Scalable Policy-aware linked data architecture for privacy, transparency and compliance

Results

Project Information

SPECIAL
Grant agreement ID: 731601

DOI
10.3030/731601

Funded under
H2020-EU.2.1.1.

Overall budget
€ 3,991,388.75

EU contribution
€ 3,991,388.75

Coordinated by
GEIE ERCIM
France

Start date
1 January 2017
End date
31 December 2019

Closed project

This project is featured in...

RESEARCH*EU MAGAZINE
The future of aviation: The only way is up

NO. 99, FEBRUARY 2021
Deliverables

Demonstrators, pilots, prototypes (17)

Formal representation of the legislation V1
Linked Data representation of the legislation and development of re-usable and extensible policy templates (T2.2).

Final release
The final release will incorporate all feedback from the inhouse robustness testing (T3.6), pilot evaluations (T5.1, T5.2), and hacking challenges (T5.3).

Pilot implementations and testing plans V1
The first pilot release will focus on privacy preserving data processing and aggregation functionality based on D3.2 & D4.1.

Policy Language V2
Development of the Policy Language syntax and algorithms to algorithms to synthesise policies for derived data (T2.1).

Transparency and Compliance Algorithms V2
Development of transparency and compliance algorithms (T2.4) to assure that any data processing is inline with the policies and the legislation (T2.1, T2.2), and to provide synthesis of policies for mined and aggregated data based on the user context, on top of the designed transparency framework (T2.3).

Transparency & compliance release
This release provides more mature components mainly the transparency components from T4.5 but also the improvements resulting from work in T3.3 and T3.4.

Formal representation of the legislation V2
Linked Data representation of the legislation and development of re-usable and extensible policy templates (T2.2).

Transparency dashboard and control panel release final release
The final release will incorporate all feedback from the inhouse robustness testing (T4.4), pilot evaluations (T5.1, T5.2), and hacking challenges (T5.3).

SPECIAL Website Setup
The SPECIAL website creation and release
Development of the Policy Language syntax and algorithms to algorithms to synthesise policies for derived data

**Transparency and Compliance Algorithms V1**
Development of transparency and compliance algorithms (T2.4) to assure that any data processing is inline with the policies and the legislation (T2.1, T2.2), and to provide synthesis of policies for mined and aggregated data based on the user context, on top of the designed transparency framework (T2.3).

**Transparency dashboard and control panel release V1**
This release will include policy and event data visualisation (T4.1) and system interaction (T4.2).

**Transparency dashboard and control panel release V2**
This release includes improvements to the policy and event data visualisation (T4.1) and system interaction (T4.2) and new visualisations to support the transparency and compliance functionality (T4.1 & T4.2).

**Initial setup of policy aware Linked Data architecture and engine**
Initial setup of policy aware Linked Data architecture and engine

**Policy & events release**
This release provides more mature components mainly the policy and synthesis management ones (outcomes of T3.4 on which WP3 first focusses). It will also integrate the progress made in the authentication and authorisation (T3.3).

**Transparency Framework V1**
Design of an immutable record of data transactions/transformations, associated to Linked Data access/usage policies (T2.3), which are outcomes og T2.1 and T2.2.

**Transparency Framework V2**
Design of an immutable record of data transactions/transformations, associated to Linked Data access/usage policies (T2.3), which are outcomes og T2.1 and T2.2.

**Documents, reports (19)**

**Use case scenarios V2**
Document detailing the use cases and data sharing scenarios provided by SPECIAL partners (T1.1).
The second pilot release will extend the data processing and aggregation pilots with transparency and compliance functionality based on D3.4 & D4.3.

The results of the public challenges (T5.3) will be documented and used to inform future releases of the platform (D3.6, D4.5).

This document will include details on the policy and transparency considerations of the use case, and the compliance requirements against policies.

This document will set the basis for the SPECIAL consortium involvement in events/workshops (T6.2.1) and standardisation activities (T6.2.2).

This report will collect the inputs from the reference group and the efforts of the community group (T6.2.2).

The results of the public challenges (T5.3) will be documented and used to inform future releases of the platform (D3.4, D4.3, D3.6 & D4.5).

Report on technical requirements and challenges (T1.4) that arise in extending the BDE architecture to cope with all privacy-aware SPECIAL requirements while assuring scalability and security.

This document will include details on the policy and transparency considerations of the use case, and the compliance requirements against policies (T1.3).

This report will present the findings of the pilots and future implementation plans by the industry partners and beyond.

This document will include details on the policy and transparency considerations of the use case, and the compliance requirements against policies (T1.3).

Report on technical requirements and challenges that arise in extending the BDE architecture to cope with all privacy-aware SPECIAL requirements while assuring
scalability and security.

Frontend Scalability and Robustness testing report V1
The results of the usability testing (T4.4) will be documented and used to inform future releases of the platform (D4.3 & D4.5).

Use case scenarios V1
Document detailing the use cases and data sharing scenarios provided by SPECIAL partners

Pilot implementations and testing plans V3
The final pilots will be delivered at the same time as D3.6 & D4.5 and will incorporate all feedback from the inhouse robustness testing, pilot evaluations and hacking challenges.

Usability testing report V2
The results of the usability testing (T4.4) will be documented and used to inform future releases of the platform (D4.3 & D4.5).

Backend Scalability and Robustness testing report V1
The results of the scalability and robustness testing (T3.6) will be documented and used to inform future releases of the platform.

Legal requirements for a privacy enhancing Big Data V1
Report providing details of all legal and ethical considerations (T1.2), as a main input for the SPECIAL privacy-aware platform

Scalability and Robustness testing report V2
The results of the scalability and robustness testing (T3.6) will be documented and used to inform future releases of the platform (D3.4 & D3.6).

Open Research Data Pilot (1)

Quality, risk and data management plan
An evolving plan that describes the data management life cycle for the project data to be collected and processed along with quality and risk management procedures

Publications
Transparent Personal Data Processing: The Road Ahead

**Author(s):** Piero Bonatti, Sabrina Kirrane, Axel Polleres, Rigo Wenning  
**Published in:** TELERISE: 3rd International Workshop on TEchnical and LEgal aspects of data pRivacy and Security, 2017, Page(s) 337-349  
**Publisher:** Springer International Publishing  
**DOI:** 10.1007/978-3-319-66284-8_28

LOD-a-lot. A Queryable Dump of the LOD Cloud

**Author(s):** Javier D. Fernández, Wouter Beek, Miguel A. Martínez-Prieto, Mario Arias  
**Published in:** International Semantic Web Conference (ESWC 2017), LNCS volume 10588, 2017, Page(s) 75-83, ISBN 978-3-319-68204-4  
**Publisher:** Springer International Publishing  
**DOI:** 10.1007/978-3-319-68204-4_7

LOD-a-lot: A Single-File Enabler for Data Science

**Author(s):** Wouter Beek, Javier D. Fernández, Ruben Verborgh  
**Published in:** SEMANTiCS 2017, 2017, Page(s) 181-184, ISBN 978-1-4503-5296-3  
**Publisher:** ACM

A New Semantics for Overriding in Description Logics

**Author(s):** Piero A. Bonatti, Marco Faella, Iliana M. Petrova, Luigi Sauro  
**Published in:** Proceedings of IJCAI-17, 2017, Page(s) 4975-4979  
**Publisher:** International Joint Conferences on Artificial Intelligence

Designing a GDPR-compliant and Usable Privacy Dashboard

**Author(s):** Philip Raschke, Axel Küpper, Olha Drozd and Sabrina Kirrane  
**Published in:** IFIP Summer School 2017, 2018  
**Publisher:** Springer

Evaluating Query and Storage Strategies for RDF Archives

**Author(s):** Javier D. Fernández, Jürgen Umbrich, Axel Polleres, and Magnus Knuth  
**Published in:** Semantic Web Journal, 2018  
**Publisher:** Semantic Web Journal
HDTQ: Managing RDF Datasets in Compressed Space

Author(s): Javier D. Fernández and Axel Polleres
Published in: Extended Semantic Web Conference (ESWC 2018), 2018
Publisher: Springer International Publishing

A Scalable Consent, Transparency and Compliance Architecture

Author(s): Sabrina Kirrane, Javier D. Fernández, Wouter Dullaert, Uros Milosevic, Axel Polleres, Piero A. Bonatti, Rigo Wenning, Olha Drozd, and Philip Raschke
Published in: Extended Semantic Web Conference (ESWC 2018), 2018
Publisher: Springer International Publishing

Fast Compliance Checking in an OWL2 Fragment

Author(s): Piero A. Bonatti
Published in: Proceedings of the Twenty-Seventh International Joint Conference on Artificial Intelligence, 2018, Page(s) 1746-1752, ISBN 9780-999241127
Publisher: International Joint Conferences on Artificial Intelligence Organization
DOI: 10.24963/ijcai.2018/241

Legislative Compliance Assessment: Framework, Model and GDPR Instantiation

Author(s): Sushant Agarwal, Simon Steyskal, Franjo Antunovic and Sabrina Kirrane
Published in: Proceedings of the Annual Privacy Forum (APF 2018), 2018
Publisher: APF 2018

Uncovering Canvas Fingerprinting and Analyzing Its Usage For Web Tracking

Author(s): Raschke, P. and Küpper, A
Published in: Workshops der Informatik 2018. Lecture Notes in Informatics (LNI)., 2018
Publisher: Workshops der Informatik 2018

Towards Making Distributed RDF Processing FLINKer

Author(s): Amr Azzam, Sabrina Kirrane, Axel Polleres
Published in: International Conference on Big Data Innovations and Applications (Innovate-Data 2018, 2018
Publisher: IEEE

Data Privacy Vocabularies and Controls: Semantic Web for Transparency and Privacy
SPIRIT: A Semantic Transparency and Compliance Stack

**Author(s):** Piero A. Bonatti, Bert Bos, Stefan Decker, Javier D. Fernández, Sabrina Kirrane, Vassilios Peristeras, Axel Polleres, and Rigo Wenning

**Published in:** Semantic Web for Social Good (ISWC2018 Workshop), 2018

**Publisher:** Springer International Publishing

Enabling Personal Data Processing Control via Dynamic Consent

**Author(s):** Patrick Westphal, Javier Fernández, Sabrina Kirrane and Jens Lehmann

**Published in:** Proceedings of the Posters and Demos Track of the 14th International Conference on Semantic Systems (SEMANTiCS 2018), 2018

**Publisher:** SEMANTiCS 2018

Fast Compliance Checking with General Vocabularies

**Author(s):** Olha Drozd, Rigo Wenning and Sabrina Kirrane

**Published in:** OPERANDI 2018: Open Day for Privacy, Transparency and Decentralization (PETS2018), 2018

**Publisher:** PETS2018

Big Data and Analytics in the Age of the GDPR

**Author(s):** Piero Bonatti and Sabrina Kirrane

**Published in:** IEEE Computer Society, 2019, 2019

**Publisher:** TBA

Big Data and Analytics in the Age of the GDPR

**Author(s):** Piero A. Bonatti, Sabrina Kirrane

**Published in:** TBA, 2019

**Publisher:** TBA

A More Decentralized Vision for Linked Data

**Author(s):** Axel Polleres, Javier Fernández

**Published in:** Proceedings of the 2nd Workshop on Decentralizing the Semantic Web co-located with the 17th International Semantic Web Conference, DeSemWeb@ISWC, CEUR-2165, paper 1, 2018, 2018
Consent Comprehension Made EasyDemo

**Author(s):** Olha Drozd and Sabrina Kirrane  
**Published in:** Open Day for Privacy, Usability, and Transparency (PUT 2019), 2019  
**Publisher:** TBA

---

ODRL policy modelling and compliance checking

**Author(s):** Marina De Vos, Sabrina Kirrane, Julian Padget and Ken Satoh  
**Published in:** 3rd International Joint Conference on Rules and Reasoning (RuleML+RR 2019), 2019  
**Publisher:** TBA

---

Machine Understandable Policies and GDPR Compliance Checking

**Author(s):** Piero A. Bonatti, Sabrina Kirrane, Iliana M. Petrova, Luigi Sauro  
**Published in:** Kuenstliche Intelligenz, 2019  
**Publisher:** Arxiv

---

I Agree: Customize your Personal Data Processing with the CoRe User Interface.

**Author(s):** Olha Drozd and Sabrina Kirrane  
**Published in:** 6th International Conference on Trust, Privacy and Security in Digital Business, 2019  
**Publisher:** TBA

---

Real-Time Reasoning in OWL2 for GDPR Compliance.

**Author(s):** P.A. Bonatti, L. Ioffredo, I.M. Petrova, L. Sauro, I.R. Siahaan  
**Published in:** Artificial intelligence Journal, 2019  
**Publisher:** Arxiv

---

On the logical properties of the nonmonotonic description logic DL^N

**Author(s):** P. A. Bonatti  
**Published in:** 2018  
**Publisher:** TBA

---

Privacy-aware Linked Widgets
Towards Real-Time Web Tracking Detection with T.EX - The Transparency EXtension

Author(s): Raschke P., Zickau S., Kröger J.L., Küpper A.
Publisher: Springer, Cham

Creating a vocabulary for data privacy: the first-year report of data privacy vocabularies and controls community group (DPVCG)

Published in: 2019
Publisher: TBA

Self-Enforcing Access Control for Encrypted RDF

Author(s): Javier D. Fernández, Sabrina Kirrane, Axel Polleres, Simon Steyskal
Published in: Extended Semantic Web Conference (ESWC 2017), volume = {10249} year = {2017}, 2017, Page(s) 607-622, ISSN 1611-3349
Publisher: Springer International Publishing
DOI: 10.1007/978-3-319-58068-5_37

Non-peer reviewed articles (1)

"Un cruscotto made in "'Federico II'" per aiutare i cittadini a capirne di più"

Author(s): P.A. Bonatti
Published in: Il Mattino, 2018, Page(s) 55, ISSN 1592-3908
Publisher: Il Mattino

Peer reviewed articles (1)

HDT crypt: Compression and Encryption of RDF Datasets