in section 3.1.

2.2.9 BigDataStack

BigDataStack ‘High-performance data-centric stack for big data applications and operations’ is a three-year project running from 1st January 2018 to the 31st December 2020. It has a budget of c€5m and is led by IBM ISRAEL - SCIENCE AND TECHNOLOGY LTD with a consortium of 16 partners.

The project aims to deliver a complete high-performant stack of technologies addressing the emerging needs of data operations and applications. The stack is based on a frontrunner infrastructure management system that drives decisions according to data aspects thus being fully scalable, runtime adaptable and performant for big data operations and data-intensive applications.

Track&Know were contacted by the coordinator of the BigDataStack to participate in the Big Data Demo Days webinar series and the EBDVA event held in November 2020. Further details of these activities are provided in section 3.1.

Track&Know connected with BigDataStack through the University of Piraeus Research Center (UPRC) who are partners in both projects.

In addition, UPRC has produced two publications (BMDA’19 and Geoinformatica’20) on the enrichment of mobility data with weather data, which are of common interest to both projects and their use-cases.

2.2.10 PolicyCloud

PolicyCLOUD ‘Policy Management through technologies across the complete data lifecycle on cloud environments’ is a three year project running from 1st January 2020 to 31st December 2022. It has a budget of c€5m and is coordinated by ATOS SPAIN SA with a consortium of 13 partners.

The project aims to deliver an integrated cloud-based environment for data-driven policy management. The environment will provide decision support to public authorities for policy modelling, implementation and simulation through identified populations, as well as for policy enforcement and adaptation. It will ultimately pave the way for an entire ecosystem of stakeholders contributing, producing, processing and using policy-related data assets. Citizen participation will also be ensured exploiting techniques for incentives management.

Track&Know connected with PolicyCLOUD through the coordinators of the I-BiDaas and BigDataStack project and collaborated with them on the delivery of the Big Data Webinar series. Further details are provided in section 3.1.2.

3 Collaborative activities

3.1 Joint Dissemination Activities

3.1.1 Planned impact

The purpose of this exercise was to investigate the possibility of dissemination collaboration with related research projects in order to reach a wider audience than would otherwise be possible through Track&Know dissemination activity.

3.1.2 Big Data Webinars

Track&Know joined an initiative led by the BDV PPP projects I-BiDaaS⁵ and BigDataStack⁶ to deliver a series of webinars to demonstrate the innovative technologies to address the emerging needs of data operations and applications in differing domains. The partnership included I-BiDaaS, BigDataStack, Track&Know and PolicyCLOUD⁷ and included 9 webinars presented from 21st May to 16th July 2020 as show in the figure below.

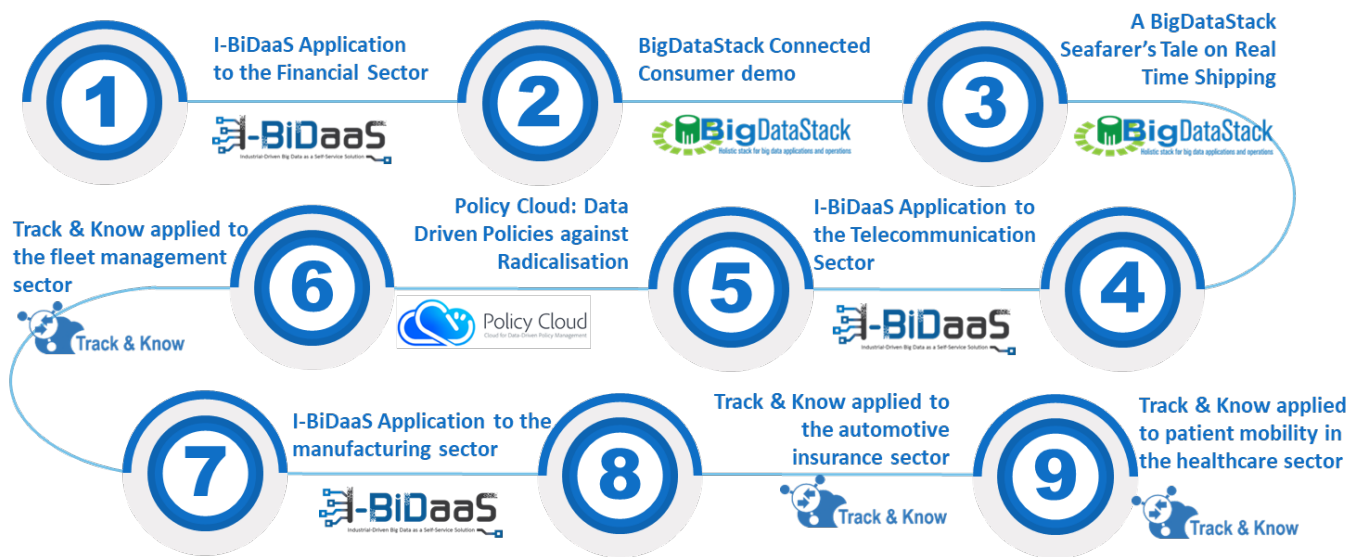


Figure 3-1: Big Data Webinar Series

The Track&Know webinars focused on the three pilot demonstrators, Fleet management services: Quality and predictions in location data from GPS devices, Application to the manufacturing sector. Insurance Sector: Using mobility data to understand and mitigate risky driving behaviour and Healthcare Service: Using patient mobility information to understand the provision of services across large rural and urban communities.

Details of the webinar series with links to the webinar information and recordings where available can be found in the table 3-1.

⁵ I-BiDaaS, ICT-16-2017, Industrial-Driven Big Data as a Self-Service Solution <https://www.ibidaas.eu/>

⁶ BigDataStack, ICT-16-2017, High-performance data-centric stack for big data applications and operations <https://bigdatastack.eu/>

⁷ Policy Cloud, H2020-EU.3.6.2.2, Policy Management through technologies across the complete data lifecycle on cloud environments, <https://policycloud.eu/>

Table 3-1: Big Data Webinar Series

#	Date	Project	Title	Webinar information
1	21 May	I-BiDaas	Application to the Financial Sector	http://www.ibidaas.eu/news/Big-Data-Pilot-Demo-Days%3A-I-BiDaaS-Application-to-the-Telecommunication-Sector
2	28 May	BigDataStack	Connected Consumer	https://bigdatastack.eu/news/big-data-pilot-demo-bigdatastack-connected-consumer
3	18 June	BigDataStack	A BigDataStack Seafarer's Tale on Real Time Shipping	https://bigdatastack.eu/news/insights-big-data-pilot-demo-day-bigdatastack-seafarer%E2%80%99s-tale-real-time-shipping
4	25 June	I-BiDaas	I-BiDaaS Application to the telecommunications sector: Telefonica I+D	http://www.ibidaas.eu/news/Big-Data-Pilot-Demo-Days%3A-I-BiDaaS-Application-to-the-Telecommunication-Sector
5	2 July	PolicyCLOUD	Policy Cloud for Policies against radicalisation	https://policycloud.eu/news-events/events/big-data-pilot-demo-days
6	7 July	Track&Know	Fleet management services: Quality and predictions in location data from GPS devices	https://trackandknowproject.eu/webinars/
7	9 July	I-BiDaas	Application to the manufacturing sector	http://www.ibidaas.eu/news/Big-Data-Pilot-Demo-Days%3A-I-BiDaaS-Application-to-the-Manufacturing-Sector
8	14 July	Track&Know	Insurance Sector: Using mobility data to understand and mitigate risky driving behaviour	https://trackandknowproject.eu/webinars/
9	16 July	Track&Know	Healthcare Service: Using patient mobility information to understand the provision of services across large rural and urban communities	https://trackandknowproject.eu/webinars/

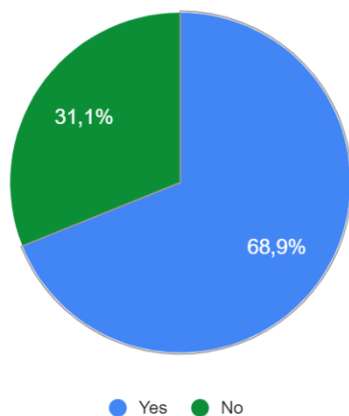
The webinars were advertised via the BDVA and through each project's website and social media channels. A total of 483 delegates from 43 different countries attended the webinar series, of which 236 attended the Track&Know webinar events (as shown in figure 3-2).

Figure 3-2: Big Data Demo Days Webinar Attendees

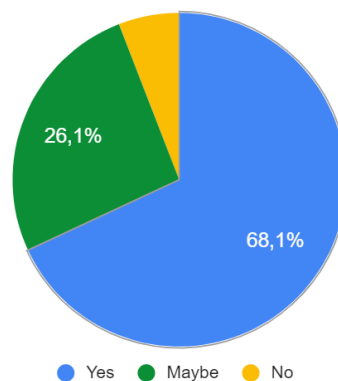
Registrants/attendees per webinar	Attendees									
	21/05/2020	28/05/2020	18/06/2020	25/06/2020	02/07/2020	07/07/2020	09/07/2020	14/07/2020	16/07/2020	
Albania	1									
Belgium					3	6	1	3	10	
Bolivia	1									
Bulgaria					2					1
China						1		1	1	
France	3	2	2	2		3	2	2	1	
Germany	4	1	1	2		5		4	7	
Ghana		1								
Greece	16	4	3	17	9	36	10	22	9	
Hungary					1					
India			1							2
Ireland						1		2	2	
Israel					1		1			
Italy	4	3	3	4	1	15	22	12	7	
Luxembourg						1				
Malta			1							
Netherlands			1		1					1
Oman						3				3
Pakistan										1
Portugal				1						
Romania		2	2							
Rwanda						1				
Serbia	5									1
Spain	10	5	2	3	12		3	2		
Sweden										1
Switzerland			2	1		7	1	7	8	
Taiwan		1								
Turkey							2			
United Kingdom	3	1	3	4	3	11	3	5	11	
United States of America	1	2	4	3	2	7	4	2	11	
Totale generale	48	22	25	37	35	97	49	62	77	

In each of the webinars the audience was polled to ascertain the stakeholder group, their interest in Big Data technologies and current barriers to adopting Big Data solutions in their organisations. The combined results of the polls are shown in the following figures.

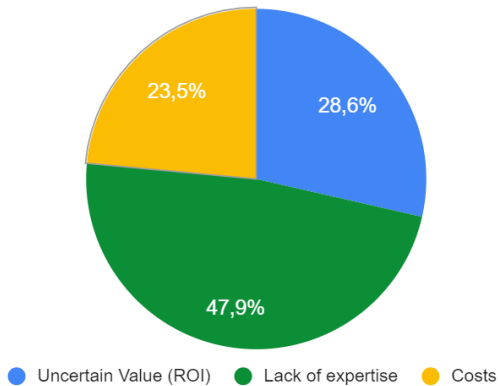
Are you working with BigData?



Are you interested in BigData Technologies to optimise your customer experience?



What is the main barrier or risk preventing you from implementing BigData analytical solutions in your organisation?



To which of our stakeholder types do you belong?

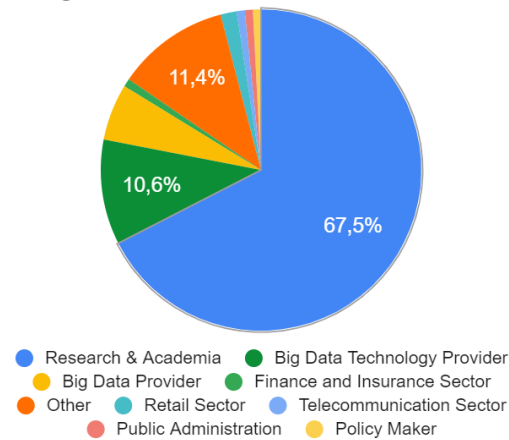


Figure 3-3: Big Data Demo Days Audience Poll Responses

An analysis of the information gathered with the interactive polls shows that the audience was mostly from the area of Academia and Research (67,5%), working with BigData (68,9%) and interested in BigData technologies to optimise customer experience (68,1%).

3.1.3 EBDVA collaborative event

Track&Know joined I-BiDaaS⁸ and BigDataStack⁹ to deliver a session in the European Big Data Value Forum event 3-5 November held in Berlin and in parallel as a virtual event. The session was titled “Parallel session on European Big Data Research for Industry. 3 projects. 7 sectors. 9 applications. 41 software components. Now what?”

The 1 hour session included introductory pitches demonstrating the research highlights from each project followed by a speaker-led discussion session aiming to discuss research highlights, barriers to adoption of BigData research in different sectors as well as the current and future impact of their research. Speakers also elaborated on the concrete business questions that have been answered in the project pilots.



Figure 3-4: EBDVA joint session chairs

The session chairs included Jenny Rainbird, Senior Project Manager, Inlecom from Track&Know, Despina Kopanaki, Project Manager, FORTH-ICSI from BiDaaS and Marieke Willems Project Manager, Trust-IT Services

⁸ I-BiDaaS, ICT-16-2017, Industrial-Driven Big Data as a Self-Service Solution <https://www.ibidaas.eu/>

⁹ BigDataStack, ICT-16-2017, High-performance data-centric stack for big data applications and operations <https://bigdatastack.eu/>

from BigDataStack. The panel speakers were Toni Stakkova Co-Founder and Vice President, UKeMED from Track&Know, Alon Rozen, Professor of Innovation, Dean, Ecole des Ponts Business School from I-BiDaaS and Richard McCreadie, Lecturer in Information Retrieval and Data Systems, University of Glasgow from BigDataStack.

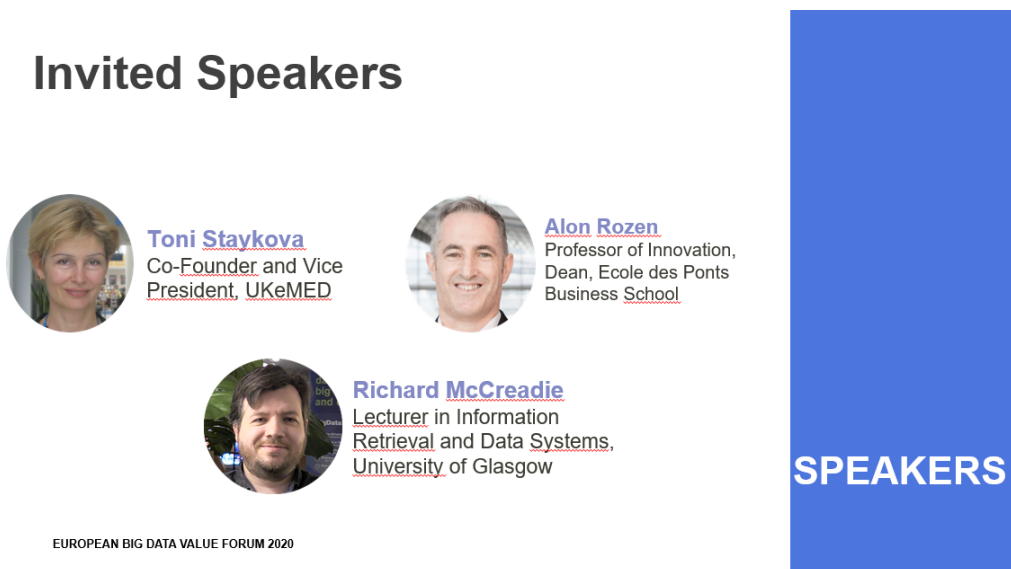


Figure 3-5: EBDVA session speakers

The speakers provided responses to “How the projects are contributing to the European Big Data Ecosystem”? “What is the role/impact of new technologies in the industries? What barriers did you encounter with the industries in your project”? and “Now What”?

The session also highlighted the collaboration between the three projects.



Figure 3-6: EBDVA Collaboration

117 participants joined the session from 14 countries (Figure 3.7) and a poll showed that the attendees were predominantly researchers (62%) Big Data Technology providers (23%) or from other industry (15%) 92% of attendees were working with big data and 85% were interested in Big Data Technologies to optimise their

customer experience. The recorded session was made available on the EBDVA platform post event and a joint report was written and submitted to the EBDVA summarising the event and main conclusions (Annex 5).

EBDVF 2020 - Parallel session on European Big Data Research for Industry. 3 projects. 7 sectors. 9 applications. 41 software components. Now what?

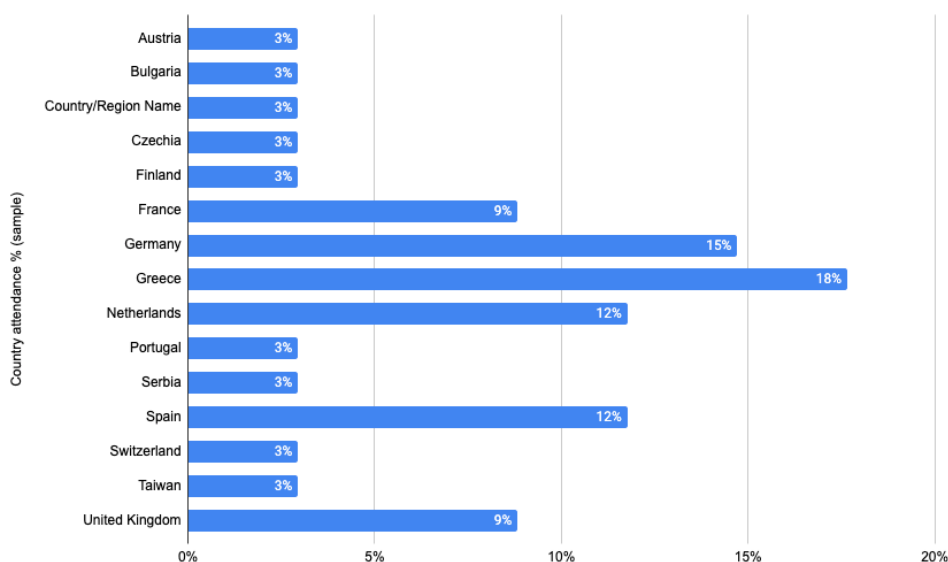


Figure 3-7: Countries attending the EBDVA event

3.1.4 Workshops conferences and events

The table below provides a list of the dissemination activities which were undertaken during the project. It includes the title and type of event (either Conference, Workshop or Summit) the date and country of the event. The Track&Know partners who attended and the total estimated number of attendees. The table also identifies the liaison projects who attended the event and the outputs that were achieved. Photos from selected events can be found in Section 8.

Table 3-2 : Collaborative dissemination activities

Liaison Project	Title	Type	Date	Co	T&K Pnr (s)	#	Output
e-SIDES, Databench, TT, Data Bio, BigMedilytics	European Big data value Forum	Conf.	12-14:11:18	AT	ILS	170	Proj. Pres.
e-Sides	E-sides WKSH	WKSH	02:04:19	BU	UHASSELT	40	Proj. Pres. and Ethics considerations
e-SIDES, DataBio, TT, BigMedilytics DataBench	Big data value summit PPP	WKSH + summit	26-28:06:19	LV	KT	200	Proj. Pres. Health pilot success story was shortlist for award
BigMedilytics	Big Data: Fueling the transformation of Europe's	WKSH + Conf.	4-5:09:19	ES	ILS	170	Conf. Pres. WKSH "Data Analytics in Healthcare" and "Privacy & Legal

	Healthcare Sector						aspects of Healthcare Big Data Analytics"
BigDataStack, I-Bidaas, PolicyCLOUD,	BigDataWebinar Series	Webinar	7,14,16: 06:20	ILS	ILS, SIS, INTRA, PAP, CMA, VFI	236	3 x webinar sessions on the Fleet management services, Insurance Sector and Healthcare Service
BigDataStack, I-Bidaas,	EBDVA	Conf.	3:11:20	ILS	ILS, CMA	117	Parallel session on European Big Data Research for Industry.
SoBigData++	SoBigData Webinar series	Webinar	07:12:20	IT	CNR	20	Webinar presentation on BDA tools and Pilot 1 applications

3.1.5 Dissemination of code

Track&Know worked with the BDVA to share assets from the project via the Innovation Market Place¹⁰. This platform provides a space for projects under the BDV PPP umbrella to share their outputs. It provides free access to a catalogue of solutions from the BDV PPP to external organizations, as well a contact point to the organizations behind each asset, and the opportunity to participate in discussion forums, and a contribution channel to upload additional information for new assets. The assets are searchable by solution type, BDV Reference Category, TRL level, Market and Owner¹¹.

To help the BDVe-PPP achieve the common goal of strengthening the European Big Data economy, the Track&Know project has made the following codes (with a high TRL) available on the BDVA Innovation Marketplace:

- Distributed Sub-trajectory Clustering
- Location Extraction
- Individual Mobility Network Extraction
- Crash prediction process
- Genetic p-Median Solver

¹⁰ BDVA Innovation Market Place <https://marketplace.big-data-value.eu/node/2>

¹¹ BDVA Innovation Market Place, Search for Innovations <https://marketplace.big-data-value.eu/solutions>

3.1.6 Other joint dissemination

Track&Know promoted and disseminated results via regular contributions to the Big Data Value Association newsletters¹² a couple of examples of which can be found in the figure below.

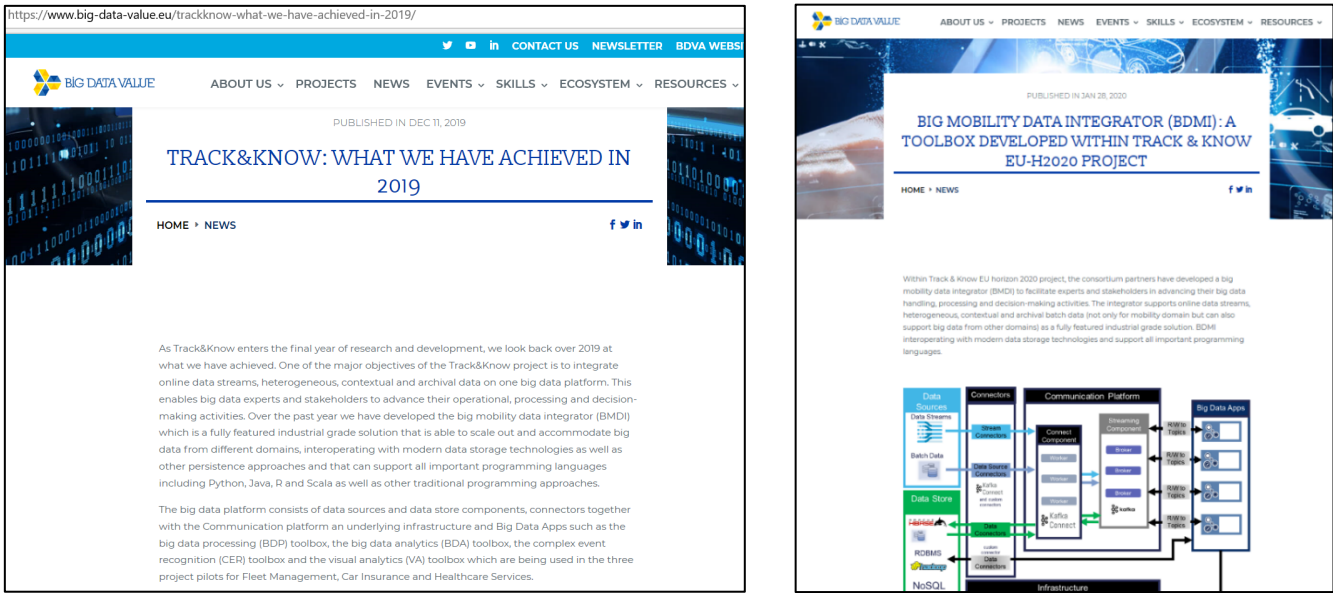


Figure 3-8 : BDVA December 2019 and January 2020 Newsletter Track&Know articles

¹² BDVA newsletters <http://www.bdva.eu/node/839>

3.2 Knowledge observatory

H2020 projects previously identified in section 2 were contacted with a request to include papers in the Track&Know online observatory. The online observatory required a redesign to improve navigation and organization under topic heading rather than project tasks. A list of the papers provided can be found in the table below.

Table 3-3: Papers uploaded to the Track&Know observatory

Project	Title	Authors	Conference	year
eSIDES	The Role of Privacy-Preserving Technologies in the Age of Big Data, Proceedings of the 13th Pre-ICIS Workshop on Information Security and Privacy,	Bachlechner, D., La Fors, K., & Sears, A.M	Proceedings of the 13th Pre-ICIS Workshop on Information Security and Privacy, WISP 2018 December 13, 2018, San Francisco, USA.	2018
eSIDES	Reassessing values for emerging big data technologies: integrating design-based and application-based approaches	La Fors, K., Custers, B.H.M., and Keymolen, E.	Ethics and Information Technology, Volume 21, Number 3, p. 209-226.	2019
eSIDES	Profiling as Inferred data: Amplifier Effects and Positive Feedback Loops	Custers, B.H.M.	Being Profiled: Cogitas ergo Sum, Amsterdam: Amsterdam University Press, p. 112-115.	2018
eSIDES	Methods of data research for law	Custers, B.H.M.	Research Handbook in Data Science and Law, Cheltenham: Edward Elgar, p. 355-377.	2018
eSIDES	Data Mining and Profiling in Big Data	Custers, B.H.M.	The SAGE Encyclopedia of Surveillance, Security, and Privacy, p. 277-279, Thousand Oaks: SAGE Publications, Inc.	2018
eSIDES	Nepnieuws, filterbubbels en echokamers	Custers, B.H.M.	Recht uit het hart, Universiteit Leiden: Meijers Instituut.	2019
eSIDES	Privacywaakhond krijgt geld, nu nog tanden	Custers, B.H.M.	Privacy & Informatie, Vol 22, nr. 4, p. 152.	2019
eSIDES	Policy for Data Policy Brief: Big Data in Europe for 2020 and beyond: Policy insights and recommendations from current H2020 big data projects.	Timan, T. et al.	European Common Dissemination Booster on Big Data Technologies (BDVA) Policy Brief (report).	2019

Project	Title	Authors	Conference	year
SmartDataLake	Automatic Clustering by Detecting Significant Density Dips in Multiple Dimensions	P. Chronis, S. Athanasiou, S. Skiadopoulos	IEEE International Conference on Data Mining (ICDM), 2019	2019
SmartDataLake	explAIner: A visual analytics framework for interactive and explainable machine learning	T. Spinner, U. Schlegel, H. Schäfer, M. El-Assady	IEEE Transactions on Visualization and Computer Graphics, 2019.	2019
SmartDataLake	Uncertainty-aware principal component analysis.	J. Görtler, T. Spinner, D. Streeb, D. Weiskopf, O. Deussen	IEEE Transactions on Visualization and Computer Graphics, 2019.	2019
SmartDataLake	Local pair and bundle discovery over co-evolving time series	G. Chatzigeorgakidis, D. Skoutas, Kostas Patroumpas, T. Palpanas, S. Athanasiou, S. Skiadopoulos	Proceedings of the 16th International Symposium on Spatial and Temporal Databases (SSTD), 2019.	2019
SmartDataLake	Scalable temporal clique enumeration	K. Zhu, G. H. L. Fletcher, N. Yakovets, O. Papapetrou, Y. Wu	Proceedings of the 16th International Symposium on Spatial and Temporal Databases (SSTD), 2019.	2019
SmartDataLake	Local Similarity Search on Geolocated Time Series Using Hybrid Indexing.	G. Chatzigeorgakidis, D. Skoutas, K. Patroumpas, T. Palpanas, S. Athanasiou, S. Skiadopoulos	ACM International Conference on Advances in Geographic Information Systems (SIGSPATIAL), 2019.	2019
SmartDataLake	Visual Exploration of Geolocated Time Series with Hybrid Indexing	G. Chatzigeorgakidis, K. Patroumpas, D. Skoutas, S. Athanasiou, S. Skiadopoulos,	Big Data Research, Volume 15, 2019, Pages 12-28, ISSN 2214-5796, https://doi.org/10.1016/j.bdr.2019.02.001 .	2019

Project	Title	Authors	Conference	year
SmartDataLake	Taster: Self-Tuning, Elastic and Online Approximate Query Processing	M. Olma, O. Papapetrou, R. Appuswamy, A.Ailamaki	EEE International Conference on Data Engineering (ICDE), 2019.	2019
SmartDataLake	JedAI3: beyond batch, blocking-based Entity Resolution	G. Papadakis, L. Tsekouras, M. Thanos, N. Pittaras. G. Simonini, D. Skoutas. P. Isaris, G. Giannakopoul, T. Palpanas, M. Koubarakis	Proceedings of the 23rd International Conference on Extending Database Technology (EDBT), March 30-April 2, 2020, ISBN 978-3-89318-083-7 on OpenProceedings.org.	2020
SmartDataLake	GPU-accelerated data management under the test of time	A Raza, P. Chrysogelos P. Sioulas V. Indjic A. C. Anadiotis A. Ailamaki	10th Annual Conference on Innovative Data Systems Research (CIDR '20) January 12-15, 2020, Amsterdam, Netherlands	2020
ExtremeEarth	From Copernicus Big Data to Extreme Earth Analytics	M. Koubarakis, et al.	Advances in Database Technology - EDBT 2019, 22nd International Conference on Extending Database Technology, Lisbon, Portugal, Proceedings	2019
Musketeer	Defending against Poisoning Attacks in Online Learning Settings	E. C. Lupu, L. Munoz-Gonzalez	Whitepaper BDVA – Data protection in the era of big data for artificial intelligence	2019
Musketeer	DATA PROTECTION IN THE ERA OF ARTIFICIAL INTELLIGENCE - Trends, existing solutions and recommendations for privacy-preserving technologies	Timan, T. & Z. Á. Mann	BDVA	2019
BodyPass	The interoperability challenges of 3D Personal Data	J. V. Durá	BDV PPP Meetup in Riga	2019

Project	Title	Authors	Conference	year
BodyPass	3D Human Models from 1D, 2D and 3D Inputs: Reliability and Compatibility of Body Measurement	A. BALLESTER*, A. PIÉROLA, E. PARRILLA, J. URIEL, A. V. RUESCAS, C. PÉREZ, J. V. DURÁ, S. ALEMANY	Proceedings of 3DBODY.TECH 2018 9th Int. Conference and Exhibition on 3D Body Scanning and Processing Technologies, Lugano, Switzerland	2018
DataBench	Relating Big Data Business and Technical Performance Indicators	B. Pernici, C. Francalanci, A. Geronazzo, L. Polidori, L. Riva, S. Ray, A. Berre, T. Ivanov	XV itAIS conference Pavia, Italy	10:18
DataBench	Evidence Based Big Data Benchmarking to Improve Business Performance	T. Ivanov, et al	KDD'18, United Kingdom	2018
DataBench	ABench: Big Data Architecture Stack Benchmark	T. Ivanov, R. Singhal	Companion of the 2018 ACM/SPEC International Conference	2018
DataBench	Exploratory Analysis of Spark Structured Streaming	T. Ivanov, J. Taaffe	Companion of the 2018 ACM/SPEC International Conference	2018
DataBench	Analytics Benchmarks	T. Ivanov, R. V. Zicari	Addition to the Encyclopedia of Big Data Technologies	2018
DataBench	Tutorial on Benchmarking Big Data Analytics Systems	T. Ivanov, R. Singhal	Companion of the 2018 ACM/SPEC International Conference	2018
DataBench	CoreBigBench: Benchmarking Big Data Core Operations	Y. Ivanov, A. Ghazal, A. Crolotte, P. Kostamaa, Y. Ghazal	DBTest'20, June 19, 2020, Portland, OR, USA	2020
BigMedilytics	Fuzzy Inference System for Risk Evaluation in Gestational Diabetes Mellitus	C. Salort Sánchez <i>et al.</i>	2019 IEEE 19th International Conference on Bioinformatics and Bioengineering (BIBE), Athens, Greece, 2019, pp. 947-952, doi: 10.1109/BIBE.2019.00177	2020

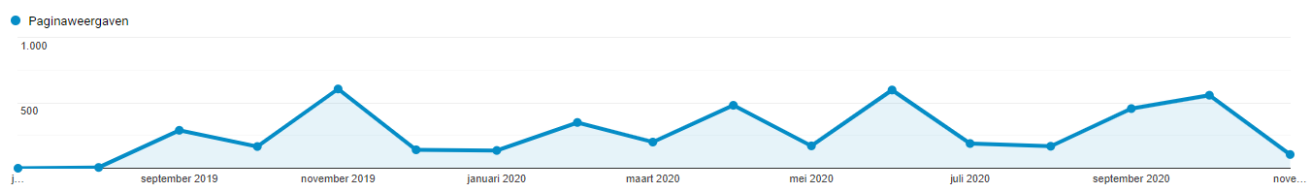
Project	Title	Authors	Conference	year
BigMedilytics	A Data-Driven Approach for Analyzing Healthcare Services Extracted from Clinical Records	M. Scurti et al	2020 IEEE 33rd International Symposium on Computer-Based Medical Systems (CBMS), Rochester, MN, USA, 2020, pp. 193-196, doi: 10.1109/CBMS49503.2020.00044	2020
BigMedilytics	From Witch's Shot to Music Making Bones – Resources for Medical Laymen to Technical Language and Vice Versa	S. L, Marten O, Mikhailov M, Schmeier S, Möller s, Roller R.	Proceedings of The 12th Language Resources and Evaluation Conference, 2020, Page(s) 6185–6192. Available in: https://www.aclweb.org/anthology/2020.lrec-1.759/	2020
BigMedilytics	Impact of Acute Hemoglobin Falls in Heart Failure Patients: A Population Study	Lopez, C.; Holgado, J.L.; Fernandez, A.; Sauri, I.; Uso, R.; Trillo, J.L.; Vela, S.; Bea, C.; Nuñez, J.; Ferrer, A.; Gamez, J.; Ruiz, A.; Redon, J.	J. Clin. Med. 2020, 9, 1869.	2020
BigMedilytics	Radiomics for predicting response to neoadjuvant chemotherapy treatment in breast cancer	S. Rabinovici-Cohen, T. Tlusty, A. Abutbul, K. Antila, X. Fernandez, B. Grandal Rejo, E. Hexter, O. Hijano Cubelos, A. Khateeb, J. Pajula, S. Perek	Proc. SPIE 11318, Medical Imaging 2020: Imaging Informatics for Healthcare, Research, and Applications, 113181B (2 March 2020); https://doi.org/10.1117/12.2551374	2020
BigMedilytics	Acute kidney injury in heart failure: a population study	Holgado JL, Lopez C, Fernandez A, Sauri I, Uso R, Trillo JL et al.		2020
BigMedilytics	MoRTy: Unsupervised Learning of Task-specialized Word Embeddings by Autoencoding	Rethmeier N, Plank B.	Proceedings of the 4th Workshop on Representation Learning for NLP (RepL4NLP-2019), 2019, Page(s) 49-54. DOI: 10.18653/v1/w19-4307	2019

Project	Title	Authors	Conference	year
BigMedilytics	Exploring Diachronic Changes of Biomedical Knowledge using Distributed Concept Representations	Vashisth G, Voigt-Antons J-N, Mikhailov M, Roller R.	Proceedings of the 18th BioNLP Workshop and Shared Task, 2019, Page(s) 348-358. DOI: 10.18653/v1/w19-5037	2019
BigMedilytics	Knowledge Distillation from Machine Learning Models for Prediction of Hemodialysis Outcome	Freitas da Cruz, H., Horschig, S., Nusschag, C., Schapranow, M.-P.	Knowledge Distillation from Machine Learning Models for Prediction of Hemodialysis Outcomes. International Journal On Advances in Life Sciences, 11 (12), 33-43.	2019
BigMedilytics	External Validation of a “Black-Box” Clinical Predictive Model in Nephrology: Can Interpretability Methods Help Illuminate Performance Differences?	da Cruz H.F., Pfahringer B., Schneider F., Meyer A., Schapranow MP.	Riaño D., Wilk S., ten Teije A. (eds) Artificial Intelligence in Medicine. AIME 2019. Lecture Notes in Computer Science, vol 11526. Springer, Cham	2019
BigMedilytics	Enabling analytics on sensitive medical data with secure multi-party computation	Veeningen M, Chatterjea S, Horváth AZ, Spindler G, Boersma E, van der Spek P, van der Galiën O, Gutteling J, Kraaij W, Veugen T.	Stud Health Technol Inform. 2018;247:76-80. doi:10.3233/978-1-61499-852-5-76	2018

Links to 41 papers and to the BDVA downloads site were provided from the Track&Know knowledge observatory. The statistics collected via the Track&Know website from the 1st July 2019 to 23rd November 2020 showed the total views of the knowledge observatory were 4,621 over the period and that it is the second most popular page of the project website after the homepage, evidencing the increased promulgation of Big Data related research results.

Page Title	Page Views	Unique Page Views
Paginatitel ?	Paginaweergaven ?	Unieke paginaweergaves ? ↓
	27.686 % van totaal: 100,00% (27.686)	8.848 % van totaal: 100,00% (8.848)
1. Track & Know 	7.498 (27,08%)	2.549 (28,81%)
2. Online observatory Track & Know	4.621 (16,69%)	1.166 (13,18%)

MONTHLY EVOLUTION OF PAGE VIEWS:



MONTHLY EVOLUTION OF UNIQUE PAGE VIEWS:

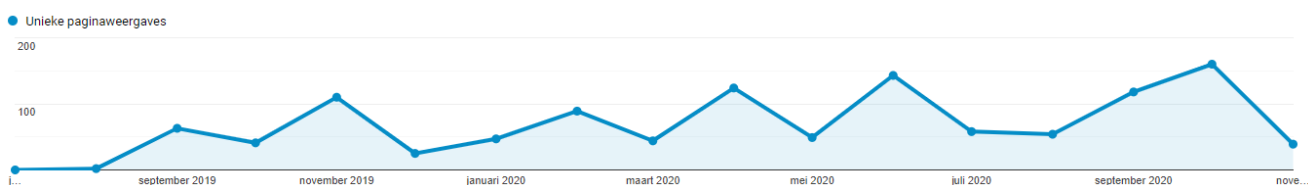


Figure 3-9 Google Analytics of the Track&Know Knowledge Observatory pages

3.3 Common Data Governance framework activities

The purpose of this task was to work with H2020 projects and contribute to the development of a ‘common data governance framework’, including guidelines for data privacy and security. All projects which were identified in section 2.1 were contacted with a view to identifying those who were working in the development of data governance frameworks. None of the projects identified were involved in data governance framework development activities, as a consequence Track&Know engaged directly with the Big Data Value Association to support their activities (Annex 4).

Track&Know participated in the BDVA Activity Group workshops on the 11th and 12th December in Brussels¹³ which included the following presentations and discussion topics:

- DLT & SC for Data Governance Nadia Fabrizio, Cefriel –Politecnico di Milano Bruxelles,BDVAWg on DG-12 December 2019
- Data unleashed Play in three acts Tuomo Tuikka, VTT
- Data governance workshop, Interactive session, Natalie BERTELS and Charlotte DUCUING, KU Leuven

Key points from the discussion included:

- GDPR is very broad when applied because almost all data can be interpreted as personal
- Data governance plays an important part in ensuring good quality of data, meaning that more research is needed on how to shape data governance models.
- GDPR is often seen as a burden and hindrance for innovation, however, data protection and privacy are core assets for any organization, also in prep for Artificial Intelligence.

Challenges include:

- The challenging part about regulating data is its changing nature, meaning and value. More research is needed on how to shape data governance models, and how to implement them.
- Data regulatory landscape is complex.
- Interaction between FFoD and GDPR (among others) is one to watch.
- PPTs such as MPC can help bridge this gap (between data utility and data protection/confidentiality), but the implementation of this technology is difficult in practice
- There is currently no framework that regulates the ownership of data, but there is a consensus that establishing a data ownership right is not desirable. However, a lack of a clear regulatory regime creates high levels of uncertainty for the actors involved.

Recommendations from the workshop included:

- support the integration and interoperability of public administration databases
- support development of data markets and provide guidance on their effective use
- support work on the adoption of privacy-preserving technologies for big data and AI
- promote data-driven policymaking and regulatory automation

¹³ BDVA ‘Last BDVA Activity Group of 2019: Data Governance, Data Sharing, and much more!’ <http://www.bdva.eu/node/1421>

4 Conclusions

The purpose of the liaison and clustering activity was to engage with related H2020 projects to identifying common areas of interest and promoting key outcomes. The goal has been to collectively raise the projects' profiles, promote knowledge transfer, identify where the partnerships can work collaboratively on developing common data governance and increase the uptake of results.

Track&Know identified several projects which were related to either the pilot domain areas and/or the big data and ICT development themes and contacted them either through project partners or directly via the project coordinating partners.

This document has provided a report on the liaison and clustering activities carried out by Track&Know, namely a) the collaborative dissemination activities carried out by Track&Know and partner projects and b) the activities carried out with partner projects on the development of a common data governance framework, including guidelines for data privacy and security.

Specifically Track&Know addressed the goals of the liaison and clustering activity in the following actions:

[To establish a dialogue and collaboration with related projects, in order to identify commonalities and important outcomes that will provide input to several tasks.](#)

Track&Know worked with the BDVA to share assets from the project via the Innovation Market Place . To help the BDVe-PPP achieve the common goal of strengthening the European Big Data economy, the Track&Know project made the following codes (with a high TRL) available on the BDVA Innovation Marketplace:

- Distributed Sub-trajectory Clustering
- Location Extraction
- Individual Mobility Network Extraction
- Crash prediction process
- Genetic p-Median Solver

[Monitor relevant projects via the knowledge observatory.](#)

41 papers from 7 projects plus links to the BDVA papers and resources were provided via links though the knowledge observatory which was redesigned to allow for better searching and archiving of results a total of 4,621 views were achieved between July 2019 and November 2020.

[Dissemination collaboration to reach wider audience.](#)

Track&Know participated in a total of 6 joint dissemination events throughout the project and contributed to BDVA newsletters which enabled the results of the project to be shared via a wider stakeholder audience. The presentations were well received, and valuable connections were made via networking activities.

[Contribute to a common data governance framework, including guidelines for data privacy and security.](#)

Lastly, Track&Know actively contributed to the BDVA data governance workshop held in Brussels on the 12th December which discussed Data Governance, GDPR, the challenges to data regulation and the need for a framework to regulate ownership of data.



5 Annex I: P1 shortlisted H2020 projects

TRAC K&K NOW Area	ICT	ID	Acronym	Topics	Title	Start Date	End Date
Oth.	1,2,3	780966	DataBench	ICT-17-2016-2017	Evidence Based Big Data Benchmarking to Improve Business Performance	18-01-01	20-12-31
Oth.	1,2	731873	e-Sides	ICT-01-2016	Ethical and Societal Implications of Data Sciences	17-01-01	19-12-31
Oth.	1,2,3,4	732064	DataBio	ICT-01-2016	Data-Driven Bioeconomy	17-01-01	19-12-31
A	1,2,3,4	731932	TT	ICT-15-2016	Transforming Transport	17-01-01	19-07-31
C	1,2	780495	BigMedilytics	ICT-15-2016-2017	Big Data for Medical Analytics	18-01-01	21-02-28



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No 780754.

6 Annex 2: P2 shortlisted H2020 projects

TRACK & KNOW Area	ICT	ID	Acronym	Topics	Title	Start Date	End Date	URL
Oth.	1,2	825184	CloudButton	ICT-12-2018-2020	Serverless Data Analytics Platform	18-01-01	20-12-31	cloudbutton.eu
Oth.	1,2	825355	CYBELE	ICT-11-2018-2019	Fostering Precision Agriculture and Livestock Farming Through Secure Access to Large-Scale Hpc-Enabled Virtual Industrial Experimentation Environment Empowering Scalable Big Data Analytics	19-01-01	21-12-31	cybele-project.eu
Oth.	1,2	825014	Data Market Services	ICT-13-2018-2019	Supporting the European data market providing free support services to data-centric SMEs and start-ups	19-01-01	21-12-31	datamarketservices.eu
	1,2	825111	DeepHealth	ICT-11-2018-2019	Deep-Learning and HPC to Boost Biomedical Applications for Health	19-01-01	21-12-31	deephealth-project.eu
Oth.	1,2	780245	E2DATA	ICT-16-2017	European Extreme Performing Big Data Stacks	18-01-01	20-12-31	e2data.eu
Oth.	1,2	825473	ELASTIC	ICT-12-2018-2020	A Software Architecture for Extreme-Scale Big-Data Analytics in Fog Computing Ecosystems	18-12-01	21-11-30	elastic-project.eu
Oth.	1,2	825292	EXA MODE	ICT-12-2018-2020	EXtreme-scale Analytics via Multimodal Ontology Discovery & Enhancement	19-01-01	22-12-31	examode.eu
Oth.	1,2	825258	ExtremeEarth	ICT-12-2018-2020	From Copernicus Big Data to Extreme Earth Analytics	19-01-01	21-12-31	earthanalytics.eu
Oth.	1,2	825070	INFORE	ICT-12-2018-2020	Interactive Extreme-Scale Analytics and Forecasting	19-01-01	21-12-31	infore-project.eu
Oth.	1,2	732340	K-PLEX		Using humanities knowledge to explore bias in big data approaches to knowledge creation			kplex-project.eu
Oth.	1,2	824988	MUSKETEER	ICT-13-2018-2019	Machine learning to augment shared knowledge in federated privacy-preserving scenarios	18-12-01	21-11-30	musketeer.eu
Oth.	1,2	727402	MOSAIC		MODular high concentration SolAr Configuration	01-12-16	30-11-19	
Oth.	1,2	825225	Safe-DEED	ICT-13-2018-2019	Safe Data Enabled Economic Development	18-12-01	21-11-30	safe-deed.eu
Oth.	1,2	825041	SmartDataLake	ICT-12-2018-2020	Sustainable Data Lakes for Extreme-Scale Analytics	19-01-01	21-12-31	smartdatalake.eu
	1,2,4	780251	TYPHON	ICT-16-2017	Polyglot and Hybrid Persistence Architectures for Big Data Analytics	18-01-01	20-12-31	typhon-project.org
Oth.	1,2	779747	BigDataStack	ICT-16-2017	High-performance data-centric stack for big data applications and operations	18-01-01	20-12-31	bigdatastack.eu

A	1,2	780622	CLASS	ICT-16-2017	Edge and Cloud Computation: A Highly Distributed Software Architecture for Big Data Analytics	18-01-01	20-12-31	class-project.eu
TRACK & KNOW Area	ICT	ID	Acronym	Topics	Title	Start Date	End Date	URL
C	1,2	779780	BodyPass	ICT-14-2016-2017	API-ecosystem for cross-sectorial exchange of 3D personal data	18-01-01	20-12-31	bodypass.eu
Oth.	1,2	780355	FANDANGO	ICT-14-2016-2017	FAke News discovery and propagation from big Data ANalysis and artificial intelliGence Operations	18-01-01	20-12-31	fandango-project.eu
Oth.	1,2	780602	Lynx	ICT-14-2016-2017	Building the Legal Knowledge Graph for Smart Compliance Services in Multilingual Europe	17-12-01	20-11-30	lynx-project.eu
Oth.	1,2	779790	ED Incubator	ICT-14-2016-2017	European Data Incubator	18-01-10	21-06-30	edincubator.eu

7 Annex 3: H2020 projects

ID	Acronym	Topics	Title	Start Date	End Date
731873	e-Sides	ICT-01-2016	Ethical and Societal Implications of Data Sciences	17-01-01	19-12-31
824270	A-Patch	ICT-02-2018	Autonomous Patch for Real-Time Detection of Infectious Disease	19-01-01	21-12-31
825172	BEWELL	ICT-02-2018	Wearable sensors and actuators to monitor and promote physical and emotional wellbeing	19-01-01	21-12-31
824984	SINTEC	ICT-02-2018	Soft intelligence epidermal communication platform	19-01-01	22-12-31
825143	Smart2Go	ICT-02-2018	Smart and Flexible Energy Supply Platform for Wearable Electronics	19-01-01	21-12-31
825429	SocketSense	ICT-02-2018	Advanced sensor-based design and development of wearable prosthetic socket for amputees	19-01-01	21-12-31
825213	WASP	ICT-02-2018	Wearable Applications enabled by electronic Systems on Paper	19-01-01	21-12-31
825232	WEAFING	ICT-02-2018	Wearable Electroactive Fabrics Integrated in Garments	19-01-01	23-06-30
825339	WEARPLEX	ICT-02-2018	Wearable multiplexed biomedical electrodes	19-01-01	21-12-31
732642	ULPEC	ICT-03-2016	Ultra-Low Power Event-Based Camera	17-01-01	20-12-31
824980	InPulse	ICT-03-2018-2019	Indium-Phosphide Pilot Line for up-scaled, low-barrier, self-sustained, PIC ecosystem	19-01-01	22-12-31
761496	SmartEEs	ICT-04-2017	SMART Emerging Electronics Servicing DIH	17-09-14	20-09-13
761349	TETRAMAX	ICT-04-2017	TEchnology TRAnsfer via Multinational Application eXperiments	17-09-01	21-08-31
825051	ACTPHAST 4R	ICT-04-2018	Accelerating Photonics Deployment via one Stop Shop Advanced Technology Access for Researchers	19-01-01	22-12-31
825453	Caladan	ICT-04-2018	Micro assembled Terabit/s capable optical transceivers for Datacom applications	19-01-01	22-12-31
825103	CUSTODIAN	ICT-04-2018	Customized photonic devices for defectless laserbased manufacturing	18-12-01	21-11-30
825651	ELIOT	ICT-04-2018	Enhance Lighting for the Internet of Things	19-01-01	21-12-31
825512	FemtoSurf	ICT-04-2018	Functional surface treatments using ultra-short pulse laser system FemtoSurf	19-01-01	21-12-31
825246	kW-flexiburst	ICT-04-2018	Ultrashort pulsed kW-class laser with unprecedented flexible GHz burst operation for high precision high-throughput industrial manufacturing	19-01-01	22-12-31
825132	LAMPAS	ICT-04-2018	High throughput Laser structuring with Multiscale Periodic feature sizes for Advanced Surface Functionalities	19-01-01	21-12-31
825109	MASSTART	ICT-04-2018	MASS manufacturing of TrAnsceiverRs for Terabit/s era	19-01-01	21-12-31
825201	MultiFlex	ICT-04-2018	Ultrashort Pulsed Laser Processing at 1 Kilowatt Using a Flexible Multi Beam Approach	19-01-01	21-12-31
825567	MULTIPOINT	ICT-04-2018	Multibeam Femtosecond Laser System for High Throughput Micro-drilling of HLFC Structures	19-01-01	21-12-31
825503	PROMETHEUS	ICT-04-2018	Pulsed Rapid ultra-short laser surface texturing for Manufacture of Flexible and Customised Products	19-01-01	21-12-31
824996	PULSE	ICT-04-2018	High-Power Ultrafast Lasers using Tapered Double-Clad Fibre	19-01-01	22-12-31

ID	Acronym	Topics	Title	Start Date	End Date
825502	TERIPHIC	ICT-04-2018	Fabrication and assembly automation of TERabit optical transceivers based on InP EML arrays and a Polymer Host platform for optical InterConnects up to 2 km and beyond	19-01-01	21-12-31
780788	ALOHA	ICT-05-2017	software framework for runtime-Adaptive and secure deep Learning on Heterogeneous Architectures	18-01-01	20-12-31
780681	LEGaTO	ICT-05-2017	Low Energy Toolset for Heterogeneous Computing	17-12-01	20-11-30
779877	Mont-Blanc 2020	ICT-05-2017	Mont-Blanc 2020, European scalable, modular and power efficient HPC processor	17-12-01	20-11-30
780572	SDK4ED	ICT-05-2017	Software Development toolKit for Energy optimization and technical Debt elimination	18-01-01	20-12-31
779882	TeamPlay	ICT-05-2017	Time, Energy and security Analysis for Multi/Many-core heterogenous PLATforms	18-01-01	20-12-31
825113	5E	ICT-07-2018	Federating European Electronics Ecosystems for Competitive Electronics Industries	19-01-01	21-06-30
825464	AMANDA	ICT-07-2018	AutonoMous self powered miniAturized iNtelligent sensor for environmental sensing and asset tracking in smArt IoT environments	19-01-01	21-12-31
824957	BeforeHand	ICT-07-2018	Boosting Performance of Phase Change Devices by Hetero- and Nano-Structure Material Design	19-01-01	21-12-31
824962	Car2TERA	ICT-07-2018	Terahertz sensors and networks for next generation smart automotive electronic systems	19-01-01	22-03-31
825549	ELSAH	ICT-07-2018	Electronic smart patch system for wireless monitoring of molecular biomarkers for healthcare and well-being	19-01-01	22-12-31
825521	i-GRAPE	ICT-07-2018	Integrated, Low-Cost and Stand-Alone Micro-Optical System for Grape Maturation and Vine Hydric Stress Monitoring	18-12-01	21-11-30
825430	NANOSMART	ICT-07-2018	NANO components for electronic SMART wireless systems	19-01-01	21-12-31
825121	NEXTS	ICT-07-2018	Next Europractice eXtended Technologies and Services: "The access point for the future generation of electronic components and systems"	19-01-01	21-12-31
825325	SARMENTI	ICT-07-2018	Smart multisensor embedded and secure system for soil nutrient and gaseous emission monitoring	19-01-01	21-12-31
824946	SiMBiT	ICT-07-2018	Single molecule bio-electronic smart system array for clinical testing	19-01-01	22-06-30
825114	SmartVista	ICT-07-2018	Smart Autonomous Multi Modal Sensors for Vital Signs Monitoring	19-01-01	21-12-31
825272	ULISSES	ICT-07-2018	Ultra low-power integrated optical sensor systems for networked environmental multichannel gas Sensing	19-01-01	22-12-31
825572	WELMO	ICT-07-2018	Wearable Electronics for Effective Lung Monitoring	19-01-01	22-06-30
780938	ChildRescue	ICT-11-2017	ChildRescue - Collective Awareness Platform for Missing Children Investigation and Rescue	18-01-01	20-12-31
780783	Families_Share	ICT-11-2017	Socializing and sharing time for work/ life balance through digital and social innovation	18-01-01	20-10-31
780890	GrassrootWavelengths	ICT-11-2017	Grassroot Wavelengths: Highly Networked Grassroots Community Radio through a scalable digital platform	18-01-01	20-12-31

ID	Acronym	Topics	Title	Start Date	End Date
780298	Made4You	ICT-11-2017	Open and Inclusive Healthcare for Citizens Based on Digital Fabrication	18-01-01	20-12-31
780262	SHARE4RARE	ICT-11-2017	Social media platform dedicated to rare diseases, using collective intelligence for the generation of awareness and advanced knowledge on this large group of diseases.	18-01-01	20-12-31
825355	CYBELE	ICT-11-2018-2019	Fostering Precision Agriculture and Livestock Farming Through Secure Access to Large-Scale Hpc-Enabled Virtual Industrial Experimentation Environment Empowering Scalable Big Data Analytics	19-01-01	21-12-31
825111	DeepHealth	ICT-11-2018-2019	Deep-Learning and HPC to Boost Biomedical Applications for Health	19-01-01	21-12-31
825061	EVOLVE	ICT-11-2018-2019	HPC and Cloud-enhanced Testbed for Extracting Value from Diverse Data at Large Scale	18-12-01	21-11-30
856632	INFINITECH	ICT-11-2018-2019	Tailored IoT & BigData Sandboxes and Testbeds for Smart, Autonomous and Personalized Services in the European Finance and Insurance Services Ecosystem	19-10-01	22-12-31
857191	IoTwins	ICT-11-2018-2019	Distributed Digital Twins for industrial SMEs: a big-data platform	19-09-01	22-08-31
825532	LEXIS	ICT-11-2018-2019	Large-scale EXecution for Industry & Society	19-01-01	21-06-30
825184	CloudButton	ICT-12-2018-2020	Serverless Data Analytics Platform	19-01-01	21-12-31
825473	ELASTIC	ICT-12-2018-2020	A Software Architecture for Extreme-Scale Big-Data AnalyticS in Fog Computing Ecosystems	18-12-01	21-11-30
825292	EXA MODE	ICT-12-2018-2020	EXtreme-scale Analytics via Multimodal Ontology Discovery & Enhancement	19-01-01	22-12-31
825258	ExtremeEarth	ICT-12-2018-2020	From Copernicus Big Data to Extreme Earth Analytics	19-01-01	21-12-31
825070	INFORE	ICT-12-2018-2020	Interactive Extreme-Scale Analytics and Forecasting	19-01-01	21-12-31
825041	SmartDataLake	ICT-12-2018-2020	Sustainable Data Lakes for Extreme-Scale Analytics	19-01-01	21-12-31
732638	Fed4FIREplus	ICT-13-2016	Federation for FIRE Plus	17-01-01	21-12-31
825014	Data Market Services	ICT-13-2018-2019	Supporting the European data market providing free support services to data-centric SMEs and start-ups	19-01-01	21-12-31
825333	MOSAICrOWN	ICT-13-2018-2019	Multi-Owner data Sharing for Analytics and Integration respecting Confidentiality and Owner control	19-01-01	21-12-31
824988	MUSKETEER	ICT-13-2018-2019	Machine learning to augment shared knowledge in federated privacy-preserving scenarios	18-12-01	21-11-30
825225	Safe-DEED	ICT-13-2018-2019	Safe Data Enabled Economic Development	18-12-01	21-11-30

ID	Acronym	Topics	Title	Start Date	End Date
779780	BodyPass	ICT-14-2016-2017	API-ecosystem for cross-sectorial exchange of 3D personal data	18-01-01	20-12-31
780167	Cross-CPP	ICT-14-2016-2017	Ecosystem for Services based on integrated Cross-sectorial Data Streams from multiple Cyber Physical Products and Open Data Sources	17-12-01	20-11-30
779790	EDI	ICT-14-2016-2017	European Data Incubator	18-01-01	21-06-30
780355	FANDANGO	ICT-14-2016-2017	FAke News discovery and propagation from big Data ANalysis and artificial intelliGence Operations	18-01-01	20-12-31
780792	ICARUS	ICT-14-2016-2017	Aviation-driven Data Value Chain for Diversified Global and Local Operations	18-01-01	20-12-31
780602	Lynx	ICT-14-2016-2017	Building the Legal Knowledge Graph for Smart Compliance Services in Multilingual Europe	17-12-01	20-11-30
780247	TheyBuyForYou	ICT-14-2016-2017	Enabling procurement data value chains for economic development, demand management, competitive markets and vendor intelligence	18-01-01	20-12-31
731932	TT	ICT-15-2016	Transforming Transport	17-01-01	19-07-31
780495	BigMedilytics	ICT-15-2016-2017	Big Data for Medical Analytics	18-01-01	21-02-28
780732	BOOST 4.0	ICT-15-2016-2017	Big Data Value Spaces for COmpetitiveness of European COnnected Smart FacTories 4.0	18-01-01	20-12-31
780751	BigDataGrapes	ICT-16-2017	Big Data to Enable Global Disruption of the Grapevine-powered Industries	18-01-01	20-12-31
779747	BigDataStack	ICT-16-2017	High-performance data-centric stack for big data applications and operations	18-01-01	20-12-31
780622	CLASS	ICT-16-2017	Edge and CCloud Computation: A Highly Distributed Software Architecture for Big Data AnalyticS	18-01-01	20-12-31
780245	E2DATA	ICT-16-2017	European Extreme Performing Big Data Stacks	18-01-01	20-12-31
780787	I-BiDaaS	ICT-16-2017	Industrial-Driven Big Data as a Self-Service Solution	18-01-01	20-12-31
780251	TYPHON	ICT-16-2017	Polyglot and Hybrid Persistence Architectures for Big Data Analytics	18-01-01	20-12-31
824231	DECODER	ICT-16-2018	DEveloper COmpanion for Documented and annotatEd code Reference	19-01-01	21-12-31
825328	FASTEN	ICT-16-2018	Fine-Grained Analysis of Software Ecosystems as Networks	19-01-01	21-12-31
825040	RADON	ICT-16-2018	Rational decomposition and orchestration for serverless computing	19-01-01	21-06-30
825307	ReachOut	ICT-16-2018	The Beta Testing Campaign Platform for Research Projects	19-01-01	21-12-31
825480	SODALITE	ICT-16-2018	Software Defined Application Infrastructures management and Engineering	19-02-01	22-01-31
825377	UNICORE	ICT-16-2018	A Common Code Base and Toolkit for Deployment of Applications to Secure and Reliable Virtual Execution Environments	19-01-01	21-12-31
732630	BDVe	ICT-17-2016-2017	Big Data Value ecosystem	17-01-01	20-12-31

ID	Acronym	Topics	Title	Start Date	End Date
780966	DataBench	ICT-17-2016-2017	Evidence Based Big Data Benchmarking to Improve Business Performance	18-01-01	20-12-31
815074	5G EVE	ICT-17-2018	5G European Validation platform for Extensive trials	18-07-01	21-06-30
815178	5GENESIS	ICT-17-2018	5th Generation End-to-end Network, Experimentation, System Integration, and Showcasing	18-07-01	21-06-30
815279	5G-VINNI	ICT-17-2018	5G Verticals INNOvation Infrastructure	18-07-01	21-06-30
825012	5G-CARMEN	ICT-18-2018	5G for Connected and Automated Road Mobility in the European Union	18-11-01	21-10-31
825050	5GCroCo	ICT-18-2018	Fifth Generation Cross-Border Control	18-11-01	21-10-31
825496	5G-MOBIX	ICT-18-2018	5G for cooperative & connected automated MOBility on X-border corridors	18-11-01	21-10-31
762128	COMPACT	ICT-19-2017	COMPACT: FROM RESEARCH TO POLICY THROUGH RAISING AWARENESS OF THE STATE OF THE ART ON SOCIAL MEDIA AND CONVERGENCE	17-10-01	20-09-30
761934	Hyper360	ICT-19-2017	Enriching 360 media with 3D storytelling and personalisation elements	17-10-01	20-09-30
762111	VRTogether	ICT-19-2017	An end-to-end system for the production and delivery of photorealistic social immersive virtual reality experiences	17-10-01	20-09-30
857031	5G!Drones	ICT-19-2019	Unmanned Aerial Vehicle Vertical Applications' Trials Leveraging Advanced 5G Facilities	19-06-01	22-05-31
857034	5G-HEART	ICT-19-2019	5G HEalth AquacultuRe and Transport validation trials	19-06-01	22-05-31
856709	5GROWTH	ICT-19-2019	5G-enabled Growth in Vertical Industries	19-06-01	21-11-30
857008	5G-SMART	ICT-19-2019	5G for Smart Manufacturing	19-06-01	21-11-30
856691	5G-SOLUTIONS	ICT-19-2019	5G Solutions for European Citizens	19-06-01	22-05-31
856950	5G-TOURS	ICT-19-2019	SmarT mOBility, media and e-health for toURists and citizenS	19-06-01	22-05-31
857201	5G-VICTORI	ICT-19-2019	Vertical demos over Common large-scale field Trials fOr Rail, energy and media Industries	19-06-01	22-05-31
856641	EuConNeCts4	ICT-19-2019	European Conferences on Networks and Communications (EuCNC)	19-06-01	21-11-30
856777	Full5G	ICT-19-2019	Fulfilling the 5G Promise	19-09-01	21-08-31
780612	FotoInMotion	ICT-20-2017	Repurposing and enriching images for immersive storytelling through smart digital tools	18-01-01	20-12-31
780069	MeMAD	ICT-20-2017	Methods for Managing Audiovisual Data: Combining Automatic Efficiency with Human Accuracy	18-01-01	20-12-31
780656	ReTV	ICT-20-2017	Enhancing and Re-Purposing TV Content for Trans-Vector Engagement	18-01-01	20-12-31
780470	SAUCE	ICT-20-2017	Smart Asset re-Use in Creative Environments	18-01-01	20-12-31
779962	V4Design	ICT-20-2017	Visual and textual content re-purposing FOR (4) architecture, Design and video virtual reality games	18-01-01	20-12-31
824994	EMPOWER	ICT-21-2018	EMpowering transatlantic PlatfOrms for advanced WirEless Research	18-11-01	21-10-31
731724	iRead	ICT-22-2016	Infrastructure and integrated tools for personalized learning of reading skill	17-01-01	20-12-31

ID	Acronym	Topics	Title	Start Date	End Date
814956	5G-DRIVE	ICT-22-2018	5G Harmonised Research and Trials for service Evolution between EU and China	18-09-01	21-02-28
779982	EXTEND	ICT-23-2017	Bidirectional Hyper-Connected Neural System	18-01-01	21-12-31
780819	INSENSION	ICT-23-2017	Personalized intelligent platform enabling interaction with digital services to individuals with profound and multiple learning disabilities	18-01-01	20-12-31
780814	SUITCEYES	ICT-23-2017	Smart, User-friendly, Interactive, Tactual, Cognition-Enhancer that Yields Extended Sensosphere - Appropriating sensor technologies, machine learning, gamification and smart haptic interfaces	18-01-01	20-12-31
780206	WADcher	ICT-23-2017	Web Accessibility Directive Decision Support Environment	18-01-01	20-12-31
780057	WAI-Tools	ICT-23-2017	Advanced Decision Support Tools for Scalable Web Accessibility Assessments	17-11-01	20-10-31
861459	5G CONNI	ICT-23-2019	Private 5G Networks for Connected Industries	19-10-01	22-09-30
859881	5G-DIVE	ICT-23-2019	5G-DIVE: eDge Intelligence for Vertical Experimentation	19-10-01	21-09-30
825268	LEDGER	ICT-24-2018-2019	decentralized Data Governance for next generation internet	18-11-01	21-06-30
825652	NGI FORWARD	ICT-24-2018-2019	NGI FORWARD	19-01-01	21-12-31
825618	NGI_TRUST	ICT-24-2018-2019	Partnership for innovative technological solutions to ensure privacy and enhance trust for the human-centric Internet	18-12-01	21-11-30
825322	NGI0-Discovery	ICT-24-2018-2019	NGI Zero Discovery	18-11-01	21-10-31
825310	NGI0-PET	ICT-24-2018-2019	NGI Zero - Privacy Enhancing Technologies	18-11-01	21-10-31
825354	NGI4ALL	ICT-24-2018-2019	Next Generation Internet for All - Promoting Global Visibility on the Human-Centric Internet	19-01-01	21-12-31
825147	TETRA	ICT-24-2018-2019	Technology harvest & transfer for an Open Internet initiative	19-05-01	22-04-30
780960	AirBorne	ICT-25-2016-2017	Aerial Robotic technologies for professional search and rescue	18-01-01	20-12-31
731540	An.Dy	ICT-25-2016-2017	Advancing Anticipatory Behaviors in Dyadic Human-Robot Collaboration	17-01-01	20-12-31
779942	CROWDBOT	ICT-25-2016-2017	Safe Robot Navigation in Dense Crowds	18-01-01	21-06-30
731931	CYBERLEGS Plus Plus	ICT-25-2016-2017	The CYBERnetic LowEr-Limb CoGnitive Ortho-prosthesis Plus Plus	17-01-01	20-12-31
779411	HYFLIERS	ICT-25-2016-2017	HYbrid FLYing-rolling with-snake-arm robot for contact inspection	18-01-01	21-12-31
780684	MEMMO	ICT-25-2016-2017	Memory of Motion	18-01-01	21-12-31

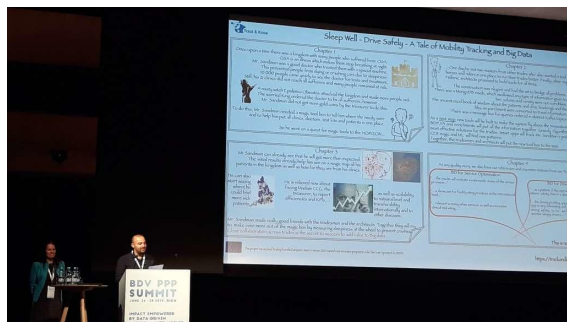
ID	Acronym	Topics	Title	Start Date	End Date
780785	micro-ROS	ICT-25-2016-2017	micro-ROS: Platform for seamless integration of resource constrained devices in the robot ecosystem	18-01-01	20-12-31
780871	MyLeg	ICT-25-2016-2017	Smart and intuitive osseointegrated transfemoral prostheses embodying advanced dynamic behaviors	18-01-01	21-12-31
780488	PICKPLACE	ICT-25-2016-2017	Flexible, safe and dependable robotic part handling in industrial environments	18-01-01	20-12-31
779776	ROBINS	ICT-25-2016-2017	Robotics Technology for Inspection of Ships	18-01-01	20-12-31
780662	SheaRIOS	ICT-25-2016-2017	Wind Turbine Shearography Robotic Inspection On-blade System (SheaRIOS)	18-01-01	20-12-31
779431	SPIRIT	ICT-25-2016-2017	A software framework for the efficient setup of industrial inspection robots	18-01-01	21-02-28
856533	ARETE	ICT-25-2018-2020	Augmented Reality Interactive Educational System	19-11-01	22-10-31
856994	ARtwin	ICT-25-2018-2020	An AR cloud and digital twins' solution for industry and construction 4.0	19-10-01	22-09-30
856716	iv4XR	ICT-25-2018-2020	Intelligent Verification/Validation for Extended Reality Based Systems	19-10-01	22-09-30
856879	PRESENT	ICT-25-2018-2020	Photoreal REaltime Sentient ENTity	19-09-01	22-08-31
856998	PRIME-VR2	ICT-25-2018-2020	Personalised Recovery Through A Multi-User Environment: Virtual Reality For Rehabilitation	19-10-01	22-09-30
856718	TACTILITY	ICT-25-2018-2020	TACTile feedback enriched virtual interaction through virtual reality and beyond	19-07-01	22-06-30
825545	XR4ALL	ICT-25-2018-2020	eXtended Reality for All	18-12-01	21-05-31
732737	ILIAD	ICT-26-2016	Intra-Logistics with Integrated Automatic Deployment: safe and scalable fleets in shared spaces	17-01-01	20-12-31
731761	IMAGINE	ICT-26-2016	Robots Understanding Their Actions by Imagining Their Effects	17-01-01	21-02-28
732410	RobMoSys	ICT-26-2016	Composable Models and Software for Robotics Systems	17-01-01	20-12-31
732287	ROSIN	ICT-26-2016	ROS-Industrial quality-assured robot software components	17-01-01	20-12-31
825619	AI4EU	ICT-26-2018-2020	A European AI On Demand Platform and Ecosystem	19-01-01	21-12-31
688735	PhotonicSensing	ICT-27-2015	Photonics based sensing	16-09-01	21-08-31
779966	COVR	ICT-27-2017	Being safe around collaborative and versatile robots in shared spaces	18-01-01	21-12-31
780265	ESMERA	ICT-27-2017	European SMEs Robotics Applications	18-01-01	22-02-28

ID	Acronym	Topics	Title	Start Date	End Date
779963	EUROBENCH	ICT-27-2017	EUropean ROBotic framework for bipedal locomotion bENCHmarking	18-01-01	21-12-31
780371	FABULOS	ICT-27-2017	Pre-Commercial Procurement of Future autonomous bus urban level Operation Systems	18-01-01	20-12-31
779967	RobotUnion	ICT-27-2017	Stimulate ScaleUps to develop novel and challenging TEchnology and systems applicable to new Markets for ROBotic soLUTIONs	18-01-01	20-12-31
779813	SARAS	ICT-27-2017	Smart Autonomous Robotic Assistant Surgeon	18-01-01	20-12-31
780883	THING	ICT-27-2017	subTerranean Haptic INvestiGator	18-01-01	21-03-31
825082	NGIoT	ICT-27-2018-2020	Next Generation Internet of Things	18-11-01	21-10-31
687866	INNODERM	ICT-28-2015	Innovative Dermatology Healthcare based on Label-Free Spectral Optoacoustic Mesoscopy	16-03-01	21-02-28
780073	INBOTS	ICT-28-2017	Inclusive Robotics for a better Society (INBOTS)	18-01-01	20-12-31
780086	SciRoc	ICT-28-2017	European Robotics League plus Smart Cities Robot Competitions	18-02-01	22-01-31
825134	ARTICONF	ICT-28-2018	smART social media eCOsyststem in a blockchaiN Federated environment	19-01-01	21-12-31
825171	EUNOMIA	ICT-28-2018	User-oriented, secure, trustful & decentralised social media	18-12-01	21-11-30
825585	HELIOS	ICT-28-2018	HELIOS: A Context-aware Distributed Social Networking Framework	19-01-01	21-12-31
825227	PROVENANCE	ICT-28-2018	Providing Verification Assistance for New Content	18-12-01	21-11-30
825477	SocialTruth	ICT-28-2018	Open Distributed Digital Content Verification for Hyper-connected Sociality	18-12-01	21-11-30
825469	SOMA	ICT-28-2018	Social Observatory for Disinformation and Social Media Analysis	18-11-01	21-04-30
825297	WeVerify	ICT-28-2018	WIDER AND ENHANCED VERIFICATION FOR YOU	18-12-01	21-11-30
732720	ESOTRAC	ICT-29-2016	Hybrid optical and optoacoustic endoscope for esophageal tracking.	17-01-01	20-12-31
732969	MOON	ICT-29-2016	Multi-modal Optical Diagnostics for Ocular and Neurodegenerative Disease	16-11-01	20-10-31
732411	PAMMOTH	ICT-29-2016	Photoacoustic/Ultrasound Mammoscopy for evaluating screening-detected abnormalities in the breast	17-01-01	20-12-31
731954	PIXAPP	ICT-29-2016	Photonic Integrated Circuits Assembly and Packaging Pilot Line	17-01-01	20-12-31
731877	SOLUS	ICT-29-2016	Smart optical and ultrasound diagnostics of breast cancer	16-11-01	21-04-30
825303	Bergamot	ICT-29-2018	Browser-based Multilingual Translation	19-01-01	21-12-31
825081	COMPRISE	ICT-29-2018	Cost-effective, Multilingual, Privacy-driven voice-enabled Services	18-12-01	21-11-30
825627	ELG	ICT-29-2018	European Language Grid	19-01-01	21-12-31
825460	ELITR	ICT-29-2018	European Live Translator	19-01-01	21-12-31
825153	EMBEDDIA	ICT-29-2018	Cross-Lingual Embeddings for Less-Represented Languages in European News Media	19-01-01	21-12-31
825299	GoURMET	ICT-29-2018	Global Under-Resourced MEedia Translation	19-01-01	21-12-31
825182	Pret-a-LLOD	ICT-29-2018	Ready-to-use Multilingual Linked Language Data for Knowledge Services across Sectors	19-01-01	21-12-31

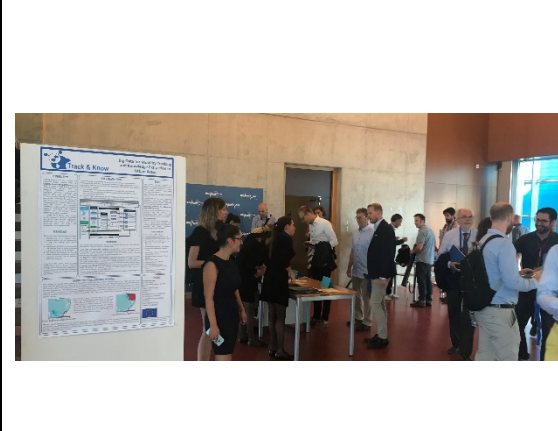
ID	Acronym	Topics	Title	Start Date	End Date
780502	3PEAT	ICT-30-2017	3D Photonic integration platform based on multilayer PolyBoard and TriPleX technology for optical switching and remote sensing and ranging applications	18-01-01	20-12-31
779472	ACTPHAST 4.0	ICT-30-2017	ACceleraTing PHotonics innovAtion for SME's: a one STop-shop-incubator	17-11-01	21-10-31
779960	IMCUSTOMEY E	ICT-30-2017	IMaging-based CUSTOMised EYE diagnostics	18-01-01	21-12-31
780989	MERLIN	ICT-30-2017	Multi-modal, multi-scale retinal imaging	17-12-01	20-11-30
779373	MiLEDI	ICT-30-2017	Micro Quantum Dot-Light Emitting Diode and Organic Light Emitting Diode Direct Patterning (MILEDI)	18-01-01	21-06-30
780598	MIRACLE	ICT-30-2017	Mid-infrared arthroscopy innovative imaging system for real-time clinical in-depth examination and diagnosis of degenerative joint diseases	18-01-01	21-06-30
780537	MOICANA	ICT-30-2017	Monolithic cointegration of QD-based InP on SiN as a versatile platform for the demonstration of high performance and low-cost PIC transmitters	18-01-01	20-12-31
780839	MOLOKO	ICT-30-2017	Multiplex phOtonic sensor for pLasmonic-based Online detection of contaminants in milk	18-01-01	21-06-30
780283	MORPHIC	ICT-30-2017	Mems-based zero-power Reconfigurable PHotonic ICs	18-01-01	21-06-30
780026	NEXIS	ICT-30-2017	Next generation X-ray imaging system	18-01-01	20-12-31
779664	NextPho21	ICT-30-2017	Developing and implementing the Next European Photonics21 industrial PPP Strategy	18-01-01	20-12-31
780326	PASSION	ICT-30-2017	Photonic technologies for progrAmmable transmission and switching modular systems based on Scalable Spectrum/space aggregation for future agile high capacity metro Networks	17-12-01	20-11-30
780278	PHENOMENO N	ICT-30-2017	Laser Manufacturing of 3D nanostructured optics using Advanced Photochemistry	18-01-01	20-12-31
780930	PICTURE	ICT-30-2017	High Performance and High Yield Heterogeneous III-V/Si Photonic Integrated Circuits using a Thin and Uniform Bonding Layer	18-01-01	20-12-31
780997	plaCMOS	ICT-30-2017	Wafer-scale, CMOS integration of photonics, plasmonics and electronics devices for mass manufacturing 200Gb/s non-return-to-zero (NRZ) transceivers towards low-cost Terabit connectivity in Data Centers	17-12-01	20-11-30
780354	QAMeleon	ICT-30-2017	Sliceable multi-QAM format SDN-powered transponders and ROADMs Enabling Elastic Optical Networks	18-01-01	21-12-31
780240	REDFINCH	ICT-30-2017	mid infraREd Fully Integrated CHEmical sensors	17-12-01	21-05-31
780548	3D-MUSE	ICT-31-2017	3D Multi-Process Sequential Integration for Smart Sensor Interfaces	18-01-01	21-12-31
780302	3eFERRO	ICT-31-2017	Energy Efficient Embedded Non-volatile Memory Logic based on Ferroelectric f (Zr)O ₂	18-01-01	21-06-30
780848	Fun-COMP	ICT-31-2017	Functionally scaled computing technology: From novel devices to non-von Neumann architectures and algorithms for a connected intelligent world	18-03-01	22-02-28
780832	INLINETEST	ICT-31-2017	In-line quality inspection system for smart production of micro and nanoelectronic components	18-01-01	20-12-31

ID	Acronym	Topics	Title	Start Date	End Date
780215	MNEMOSENE	ICT-31-2017	Computation-in-memory architecture based on resistive devices	18-01-01	20-12-31
779786	SALADIN	ICT-31-2017	Superb Atomic LAYer Deposition tool for the semiconductor INdustry	17-11-01	20-10-31
779305	SERENA	ICT-31-2017	gan-on-Silicon Efficient mm-wave euROpean systEm iNtegration plAtform	18-01-01	20-12-31
825183	NGI Godfathers Prog.	ICT-31-2018- 2019	Next Generation Internet Godfathers Programme	19-01-01	21-12-31
825189	Think NEXUS	ICT-31-2018- 2019	Think tank for the collaboration on NEXt generation internet between EU-US	18-11-01	21-04-30
825079	MindSpaces	ICT-32-2018	MindSpaces - Art-driven adaptive outdoors and indoors design	19-01-01	21-12-31
825647	REFREAM	ICT-32-2018	Re-Thinking of Fashion in Research and Artist collaborating development for Urban Manufacturing	18-12-01	21-11-30
824950	STARTS Ecosystem	ICT-32-2018	Support to STARTS Community and Lighthouse Projects through the creation of an ecosystem for hybrid talent	19-04-01	21-11-30
780192	Procure2Innov ate	ICT-33-2017	procure2innovate: European network of competence centres for innovation procurement	18-01-01	21-12-31
731996	SMART.MET	ICT-34-2016	PCP for Water Smart Metering	17-01-01	21-06-30
824516	ARCHIVER	ICT-34-2018- 2019	Archiving and Preservation for Research Environments	19-01-01	21-12-31
825215	FIN-TECH	ICT-35-2018	A FINancial supervision and TECHnology compliance training programme	19-01-01	20-12-31
688878	ANTI- SUPERBUGS	ICT-36-2015	ANTI-SUPERBUG Precommercial procurement	16-09-01	21-08-31
732019	STARTS Prize	ICT-36-2016	STARTS Prize - Grand prize of the European Commission honoring innovation in technology, industry and society stimulated by the arts	17-01-01	20-12-31
780435	EPICA	ICT-39-2016- 2017	EPICA - Strategic partnership for the co-design of an innovative and scalable eportfolio ecosystem to improve the quality and visibility of skills	18-01-01	20-12-31
780118	FANFAR	ICT-39-2016- 2017	Reinforced cooperation to provide operational flood forecasting and alerts in West Africa	18-01-01	20-12-31
781012	GO-GA	ICT-39-2016- 2017	Go-Lab Goes Africa, Deploying Contextually Engaging Digital Science, Technology, Engineering and Mathematics Educative Content in Africa by Adapting the Proven Go-Lab Ecosystem to Local Needs	18-01-01	20-12-31
779793	ISOOKO	ICT-39-2016- 2017	A community platform for building peace through information-driven dialogue	18-01-01	20-12-31
780755	SAMS	ICT-39-2016- 2017	SAMS - International Partnership on Innovation in Smart Apiculture Management Services (Apiculture = Beekeeping)	18-01-01	20-12-31
780229	WAZIHUB	ICT-39-2016- 2017	Accelerating Open IoT and Big Data Innovation in Africa	18-05-01	21-04-30

8 Annex 4: Images from events



Dr. Angelos Liapis (Konnekt-able Technologies Ltd) presenting TRACK&KNOW at the BDV PPP Meetup
26th to 28th June 2019 at the Latvian National Library, Riga, Latvia.



Jenny Rainbird (Inlecom) presenting TRACK&KNOW at the BigMedilytics, Big Data: Fueling the transformation of Europe's Healthcare Sector event
4th and 5th September 2019 at the Ciudad Politécnica de la Innovación, Valencia, Spain.



Presentations from the BDVA Activity Group workshop, Ioanna Fergadiotou (Inlecom) participating
11th and 12th December in QED – 30 Rue de Spa. 1000 Brussels

9 Annex 5: EBDVA report



BigDataStack
Holistic stack for big data applications and operations

i-BiDaaS
Industrial-Driven Big Data as a Self-Service Solution

Track & Know

European Big Data Research for Industry

3 Projects
7 Sectors
9 Applications
41 Software components

Now what?

EUROPEAN
BIG DATA
VALUE FORUM



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No 780754.

Introduction

On Tuesday November 3rd, 2020, within the framework of the European Big Data Value Forum, Big Data EU H2020 research projects I-BiDaaS (Industrial-Driven Big Data as a Self-Service Solution), BigDataStack (High performance data-centric stack for Big Data applications and operations) and Track & Know (Big Data for Mobility Tracking Knowledge Extraction in Urban Areas) hosted a joint session.

The collaboration between the three EU projects was initiated in the beginning of 2020, when during the BDV PPP Summit 2020, they decided to join forces in a series of 9 online demonstrations of innovative Big Data Technologies in the pilot studies and their applicability to an ever wider scope contributing to Europe's digital future: the Big Data Pilot Demo Days.

After 3 years of research and innovation, I-BiDaaS, Track & Know and BigDataStack joined forces again in the expert-led discussion on the impact and uptake of Big Data research results. The purpose of the discussion was to (i) Identify shared barriers to adoption of Big Data research in different sectors, and mechanisms to overcome them, (ii) map the current and future impact and sustainability of their Big Data research, (iii) share best practices on the concrete business questions that have been answered in the project pilots.

This joint report aims to summarise the key findings derived from the session with recommendations on **European Big Data Research for Industry.**

3 projects.
7 sectors.
9 applications.
41 software components.

Now what?



EUROPEAN
**BIG DATA
 VALUE**
 FORUM

**BERLIN + VIRTUAL
 3-5 NOVEMBER 2020**

Who joined BigDataStack, I-BiDaaS and Track & Know in the discussion?

In total, 117 attendees from more than 14 countries attended the session (see figure 1), a number that significantly increased the visibility of the projects.

EBDVF 2020 - Parallel session on European Big Data Research for Industry, 3 projects, 7 sectors, 9 applications, 41 software components. Now what?

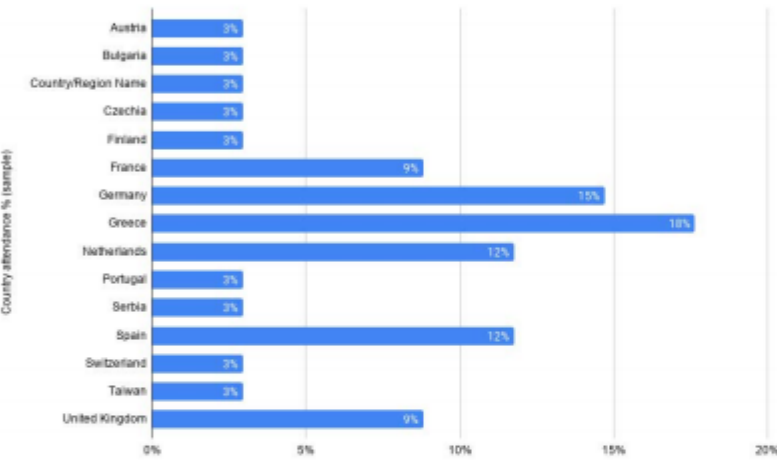


Figure 1: Geographical Spread

Fostering engagement, the attendees were asked a few questions in order to understand their background and interests. From the responses received, the majority of the attendees were from Research and Academia (62%), followed by Big Data Technology providers (23%) as shown in figure 2. An overwhelming 92% worked with Big Data and 85% were interested in Big Data technologies to improve their customer experiences, the main barrier to achieve this was considered the lack of skills (54%) as shown in figure 3.

To which of our stakeholder type do you belong?

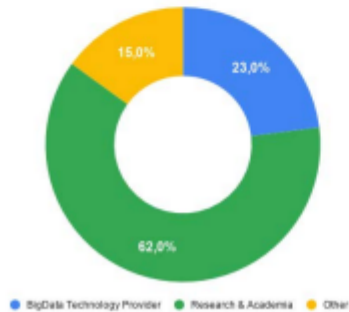


Figure 2: To which of our stakeholder types do you belong?

What is the main barrier or risk preventing you from implementing BigData analytical solutions in your organisation?

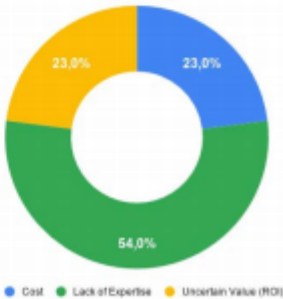


Figure 3: What is the main barrier or risk preventing you from implementing Big Data Analytical solutions in your organisation?

European Big Data Research for Industry. 3 Projects, 7 Sectors, 9 Applications, 41 Software components. Now what?

BigDataStack, I-BiDaaS and Track & Know developed three aligned infographics, showcasing the main results ready for further adoption. The infographics were shown during the session and highlighted here below.



BigDataStack is a unique high-powered stack of solutions with a focus on providing fully efficient and optimised processes across the complete set of technologies required by data operations and data-intensive applications.

Check out Website & Social

- www.bigdatastack.eu
- [@BigDataStackEU](https://twitter.com/BigDataStackEU)
- [company/bigdatastack](https://company.bigdatastack.com)
- [ZENODO Search: bigdatastack](https://zenodo.org/search?q=bigdatastack)

This project has received funding from the European Union's Horizon 2020 Research and Innovation program under grant agreement No 779747.



I-BiDaaS aims to empower IT and non-IT big data experts to easily utilize and interact with big data technologies.

Check out Website & Social

- www.ibidaas.eu
- twitter.com/ibidaas
- linkedin.com/in/i-bidaas
- zenodo.org/communities/i-bidaas

This project has received funding from the European Union's Horizon 2020 Research and Innovation program under grant agreement No 780787.



Track & Know - Big Data for Mobility Tracking Knowledge Extraction in Urban Areas - researches, develops and exploits a new software framework that aims at increasing the efficiency of Big Data.

Check out Website & Social

- www.trackandknowproject.eu
- [TrackandKnow](https://TrackandKnow.com)
- @TrackandKnow
- linkedin.com/groups/12122105

This project has received funding from the European Union's Horizon 2020 Research and Innovation program under grant agreement No 780754.



About the Speakers



Dr Toni Staykova

Dr Toni Staykova is a specialist physician and geriatrician who has been actively involved in clinical innovation projects in Cambridge and across the EU over the past 10 years. She is passionate about improving health care provision across the globe in an innovative way. Toni Staykova is the Vice President of Cambridge Medical Academy, which delivers the prestigious UKeMED international knowledge sharing program. She leads the knowledge & experience sharing activities between health care professionals to improve patient care, bridging the gaps between nations and cultures. Toni's ambition is to harness the collective intelligence of our collaboration partners to foster clinical innovation and to impact on global health.



Alon Rozen

Alon Rozen is the Dean of Ecole des Ponts Business School and Associate Professor of Innovation and Entrepreneurship. His research interest includes business modelling, circular economy, social impact and social entrepreneurship, as well as the impact that technology has on the (business) world around us. Actively developing, practising and applying his own dynamic business modelling framework and value proposition tools to help start-ups and innovation efforts at all levels.



Richard McCreadie

Richard McCreadie is a Lecturer in Information Retrieval and Data Systems at the University of Glasgow, UK. His core research topics include real-time information retrieval, machine learning, big data stream processing and evaluation methodologies over streaming data.

How are we contributing to the European Big Data Ecosystem?



Alon Rozen

I-BiDaaS as an actor and enabler of an EU big data ecosystem:

The I-BiDaaS project is in itself contributing to the ecosystem as it is both an enabler, a component, and a catalyst while looking for a solution to enlarge the ecosystem. I-BiDaaS has 13 different partners from small, medium and large companies, multinationals, several institutions of higher learning, different kind of forms of academia, universities, business schools from eight different countries and even more nationalities. This ecosystem is part of a broader ecosystem, like the three projects that collaborated and organized this session, is already another part of the ecosystem. It's also helping to bring the ecosystem closer together. Even further, it's a catalyst for developing the ecosystem as what we're trying to do is bring in more companies and organizations into this EU data ecosystem by doing the capacity building. It feels like we're both acting and enabling, and we're trying to do this with an agile lean, and a bottom-up approach, which is more European in style than anything else.

I-BiDaaS as an Actor and enabler of EU big data innovations:

In terms of enabling big data innovations, which is a key outcome of the I-BiDaaS project, we have developed 11 software components, five of which are open source. We have developed 10 European use cases across three different sectors - finance, telecom and manufacturing. Five innovations that were deemed mature by the EU Innovation Radar. Creating this much innovation despite having so many partners, time zones, nationalities, and accents in English to manage, required a lean innovation approach. I'm proud to say that we adopted a rapid prototyping approach and framework, which is called dynamic business modelling. During our workshops, we collapsed customer product and business model development into a one rapid prototyping phase. It's different from the usual business model canvases and helped us to ideate multiple

innovations rapidly. It allowed us to use lean and agile principles to identify which were the most promising. The fact that five were identified as mature was a testimony to the ability of the consortium to act in a lean innovation manner.

One exciting challenge to helping an EU Big Data ecosystem emerge came up in the project - how do you get around restrictions in data sharing and data availability? We have partners from the banking sector, so compliance issues, KYC issues and GPRD, so we initially only used synthetic data. We quickly discovered that this had too many practical limitations. The solution that the consortium found early in the project that removed this significant barrier was to move from synthetic to either encrypted or anonymized data, which allowed everyone to share data effectively and go for example from 1-month delay to a couple of days. And it let everyone to go from sharing only synthetic data to be able to share real anonymized (or encrypted) data. This is a best practice we could apply at the EU level as we advance.

I-BiDaaS as an Actor and enabler of democratization of Big Data solutions to EU SMEs:

Two innovations were deemed business ready by the EU Innovation Radar, and one as market-ready, which is the Holy grail in the EU innovation radar system. The key to ecosystem expansion is moving data beyond the scope of Fortune 1000 companies and giving much broader access to SMEs. MuSES developed by Qbeast, a spinoff of the Barcelona Supercomputer Center, is an excellent example of a Big Data cloud platform based on an innovative data storage technology that allows a simple, future-proof architecture and blazing-fast data analytics and thus democratizes big data in the EU. Qbeast is just an example, but several other innovations are moving in that direction too. The entire I-BiDaaS project has this democratization of big data analytics as its mission.

How are we contributing to the European Big Data Ecosystem?



Richard McCreadie

Ease discoverability of services, data and models for commercialization

Before answering how BigDataStack contributes to the European Big Data Ecosystem, I think it is important to highlight where such ecosystems are heading in the near term, to give some context for where BigDataStack and other projects fit.

In general, we are seeing movement towards the consolidation of both **data and software services into centralized marketplaces**, where they can be bought and sold. The core goal is to ease discoverability of services, data and models for commercialization, while simultaneously reducing barriers to entry for using those datasets and services. By doing so, the EU hopes to improve competitiveness of European businesses and more generally obtain the benefits of a data-driven economy.

BigDataStack fits into this wider vision as a supporting technology stack that aims to make it easier for companies to take the services, data and models obtained from such marketplaces or developed in-house and put them into production systems. To illustrate, consider a company, say a grocery retailer, who is opening an online store-front. The business developer decides that they should provide product recommendations for their customers, based on their shopping history. But how might this be achieved?

For companies like this there is both a **technology and knowledge gap** that needs to be overcome, which is not trivial especially for smaller companies that are less likely to have in-house expertise. Such a company might be able to go to a central marketplace and obtain large grocery recommendation datasets and/or services that use deep learning technologies to produce high-quality recommendations. But how do they put these into production? BigDataStack defines a series of processes and supporting technological solutions that the company can use to make the realization of their desired service easier, while also guiding them into producing an efficient and maintainable solution.

BigDataStack is at its core a set of containerized services that aim to simplify or automate as much of the configuration, deployment and management of user-services as possible, focusing particularly on those requiring Big Data and Hyper-Compute capacity within

private clusters or public clouds. While possible to deploy as a single holistic stack or product, BigDataStack is comprised of a range of modular specialized components targeted at particular components of the process. A good way to break these components down is based on what process they target: pre-deployment, initial deployment or post-deployment.

Pre-deployment, business analysts want to map their business goals into services, with the help of application engineers. BigDataStack provides three main services here, process modelling (for defining the business logic), process mapping (that converts this to a service list) and the data toolkit (configures each service). For deployment, BigDataStack builds and extends the Openshift platform, as well as providing an additional management layer (the Realization Engine) to make it easier to manage complex applications. Finally, post deployment, BigDataStack has been developing new automated application management tooling, with the triple monitoring framework, quality of service evaluator, and dynamic orchestrator. These enable automated decision making and alteration of the application deployment at run-time to account for changing environmental factors (like traffic load). These form the core of the BigDataStack offering.

BigDataStack, contributing to open source, supporting open innovation

However, research and development from BigDataStack also supports innovations used outside of BigDataStack itself. For instance, **BigDataStack, already has made open source contributions** to Openshift itself, enabling data storage to be shared across virtualized environments. Meanwhile, underlying data-skipping technologies developed within BigDataStack have been integrated into IBM's object storage service. It is also worth noting that BigDataStack's use-cases have also resulted in some valuable technologies to the European software ecosystem. For instance, as part of development for the grocery-recommendation use-case, a new product recommendation platform has been released as open source, that provides out-of-the-box support for a wide range of state of the art deep learning models for recommending items to users.

How can we apply Big Data in businesses? What barriers did you encounter with the industries in your project?



Dr Toni Staykova

Distinguishing between barriers to implementation and barriers to exploitation

Firstly, it is necessary to distinguish between barriers to implementation and barriers to exploitation. In the Track and Know Healthcare business case the focus has been on gathering novel intelligence regarding our service operations across a geographical area, in addition the goal was to use this intelligence alongside the simulation tools to make decisions regarding service positioning and optimization.

The first barriers to implementation that was encountered is the **gap in understanding between technical and clinical partners**. The clinical partners required some time in order to process and understand the project terminology from the big data technical domain and its application to the business domain.

Technical project partners are very knowledgeable about the State of the Art with regards to ICT however, healthcare ICT is generally less advanced and faces various limitations such as data protection ethical regulations, patient safety concerns, etc. As well as being limited by management decisions for example purchasing decisions for tools.

This was evident at workshop events but through dialogue between healthcare professionals and technical experts through demonstration and discussion strengthened the Healthcare business case and the potential impact.

Requirement to anonymise healthcare data

Another important barrier typically encountered in research involving healthcare is the requirement to anonymise healthcare data. In the Track and Know project early recognition and involvement of the right decision makers enabled access to the correct data without delays and indeed through this engagement Track and Know was able to obtain additional data, which pertained to the second business case relating to driving behavior. This data is being made available to external researchers.

The barrier of the COVID-19 crisis

The third barrier to implementation was the challenge arising from the COVID-19 crisis. This impacted the availability of healthcare professionals to participate in the project over a period of time. It also necessitated the modification of the pilot. This was overcome partly with a shift of pilot validation to available services.

Bridging gaps through communication and collaboration

To summarise the key message gained from experience in conducting the healthcare pilot within Track and Know is that the communication gap between the different domains is the most difficult part to bridge, but through working together this can be reduced and can lead to further and continued implementation of big data technologies once understanding has been achieved.

How can we apply Big Data in businesses? What barriers did you encounter with the industries in your project?



Richard McCreadie

Containers, the future in a box

One of the most important enabling technologies that has made it possible for applications to be shared, bought and sold is the wide-scale adoption of containerized services. As a quick introduction for those unfamiliar, a container is a mechanism via which user-application code along with an associated environment can be packaged together into a single unit. Once a container has been built, it can be run on almost any platform (subject to available resources and if configured correctly). This allows developers to construct reusable application components, as well as enabling the marketplaces I mentioned earlier. The analyst firm Gartner predicts that by 2023, 70% of organizations will be running three or more containerized applications in production.

From our observations from both BigDataStack, and also from the new Flagship Infinitext project which is using containers as the standard for next-generation financial services, containers are the future of big data compute. While there is some initial training needed to get companies up-to-speed with the technology, our end-users were impressed by the ease of use and portability of their applications once containerized. Additionally, containers provide a standardized mechanism for both data services and user application scaling on distributed infrastructures, enabling big data processing at scale to even small companies.

Furthermore, there are a wide range of future benefits that are only just starting to be realized. From a business perspective, as container service marketplaces become more common and widely used, it will become much easier for businesses to access state-of-the-art solutions and deploy them in production using platforms like BigDataStack. Meanwhile, as containerized solutions increasingly implement common standards (e.g. as Infinitext is defining for the financial domain), run-time orchestration as well as roll-out of incremental improvements (such as improved effectiveness or security features) will be automatable, dramatically reducing the cost of maintenance.

Rise of Deep Learning (AI)

The second main new disruptive technology that emerged during BigDataStack and is having a strong impact on Big Data applications is Deep Learning, colloquially known as AI. While there is excessive hype around 'AI' applications, deep learning when paired with Big Data is resulting in better systems than were thought possible only a few years ago. Deep learning is at its core simply a more effective means for a computer to identify and record patterns found when analysing very large datasets. For example, the current state-of-the-art deep learning model for natural language processing tasks (e.g. language translation or question answering) known as GPT-3, was trained on a filtered crawl of the entire Web, in addition to various book corpora and Wikipedia, comprising half a trillion words. This is the next frontier for Big Data, as training a single model would take 350 years on a single machine, and cost in excess of 4.5 million U.S. dollars. These types of models have only recently become feasible due to significant advances in cheap GPU compute.

These types of big data application require massive amounts of both data throughput and hyper-compute, and hence are a natural use-case for BigDataStack and containerized infrastructures in general. However, we encountered significant barriers to enabling such applications in BigDataStack. In particular, container-support for GPUs is not currently standardized, and is dependent on custom driver support by individual GPU providers. Furthermore, the space is currently dominated by a single hardware provider (Nvidia), but with a competitor only just emerging (AMD), each using different APIs, leading to software fragmentation. Over the next couple of years I expect the current issues to be resolved, which will enable companies both large and small easier and more efficient access to the new wave of deep learning technologies.

Now What?



Alon Rozen

A little bit of background and context is necessary. I-BiDaaS solution offers three different modes, reflecting the different types of knowledge that a user has.

1. **Self-Service mode** related to users that have some data science and statistic knowledge so they can select a pre-defined algorithm from a pool of algorithms for a given domain problem.
2. **Expert mode** for the big data developers where they can upload their code to the platform.
3. **Co-develop mode for in-house industrial employees that will develop their application with the help of I-BiDaaS team.**

Project-level: one of the key outcomes, in my opinion, is something we are calling the I-BiDaaS Cookbook/ User Guide, which explains how to do big data in both expert and self-service mode, which means that any organization with an IT team in-house could quickly and economically start running I-BiDaaS big data solution effectively. I think this will spread quite a bit across the EU SME landscape and even beyond that, even the larger organizations that don't have the in-house skills that are presently using consultants for that.

Consortium-level: One exciting outcome is that at the end of the project (end of 2020), the consortium will continue to live and work together as an agile ecosystem. The idea is to also share the cookbook with small to big organizations to give companies an idea of what is possible. Then depending on the use case, different members of the consortium will come together to support the customer and tailor the solution to their needs.

The idea is to take the innovations to the market, help them mature, climb the experience and learning curve

by training and upskilling in-house talent. Thus, they can use the cookbook for the I-BiDaaS Self-Service Solution without becoming addicted to consulting or outside IT partners which is more expensive or hard to find talented people in the market with the necessary skills. The approach is both Agile in action and the EU big data ecosystem in practice.

Geopolitics: The last level, which I think is very important, is the geopolitical level. What role is Europe going to be playing in this very key strategic sector in the years to come? I-BiDaaS consortium is building a bottom-up emergent big data ecosystem, a fractal of the bigger EU ecosystem.

If we look at the three projects today (I-BiDaaS, BigDataStack, Track&Know), it is an extra fractal of that as well. Even if the politicians can't quite unite on the subject, it is clear that we are moving to a polarized tech world in which the US and China will try to establish their supremacy. This could be the premises of a truly European approach to establishing things not by dictating but by collaborating on the ground.

For me, I-BiDaaS is a potential future. We have a unique EU approach to establish a robust ecosystem by doing something that is European in its DNA. Showing how formal and informal collaboration across sectors and countries can create powerful synergies with widely distributed benefits instead of narrowly held profits, which seems to be the model until now. It is a value economy approach rather than a winner-take-all approach. I-BiDaaS made me hopeful that this is a possibility, not a utopian dream, but it is actually something that is already happening at this scale.

Now What?



Dr Toni Staykova

Track & Know aimed to develop the tools for commercialisation and were focused on looking for additional funding and related social services that would use the same tool until critical mass could be achieved. The COVID-19 crisis impacted the UK's National Health Service's (NHS) ability to deliver services and which has resulted in a severe backlog of patient appointments. There are few tools to help NHS managers decide how to clear the backlog, or indeed what actions could be taken for example, additional locations of home visits, instead of clinic visits, to reduce these delays.

Towards the end of the Track & Know project (8 Months to project end) Innovate UK launched a funding call for COVID solutions that could address problems related to the crisis. A core group of project partners were able to prepare and submit an application to develop business intelligence and decision support tools extending the Track & Know tools for patient referral allocation specifically addressing the COVID crisis needs.

This application was successful and the team were able to take this initiative forward. The key learning from this activity is to engage in early planning of exploitation and definition of partners and IP and to be aware and actively seek funding opportunities in the original and related domains. It is important to carry out ethics and data protection assessments which could otherwise cause delays and lastly it is very important to promote your results to external stakeholders

¹ UKRI – UK Research and Innovation



Recordings of the session can be viewed here:
<https://youtu.be/gMDpZtKzQQ4>

Slides of the session can be reused here:
<https://zenodo.org/record/4312914#.X9DTqbPSLV8>

Stay tuned

About the Projects



BigDataStack - Holistic Stack for Big Data Applications and Operations

BigDataStack delivers a complete high-performance stack of technologies addressing the emerging needs of data operations and applications. BigDataStack promotes automation and quality and ensures that the provided data are meaningful, of value, and fit-for-purpose through its Data as a Service offering that addresses the complete data path with approaches for data cleaning, modelling, semantic interoperability, and distributed storage. To enable data operations and data-intensive applications to fully exploit the sustainability of BigDataStack and take full advantage of the developed technologies, the consortium has brought on board three use cases that will exhibit their applicability through Smart Insurance, Connected Consumer and Real-Time Shipping.



I-BiDaaS - Industrial-Driven Big Data as a Self-Service Solution

I-BiDaaS aims to empower users to easily utilize and interact with big data technologies, by designing, building, and demonstrating, a unified framework that: significantly increases the speed of data analysis while coping with the rate of data asset growth, and facilitates cross-domain data-flow towards a thriving data-driven EU economy. I-BiDaaS is being tangibly validated by real-world, industry-lead experiments in the domains of banking, manufacturing, and telecommunication.



Track & Know - Big Data for Mobility Tracking Knowledge Extraction in Urban Areas

The project has developed a software framework and demonstrated increased efficiency of Big Data applications. The project has developed a scalable, fault tolerant platform to manage big data coming from a variety of sources and has created efficient, interoperable and scalable toolboxes integrated into a Track and Know software platform. The 'Big Data Processing', 'Big Data Analytics', 'Complex Event Recognition' and 'Visual Analytics' toolboxes were successfully applied to mobility data from three domains area, fleet management, motor insurance and health sectors and delivered insights and efficiency improvements in the target domains.

www.bigdatastack.eu

www.ibidaas.eu

www.trackandknowproject.eu



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