Compliance technologies, policy and implementation

Kimmo Rossi
European Commission, CNECT.G.1

Data Policy and Legislation

European Data strategy – Common European Data Spaces; Feb 2020

Open Data Directive: transposition D/L: 2021; implementing act on High-Value Datasets, HVD): in force since Feb 2023; applies from June 2024

Data governance act (in force since June 2022; applies from Sep 2023)

Data act (in force Jan 2024; applies from September 2025)

AI act (in force Aug 2024; staged application)

European Commission

The Mission Letter

“You will present a **European Data Union Strategy** drawing on existing data rules to ensure a simplified, clear and coherent legal framework for businesses and administrations to share data seamlessly and at scale, while respecting high privacy and security standards.”

Mission Letter to Henna Virkkunen

Executive Vice President for Tech Sovereignty, Security and Democracy

Compliance projects over time (>200MEUR, 34 projects)

Horizon 2020 Call 2016 (8 + 1 MEUR, 3 RIA, 1 CSA)
ICT-18-2016: Privacy-preserving Big Data Technologies
Methodologies for privacy preservation: multi-party computing, homomorphic encryption, anonymization/pseudonymization

Horizon 2020 Call 2018/2019 (10 + 48 MEUR, 4 RIA, 9 IA)
ICT-13-2018-2019: Supporting the emergence of data markets and the data economy
Personal data protection, consent (more practical GDPR compliance), data sharing & trading models and platforms as sandboxes

Horizon Europe Call 2021 (52 MEUR, 5 RIA)
HORIZON-CL4-2021-DATA-01-01: compliance, Privacy preserving technologies
Special attention to green&responsible data operations, privacy preservation in particular use contexts (mobility, e-commerce, finance, healthcare, public administration, industry…)

Compliance projects over time (>200MEUR, 34 projects) *cont'd*

Digital Europe Call 2022 (20/9 MEUR, 4 Simple Grants)
DIGITAL-2022-CLOUD-AI-02-OPEN-AI - Public Sector Open Data for AI
Leveraging public sector data of high value, supporting the Open Data Directive and the implementing act on HVDs

Horizon Europe Call 2022 (52 MEUR, 4 IA)
HORIZON-CL4-2022-DATA-01-04 Data trading, monetizing, exchange, interoperability
Secure and trustworthy exchange of proprietary data, marketplaces, automated contracting

Horizon Europe Call 2024 (38 MEUR, 4 IA)
HORIZON-CL4-2024-DATA-01-01: AI-driven data operations and compliance technologies
Broader approach to compliance, first link to AI (data for AI, bias measures for datasets)

https://digital-strategy.ec.europa.eu/en/policies/eu-data-projects

Remaining challenges and new angles to compliance

Take compliance in the broad sense: legal/ethical compliance with any applicable rules & norms (including standards), not only Data/AI legislation, but sectoral legislation as well (agriculture, climate, financial reporting…)

Cut red tape, bureaucracy and reporting burden for companies, farmers, citizens… using data & AI

Create systems and methods that (automatically) adapt to continuously changing legislation & rules & contexts

Use of synthetic data where the use of real data is not possible?

Thank you!

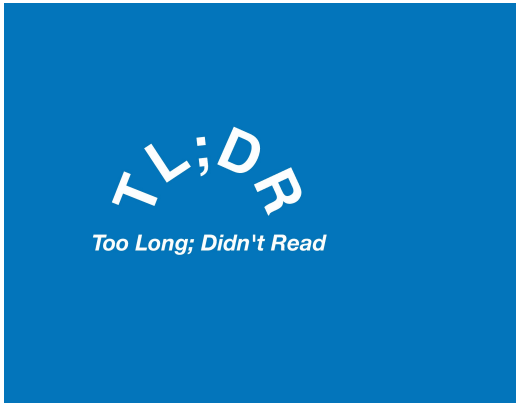
European Commission

Automated and Data-driven approaches to address compliance challenges

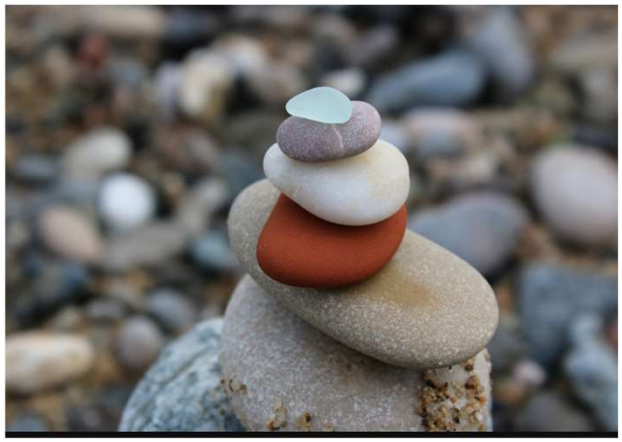
Natalie Bertels

imec-CiTiP-KULeuven

BDVA co-lead TF Policy &Societal



- Principles and values
- Fundamental rights and freedoms
- Laws
- Codes and standards
- (Company) policies
- Agreements
- (…)



Towards a broader and more holistic compliance concept?

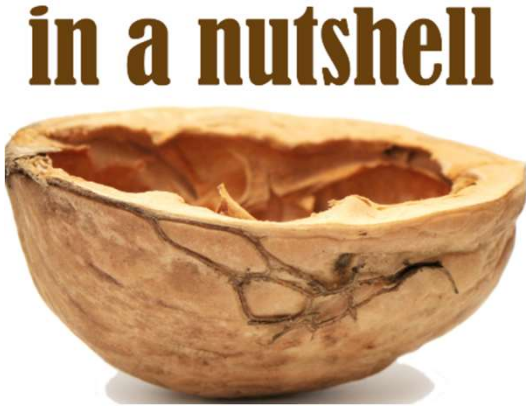
- Compliance with Regulatory Provisions
- Compliance with Industry Codes and Standards (also legally relevant)
- Compliance with Ethical Codes
- Compliance with Company Policies
- Compliance with Company Culture, (…)

Role of Data and AI?

- Compliance with Data and AI regulation
- How does regulation and compliance of this scale work in practice?

Need for RegTech (Regulatory Technology) - AI-driven and Data-driven compliance

Why Automated/Data-Driven compliance ?



- Automated solutions are scalable.
- Automated solutions are efficient.
- Data-driven solutions allow for better risk identification.
- Data-driven solutions allow for continuous compliance monitoring, rather than snapshot-like appraisals.
- Automated + Data-driven solutions enable greater accountability and transparency in reporting.

Data-driven and automated compliance is no longer an optional perk – it's becoming is a state-of-the-art **expectation** by regulators.

In Europe and beyond

"Do compliance personnel have knowledge of and means to access all relevant data sources in a reasonably timely manner? Is the company appropriately leveraging data analytics tools to create efficiencies in compliance operations and measure the effectiveness of components of compliance programs?" + "Are companies putting the same resources and technology into gathering and leveraging data for compliance purposes that they are using in their business?" – US DOJ, Sept. 2024 Evaluation Criteria for Corporate Compliance Programs

Stakeholder Audience	Function	Degree of Automation	Layer of Compliance	Industry	Maturity (TRL)	Technologies Employed	Legislations / Codes Addressed
RegTech	Risk and Operations	Descriptive	Regulatory	Financial	TRL	**AI**…	
SupTech	Compliance and Reporting	Diagnostic	Codes and Standards	Cybersecurity		…and many, many more!	
EnfTech	Supervisory	Predictive	Ethics	Healthcare			
	Ethical	Prescriptive	Internal Policies	Energetics			
	Enabling Infrastructure	Proactive	Internal Culture	Data			
				AI			
				Construction			
				Machinery			
				Many more!			

Stakeholder audience

SupTech

- data collection & analytics to enhance reporting, data monitoring, forecasting, etc.
- Audience: Supervisory Authorities

EnfTech

- monitor for violations, process evidence, and execute or assist in sanctions.
- Audience: Enforcement Agencies

RegTech

- any **technology** that **ensures** companies are **complying** with regulatory requirements." (Teichmann et al., 2024)
- Audience: Industry

Functions of Data-Driven/Automated 'Regtech' Solutions

- Grassi and Lanfranchi (2022):
  - Compliance
  - Monitoring
  - Risk Management
  - Reporting
  - Operations
- Sitra - Fehlinger (2023):
  - Risk & Operations Tech
  - Compliance & Reporting Tech
  - Supervisory Tech
  - **Ethical Tech**
  - **Enabling Infrastructure Tech**

Expected Functions of Industry Regtech

- Sitra (2023):
  - Risk and Operations Tech
    - Internal risk management
    - Data analytics
    - Data-enhanced corporate decision-making
    - Technology and interactions monitoring
    - Abuse detection
  - Compliance and Reporting Tech
    - Collecting relevant data points for audits by regulators
    - Submitting reports and data to supervisors
    - Structuring data for transparency reporting and explainability of the functioning of systems
  - Ethical Tech
    - Navigating the risks of yet unregulated uses of new technologies, such as computer-brain interfaces or quantum computing
    - Navigating the grey zone areas of existing regulations (for example moderating illegal content under the DSA)
  - Enabling Infrastructure Tech
    - Absorbing regulatory complexities
    - Automatically enforcing new legal requirements by design
    - Proprietary or open-source technological infrastructure protocols
    - Application programming interfaces
    - Data-sharing solutions
    - Blockchain and smart-contract solutions
    - Digital ID systems
    - Foundational ethical AI models

https://www.sitra.fi/en/publications/enabling-the-responsible-use-of-technology-at-scale/#summary

Degrees of Automation: some examples

- Coll (2024) on Enftech Generations:
  - Descriptive
  - Diagnostic
  - Predictive
  - Prescriptive
  - Proactive
- ACCORD Project, D1.1 (2023) on automated construction compliance checking:
  - No Automation: manual processes
  - Automated Information Exchange: Automating submission of information using appropriate data models
  - Automated Validation: Automating the checking of submitted information for completeness
  - Partial Automation: Automatic assessment of some key aspects of the building permitting process
  - Automation: Fully Automated assessment of the entire building permitting process but requiring final human review and approval.
  - Full Automation: Fully automated building permitting

Industries/Areas of Compliance Automation

- Established:
  - Financial Services
  - Cybersecurity
  - Healthcare
  - Energetics
- Recent:
  - Construction/Machinery
  - Data (personal/non-personal) & Data Markets
  - Artificial Intelligence

(Some) Common Technologies for Automated and Data-driven Compliance

- AI and Machine Learning
- Natural Language Processing for complex unstructured data
- Blockchain for e.g. transparent records of transactions
- Data Analytics for e.g. data validation and risk identification
- Knowledge Graphs for e.g. inducing rules and explainability in AI decision making.

Typical compliance solutions rely on several technologies working together!

Call to action

Stakeholder Audience	Function	Degree of Automation	Layer of Compliance	Industry	Maturity (TRL)	Technologies Employed	Legislations / Codes Addressed
RegTech	Risk and Operations	Descriptive	Regulatory	Financial	TRL	**AI**…	
SupTech	Compliance and Reporting	Diagnostic	Codes and Standards	Cybersecurity		…and many, many more!	
EnfTech	Supervisory	Predictive	Ethics	Healthcare			
	Ethical	Prescriptive	Internal Policies	Energetics			
	Enabling Infrastructure	Proactive	Internal Culture	Data			
				AI			
				Construction			
				Machinery			
				Many more!			

Some Challenges in Automated Compliance

- Achieving legal understanding – purely ChatGPT not a legal advisor!
  - Reliable, AI-assisted or automated compliance requires machine-interpretable rules

- Greater semantic interoperability needed to track data provenance/rights/permissions in multilateral ecosystems.
  - Predicated on common ontologies and vocabularies that translate new legislation into machine-readable policy language.
  - Don’t neglect the metadata

- AI-assisted compliance tools operate in an evolving regulatory regime. See: AI Act, proposed AI Liability Directive.
  - Recent Complementary Impact Assessment on AI Liability Directive – found “key shortcomings”, suggested alterations to regulatory approach. From “AI Liability Directive” to “Software Liability Regulation”?

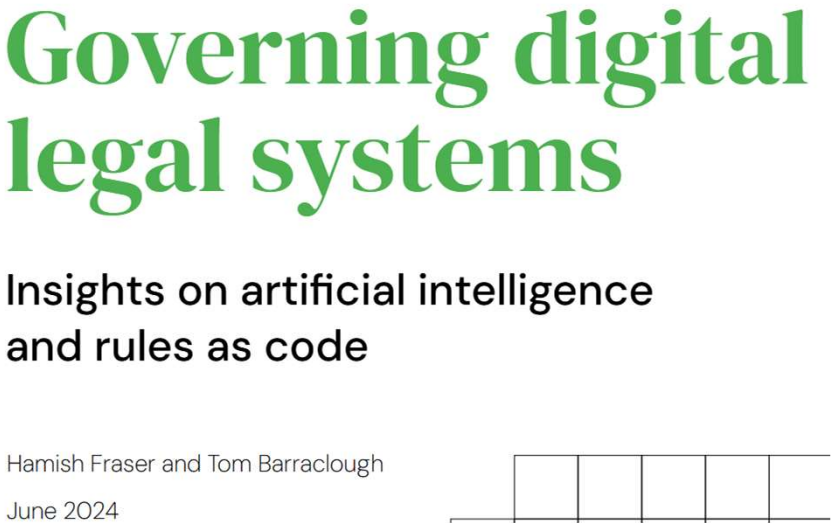
- Understanding the legal implications of different technical solutions for automated compliance.

Data Spaces as key enablers of Automated Compliance

- Data Spaces enable the predicates of streamlined, automated compliance in an ecosystem:
  - Trust
  - Interoperability
  - Accountability and Transparency

The Broad View: Automation by Default

- Automated compliance is a group effort – the legislator needs to produce automatable provisions.
- Looking to the future: the importance of parallel drafting and multidisciplinarity for producing automation-ready legislation.



TXT

accomplish

Project Presentation

Data Week 2024 – Luxembourg, December 10th, 2024

This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763

ACCOMPLISH at a Glance

Call: AI-driven data operations and compliance technologies (AI, data and robotics partnership) (IA)

Topic: HORIZON-CL4-2024-DATA-01-01

Title: ACCOMPLISH - Automated **A**ssessment and **C**ertification **Compli**ance of Organisations, **S**ystems, Data and AI Operations in a **H**uman Understandable Context

Start Date: 01/01/2025

End date (Duration): 30/06/2028 (42 months)

Consortium: 25 partners from 9 EU countries

Project Coordinator: TXT (Michele Sesana)

Technical & Scientific Coordinator: SUITE5 (Fenareti Lampathaki)

Use-cases sectors: Energy, Automotive, Robotics & Manufacturing, and Aviation

accomplish

This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763

ACCOMPLISH Consortium

The consortium is composed of 25 partners from 9 EU countries, with the most of the partners (17) coming from industry, in response to EC's and ADRA's request for increased industrial participation in this particular topic

1. TXT E-TECH SRL - Italy
2. FRAUNHOFER - Germany
3. PwC - Greece
4. IDSA International- Germany
5. POLITECNICA DE CATALUNYA - Spain
6. POLITECNICO DI MILANO - Italy
7. EUROPEAN DIGITAL SME ALLIANCE - Belgium
8. SUITE5 - Cyprus
9. DEEP BLUE - Italy
10. WITSIDE – Greece
11. ARTHUR'S LEGAL - Netherland
12. UBITECH - Cyprus
13. UTELIT - Greece
14. FUNDACIO EURECAT - Spain
15. HEDNO - Greece
16. CoEN - Greece
17. IGM CONSTRUCTIONS - Greece
18. VIRTUAL VEHICLE RESEARCH - Germany
19. EMOTION3D - Austria
20. MAN - Turkye
21. TOFAS TURK OTOMOBIL - Turkey
22. BEKO - Italy
23. CEFRIEL - Italy
24. SACBO (BGY) - Italy

Compliance and certification & Regulatory authorities
Make results adoption in the industry
Make results available in public (open science)
Demo industry partner

accomplish

This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763

Rationale and project Goal

- In today's fast-paced world driven by the unprecedented evolution of several key technological enablers (AI, 5G, Blockchain, IoT…)
- Safeguarding the society's fundamental rights, human values and freedoms has never been more relevant and crucial.
- Europe's set of legislative acts (*Data Governance Act*, *Data Act*, and *AI Act*, that lay the foundation for achieving the objectives outlined in the EU Digital Strategy and Data Strategy.
- *Although the very nature of compliance gains more and more prominence on a European and global scale, the business world is not yet equipped with appropriate technology enablers and end-to-end solutions for a smooth transition into the ever-evolving multifaceted compliance context that the AI era unequivocally brings.*
- ACCOMPLISH partners identified 10 challenges to address

Project Goal: ACCOMPLISH will design a novel AI-based compliance and certification framework cross-cutting the different regulatory/legal, environmental, cybersecurity and business/industry-specific compliance perspectives while always ensuring a human-in-the-loop (HITL) approach explaining the compliance requirements and results, as well as timely alerting about any potential risks/violations.

accomplish

This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763

Scientific and Technical Objectives (STO)

- STO.1: To study and deliver the underlying fou**ndations for fully compliant and certified Data&AI processes** through a trustworthy and explainable automated compliance assessment, **recommendation** issuing, and **certification** framework, following the EU and business domain regulations and covering the complete operations' lifecycle, while guaranteeing their trusted, secure execution
- STO.2: To **develop services and tools for Data and AI-Ops** that by-design accommodate **compliance** as part of their logic, include Human-in-the-loop and adhere to EU Acts, and that can be integrated into existing infrastructures via interoperable interfaces, or can become the data economy enablers for new solutions due to their extensive coverage of the data/AI Ops
- STO.3: To realise **legislation and domain compliant Data and AI pipelines** by delivering the **integrated ACCOMPLISH platform**, based on easily deployable, scalable, cooperative, and green services that reinforce trust, reliability, security, and interoperability amongst stakeholders that own, operate, and consume data and AI assets

accomplish

This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763

Business, Innovation and Exploitation Objectives (BIEO)

- BIEO.1: To **deploy, operate and validate** a reference Data-AI Ops Compliance Assessment and Certification **platform** within a set of representative **demonstrator** hubs that implement diverse, multi-stakeholder scenarios to solve real-world business problems where compliance in data/AI Ops is pivotal
- BIEO.2: To diffuse and **scale up the ACCOMPLISH offerings**, bringing forward **business value** grounded on compliant data and AI Ops, satisfying current and emerging needs of a wide range of stakeholders springing from EU and sector regulation
- BIEO.3: To cultivate the notion of **compliance-by-design** to all stakeholders by targeted awareness raising activities and in-situ compliance **assessment method and recommendations**, and liaise with existing initiatives towards scaling up and adopting the ACCOMPLISH offerings as part of their operational and research agendas

accomplish

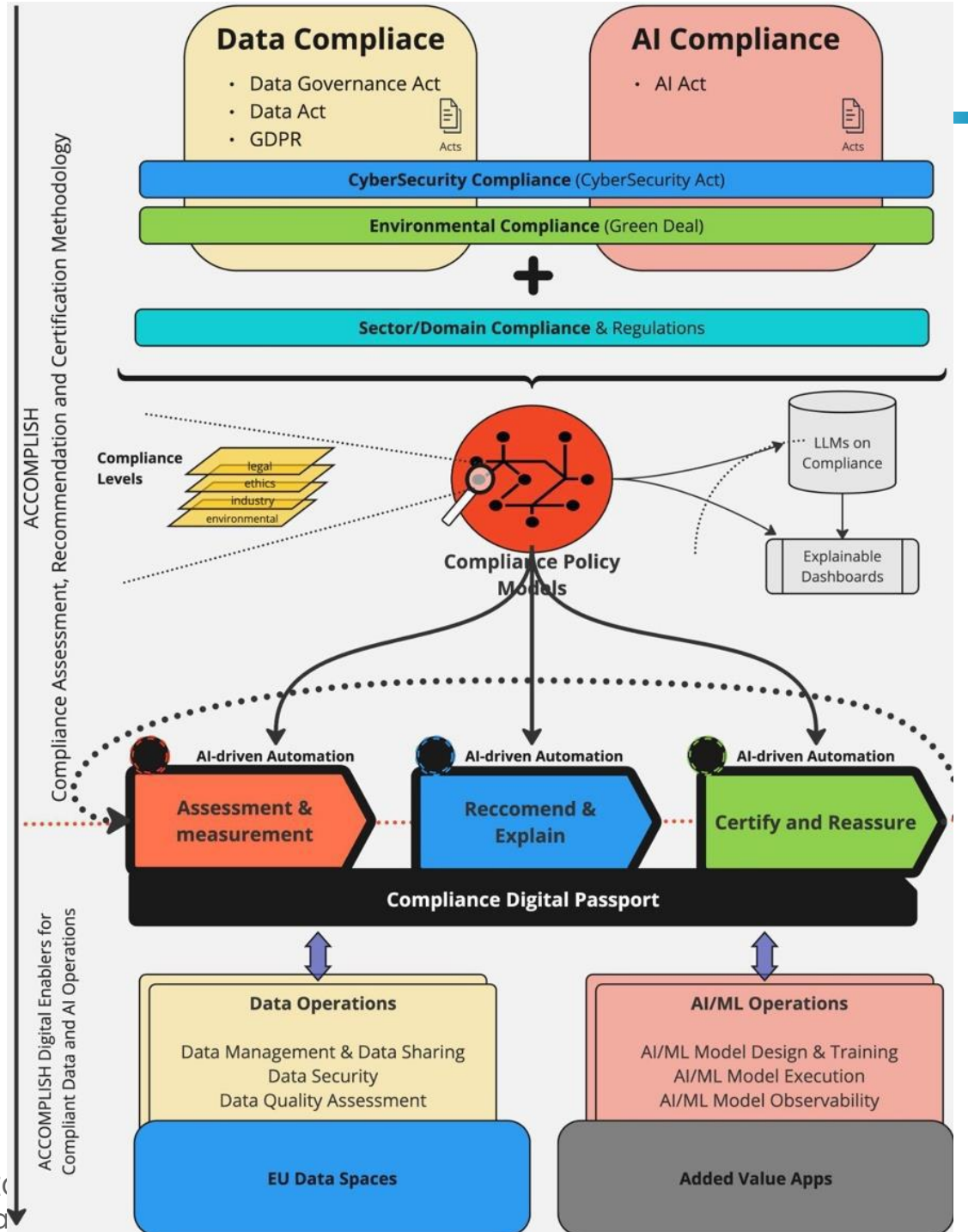
This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763

TXT

Project Results and Methodology

ACCOMPLISH Results:

- Assessment and Certification Methodology
- Automated Assessment and Certification Services
- Compliance Digital Passport
- Toolkit (Digital Enablers for Compliant Data/AI-Ops)
- Integrated Platform

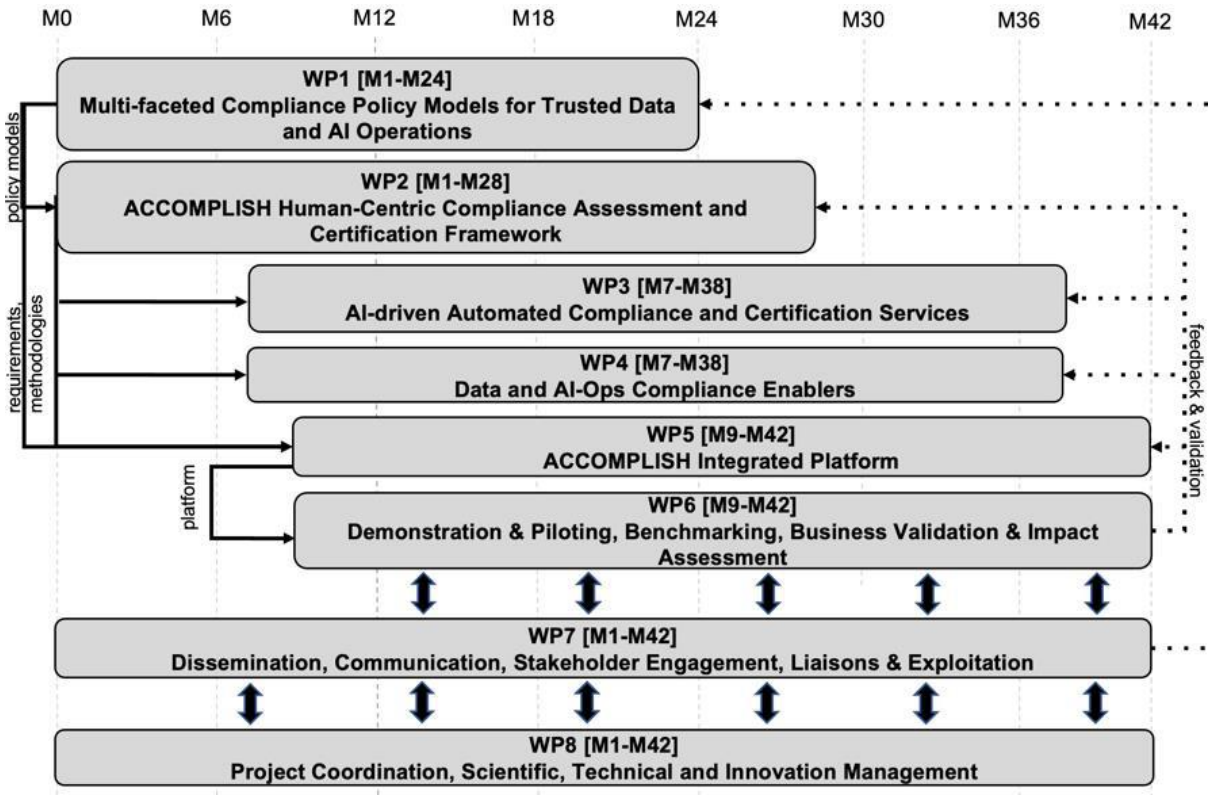


accomplish

This project has received funding from the EU HORIZ
compliance technologies CL4-2024-DATA-01-01 Gra

Project Workflow

- WP1 Multi-faceted Compliance Policy Models for Trusted Data and AI Operations
- WP2 ACCOMPLISH Human-Centric Compliance Assessment and Certification Framework
- WP3 AI-driven Automated Compliance and Certification Services
- WP4 Data and AI-Ops Compliance Enablers
- WP5 ACCOMPLISH Integrated Platform
- WP6 Demonstration and Piloting, Benchmarking, Business Validation & Impact Assessment
- WP7 Dissemination, Communication, Stakeholder Engagement, Liaisons & Exploitation
- WP8 Project Coordination, Scientific, Technical and Innovation Management



accomplish

This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763

Demonstrators

Demonstrator 1 - Energy Sector Hub (Proactive Flexibility-Aware Electricity Network Management in the Energy domain) (HEDNO, CoEn, IGM, RAE)

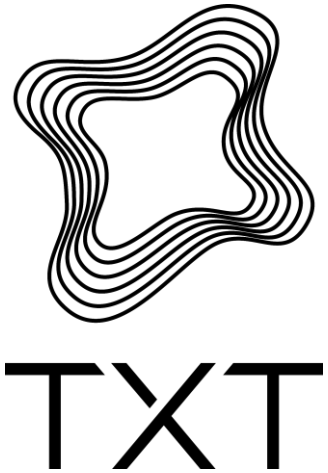
Demonstrator 2 - Automotive Sector Hub (Improved In-Vehicle Cabin Understanding for Enhanced Safety in Both Manual and Automated Driving Scenarios) (VIF + E3D + TOFAS + MAN-TR)

Demonstrator 3 - Robotics & Manufacturing Sector Hub (Ergonomics and job rotation to increase employability of people with disabilities and improve health conditions) (WHMAN+CEFRIEL+POLIMI)

Demonstrator 4 - Aviation Sector Hub (Airport Operations, Safety and Security scenarios) (SACBO+DBL+TXT)

accomplish

This project has received funding from the EU HORIZON Innovation Actions AI-driven data operations and compliance technologies CL4-2024-DATA-01-01 Grant Agreement: 101189763



Via Milano, 150
20093 Cologno Monzese (MI)
Italy

+39 02 257711
www.txtgroup.com

© TXT e-solutions –All rights reserved. Confidential and proprietary document.
This document and all information contained herein is the sole property of TXT e-solutions . No intellectual property rights are granted by the delivery of this document or the disclosure of its content. This document shall not be reproduced or disclosed to a third party without the express written consent of TXT e-solutions . This document and its content shall not be used for any purpose other than that for which it is supplied. The statements made herein do not constitute an offer. They are based on the mentioned assumptions and are expressed in good faith. Where the supporting grounds for these statements are not shown, TXT e-solutions will be pleased to explain the basis thereof.

Compliance challenges
&
ways to address them

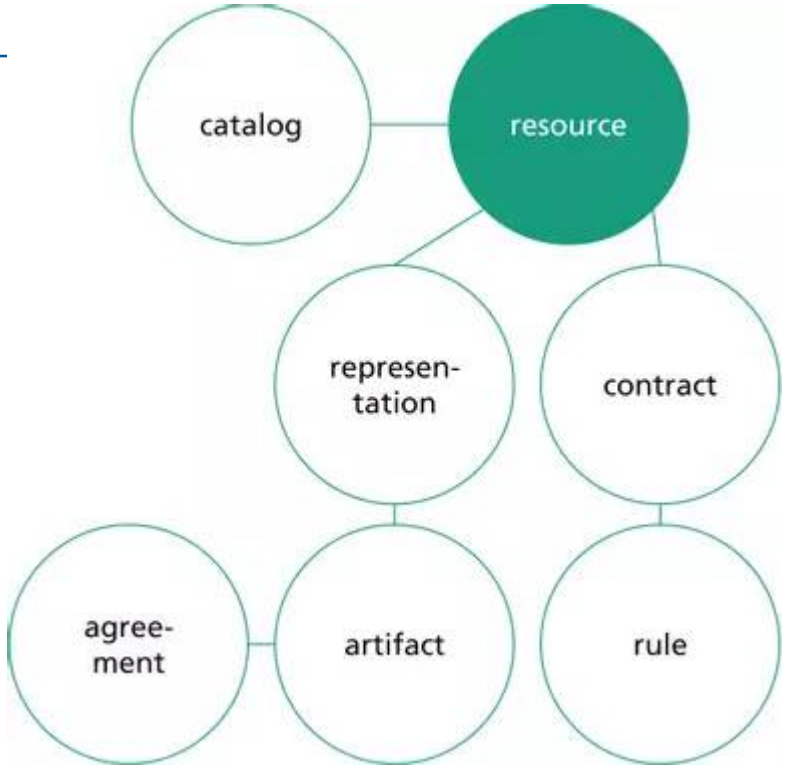
Rigo Wenning
ERCIM/W3C Legal counsel
rigo@w3.org

Legal challenges

- Data Governance Act
- Digital Market Act
- Digital Services Act
- Data Act
- High Value Data sets
- AI Act
- GDPR
- ESPR
- Machinery Regulation
- Battery Regulation

New challenge: Constraints

- Data quality (provenance)
- Data protection
- Commercial constraints
- Access control
- Usage control in data value chains
- FAIR principles



Justice has to be seen

to be done

&

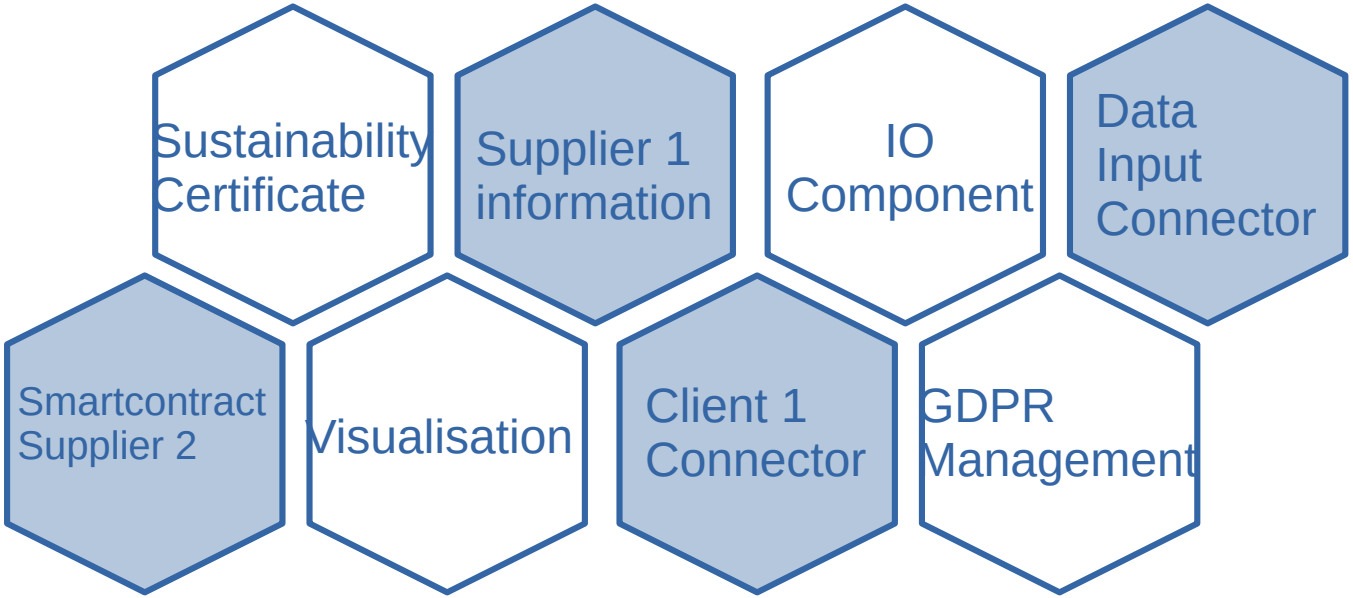
Trust needs transparency

Manual Data bureaucracy is difficult

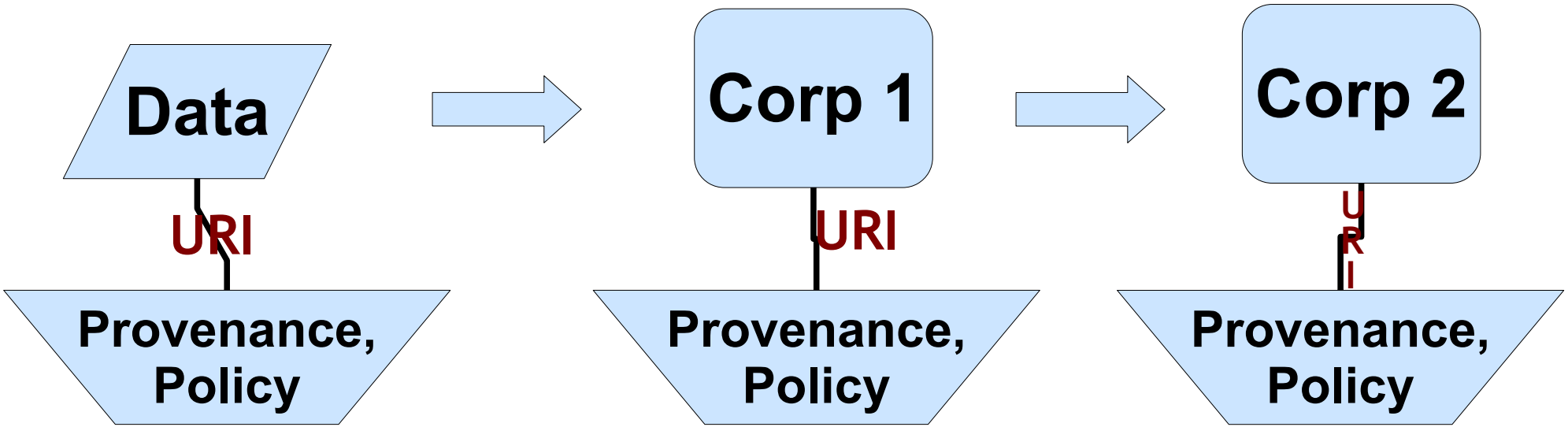
- Paper or fax is expensive & burdensome
- Data & metadata needs to be interoperable
- Data re-use is key
- Modularization of compliance artefacts for a modularized Industry
- Combinability of Certifications

Challenge: Variety of input-data can be met with Dataspace Connectors or Linked data

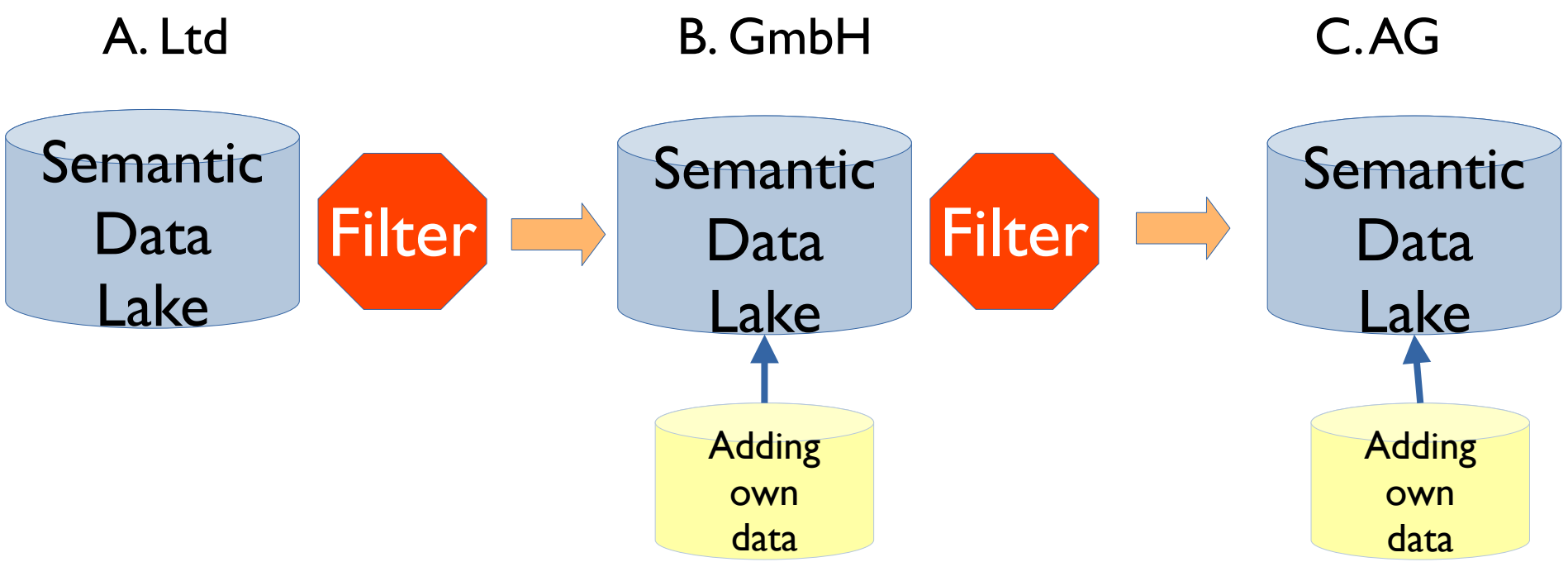
Modern Value chains are modular



Compliance information travels the value chain

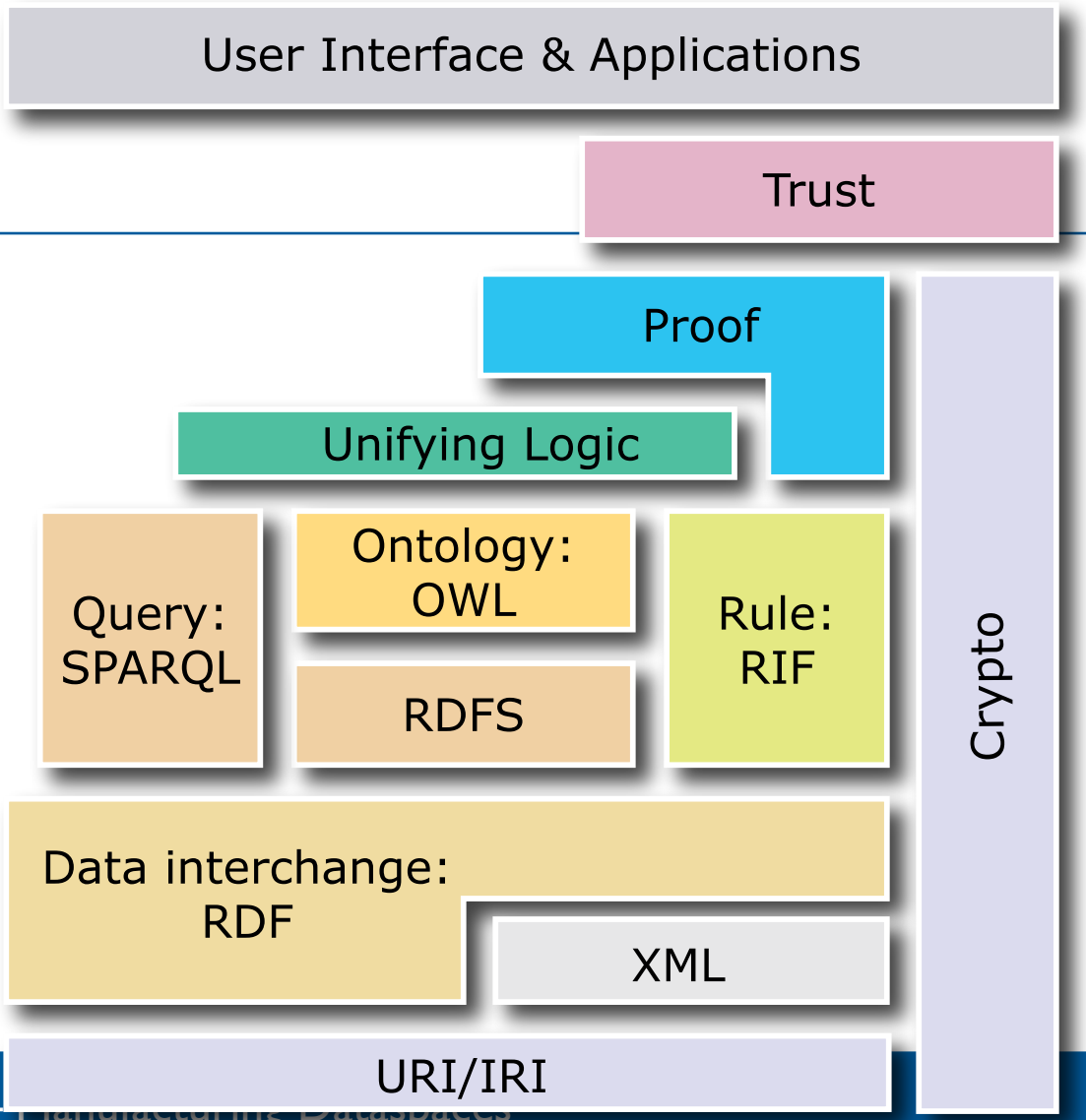


A chain adds and substracts data and compliance data



Highly extensible and still interoperable data layer needed

The Web of Data

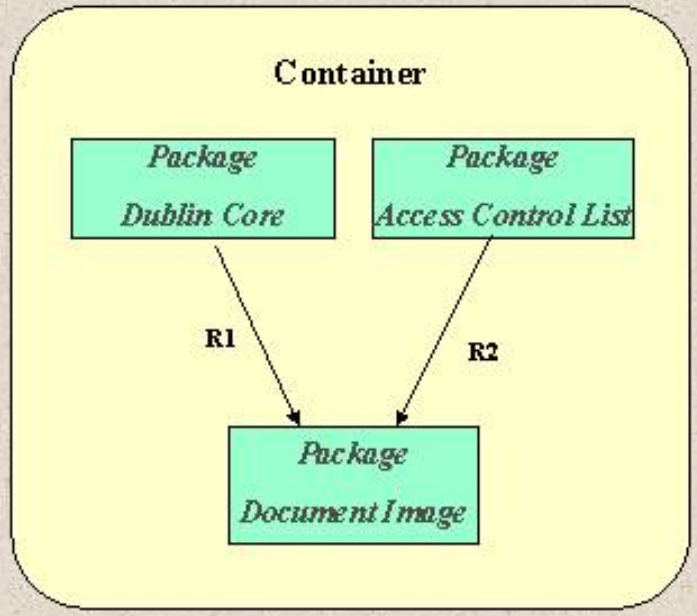


Data annotation is generic

The "About" Principle:

- There is no single "about" relationship between resources.

R1 : bibliographic description
R2: access rules



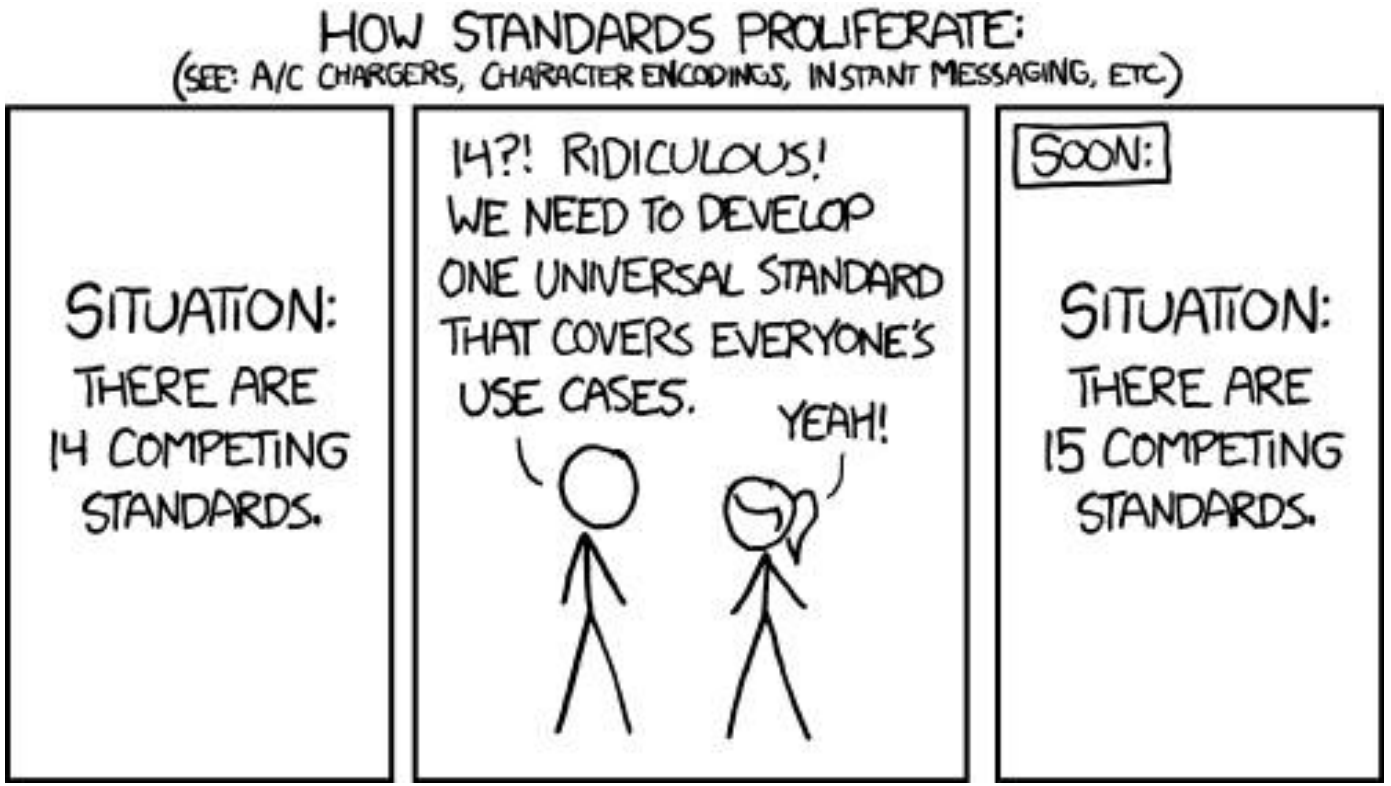
Expressions needed for

- Data protection constraints
- Commercial Constraints
- Environmental information
- Product information, labels, certification
- Data quality information (e.g. for learning)
- Match safety requirements to performance with SHACL

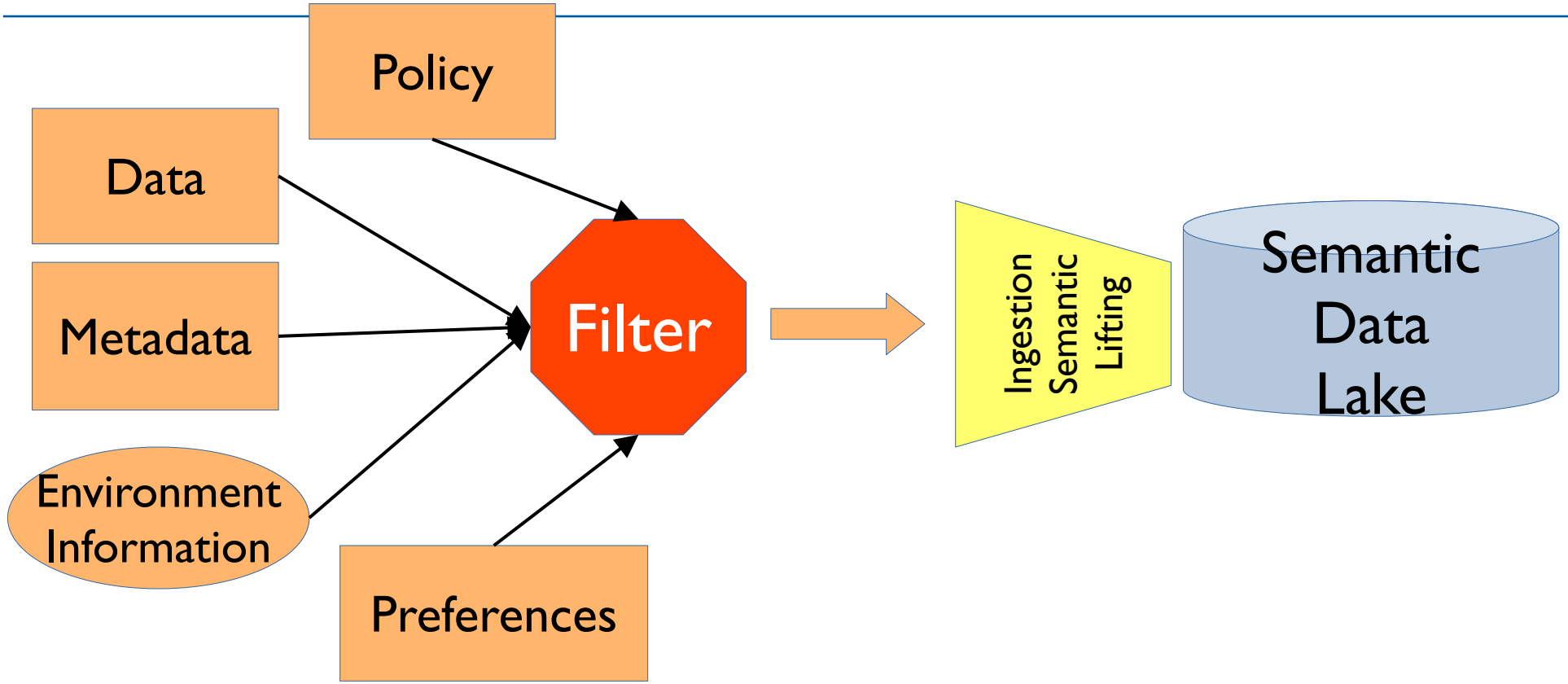
Elements of Interoperability

- Computer readable link between Object/data and its metadata
- Metadata formats (e.g. OWL, turtle, JSON-LD)
- Semantics (vocabularies, meaning)
- How to puzzle the pieces together (data space architecture)
- Standard transformations (Connectors)

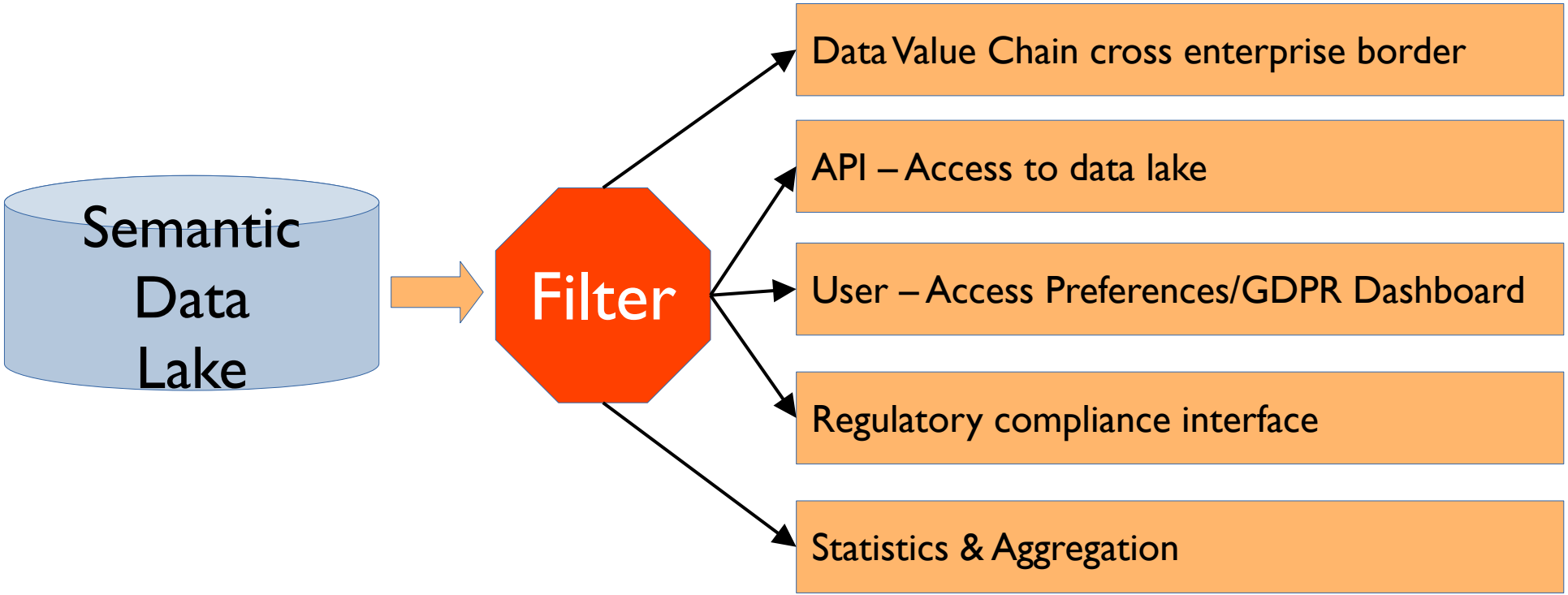
No unification please



Streams into a data lake



The output side



The filter could be governmental

- SHACL allows to match a knowledge graph
- A law can be partly transformed into a knowledge graph
- With SHACL, the compliance graph can be checked against the regulatory requirements
- Which equals to an authoritative governmental answer to a compliance question

Please consider submitting an expression of interest to the AIOTI Workshop on Semantic Interoperability for Digital Twins