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Improving Policy Coherence and Accessibility through Semantic Web Technologies: *Environmental Policies as Linked Open Data*

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Government Policies

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- **Policy is very complex**
 - Multiplicity
 - Multi-tenancy
- **Policy is Dynamic**
 - Especially environmental and energy
- **Policies are related and co-occur**
 - Government and end-users are usually oblivious to policy relationship and interactions



recreated by Jovan Radevski on 20 June 2016



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Motivation

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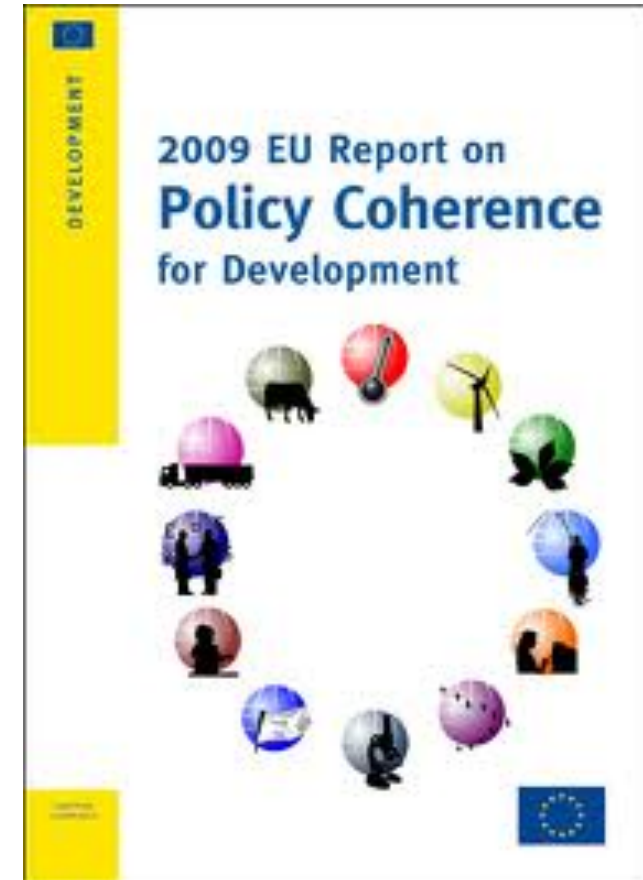


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Motivation - Policy Coherence

- **Varying Levels of Consistency**
 - **Across geographical boundaries**
e.g. counties, districts, national and international
 - **Internal** consistency and cross-domain coherence of policies within local government departments
- **Goals of Policy Coherency**
 - **Consistent** interpretation of policy
 - **Comprehensive** policies ease decision making
 - Decision making on **quality** rather than quantity



Motivation - Policy Accessibility

■ What is Policy Accessibility?

- The ability for state and local government departments, business and citizens to have open access to state policy
- To have access to policy in formats which they can consume and absorb in order to facilitate their work
- Providing open access to all aspects of society including citizens with impairments

■ How is policy accessibility achieved

- Making use of web technologies to provide transparent access to policy and regulations (i.e. Web Portals)
- Simplifying policy drafting and publishing workflows



Desired Outcome - Policy Compliance

■ Policy Coherency Aids Compliance

- The more people understand policy, the easier it is to make steps to compliance
- Reduces the costs for SME/SMB's, normal citizens and other parties to comply
 - Reduces need for lawyer to interpret policy.

■ Policy Accessibility Aids Compliance

- Provides a platform for more effective engagement with policies
- Encourages more of society to engage with, and understand, policy and regulations which may affect them.

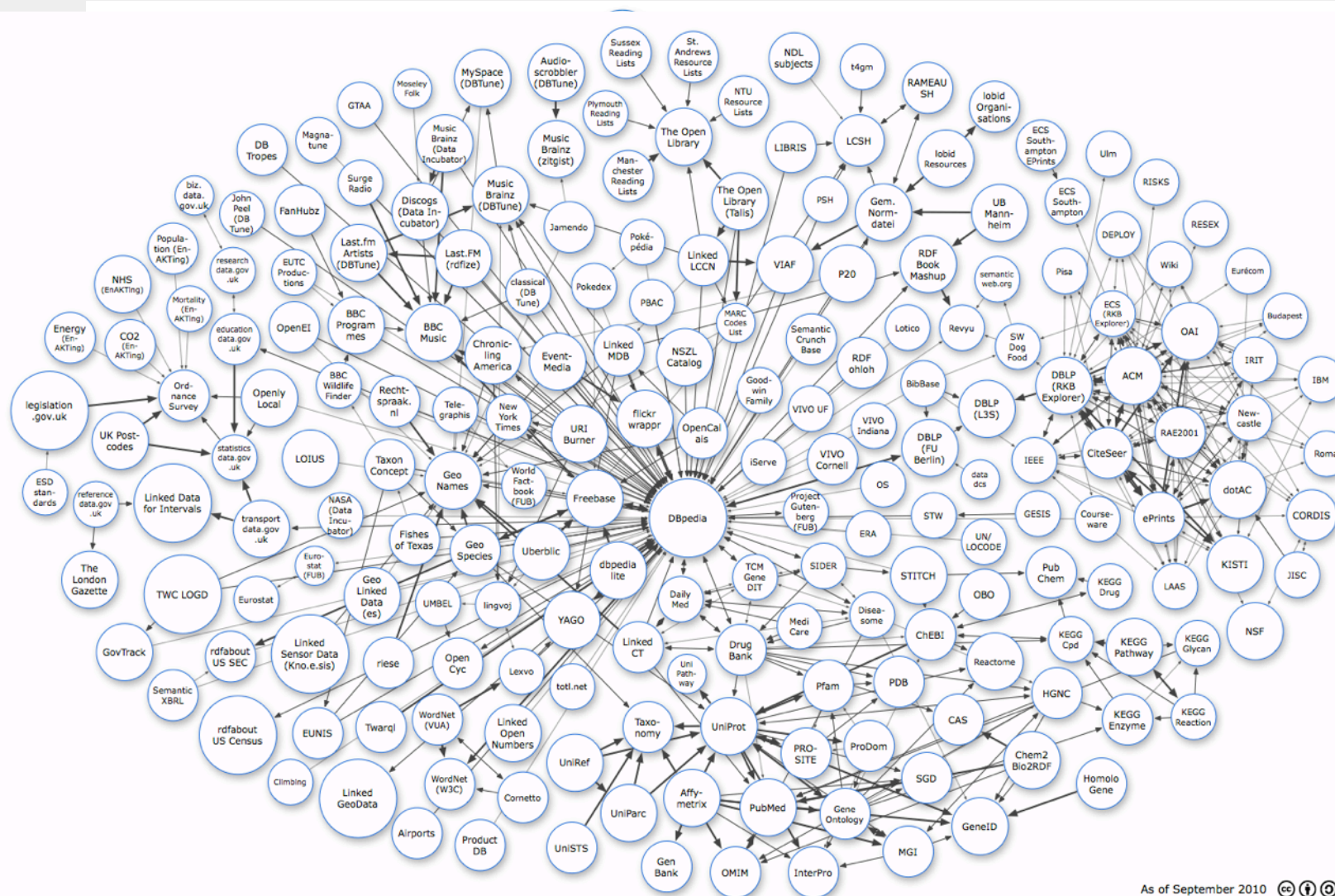


Environmental Regulation Web Portal

- A wealth of documents relating to Environmental Regulation are published in the portal
 - Users are simply *expected* to comply
 - Need to consult and study multiple document to understand compliance requirements

The Linked Open Data cloud

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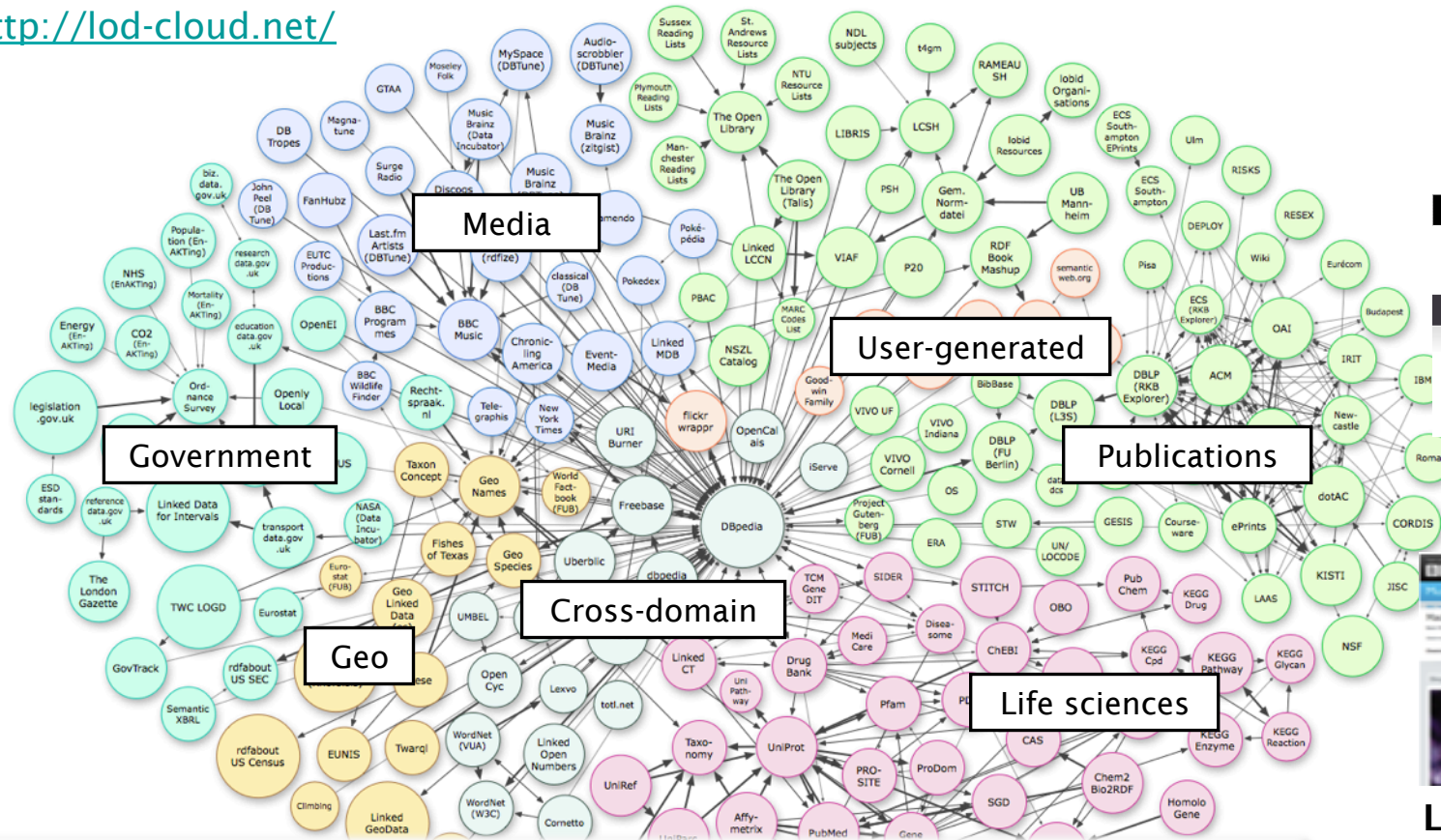


Linked Open Data Cloud

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<http://lod-cloud.net/>



Over 300 open data sets with more than 35 billion facts, interlinked by 500 million typed links.

Linking Open Data cloud diagram, by Richard Cyganiak and Anja Jentzsch.

BestBuy
Overstock.com
Facebook
US government
UK government

HM Government

data.gov.uk

Data Apps Ideas Forum Wiki

Transparency is at the heart of this Government. Data.gov.uk is home to national & local data for free re-use.

BBC
New York Times



LinkedGeoData



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Linked Data Principles

1. Use **URIs** to identify the “things” in your data
2. Use **HTTP URIs** so people (and machines) can look them up on the Web
3. When a URI is **looked up**, return a **description** of the thing in a structured format (RDF)
4. Include **links to related things** to provide context

<http://www.w3.org/DesignIssues/LinkedData.html>



Could Lightweight Policy Semantics Help ?

- Could Linked Data increase accessibility of policies?
 - Use of established vocabularies and descriptions to describe policies

- Could Linked Data aid in the coherence of policies?
 - Stakeholders adopt shared vocabulary when interpreting and exchanging communication over policy



The Linked Policy Concept

■ Building Regulations

- Address co-occurrence and inherent complexities
 - Use of industry standards e.g. ISO, IFC, to explicitly represent relevant citations essential to a more comprehensive understanding of technical documents
- Improve cohesion and interpretation of complex technical regulations and policy
 - Use of industry vocabularies for describing physical construction and building entities within specific contexts

■ Fisheries Policy

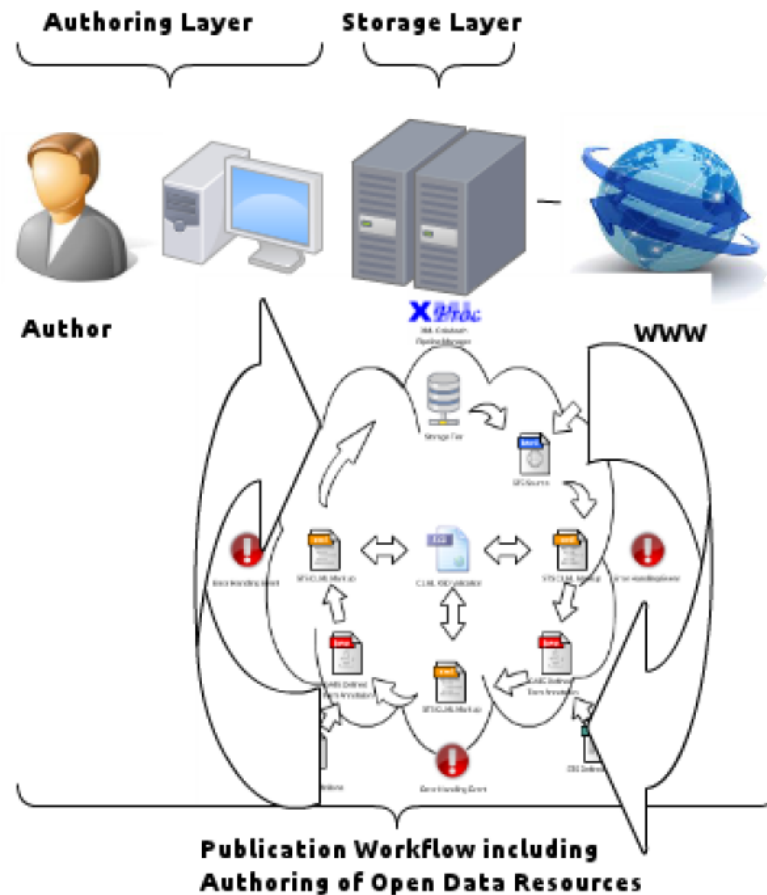
- Utilising linked data to invoke inferences between the environment, EU quotas and local policy

■ Publication Workflows

- Engaging with regulation drafters to ensure that Linked Data is baked in to their workflows



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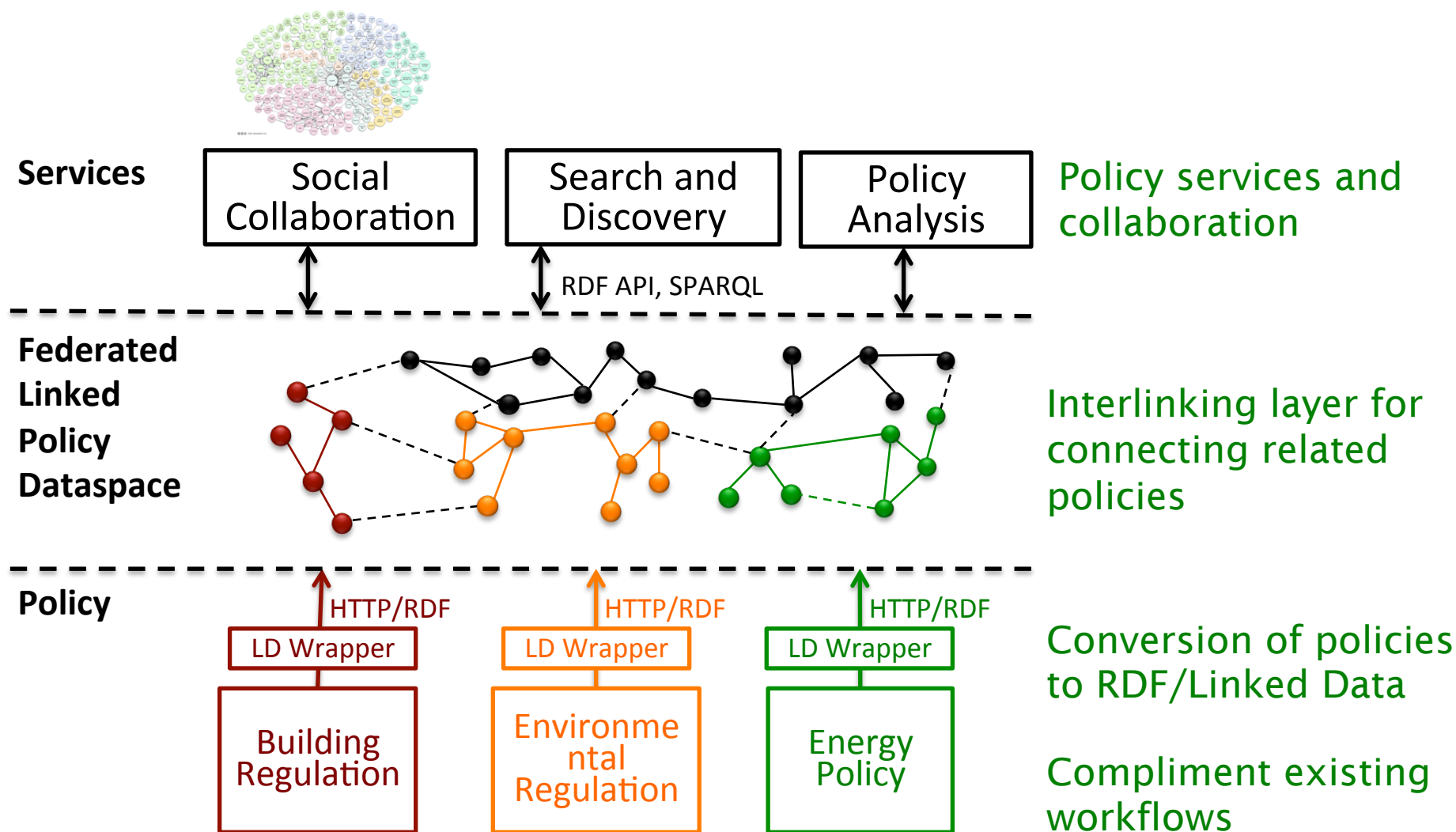


- Compliment, not replace, existing practice and workflows with Linked Data Infrastructure

High-Level Reference Architecture

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Research Challenges

- What type of **lightweight policy semantic framework** can be used to improve coherence and accessibility to policy end users including the policy makers, policy engineers, etc.?
- What kind of processes is required to create a **sustainable semantic policy modelling practice** in governmental and international organizations?
- What kind of **technology infrastructure** is required to enable the modelling, linking, publishing and management of these semantic policies?
- What **policy analyses services** are possible?

