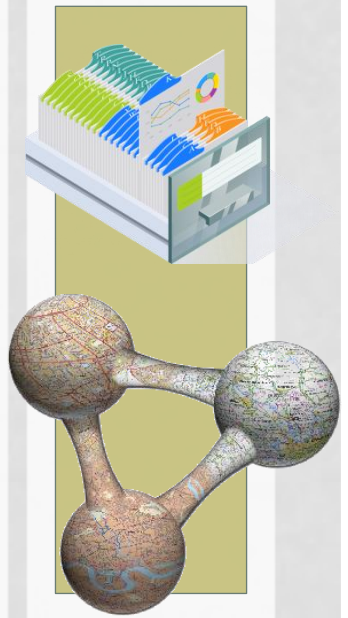
CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

Information Technologies Institute

LINKED OPEN DATA & DATA MANAGEMENT IN ENERGY SECTOR



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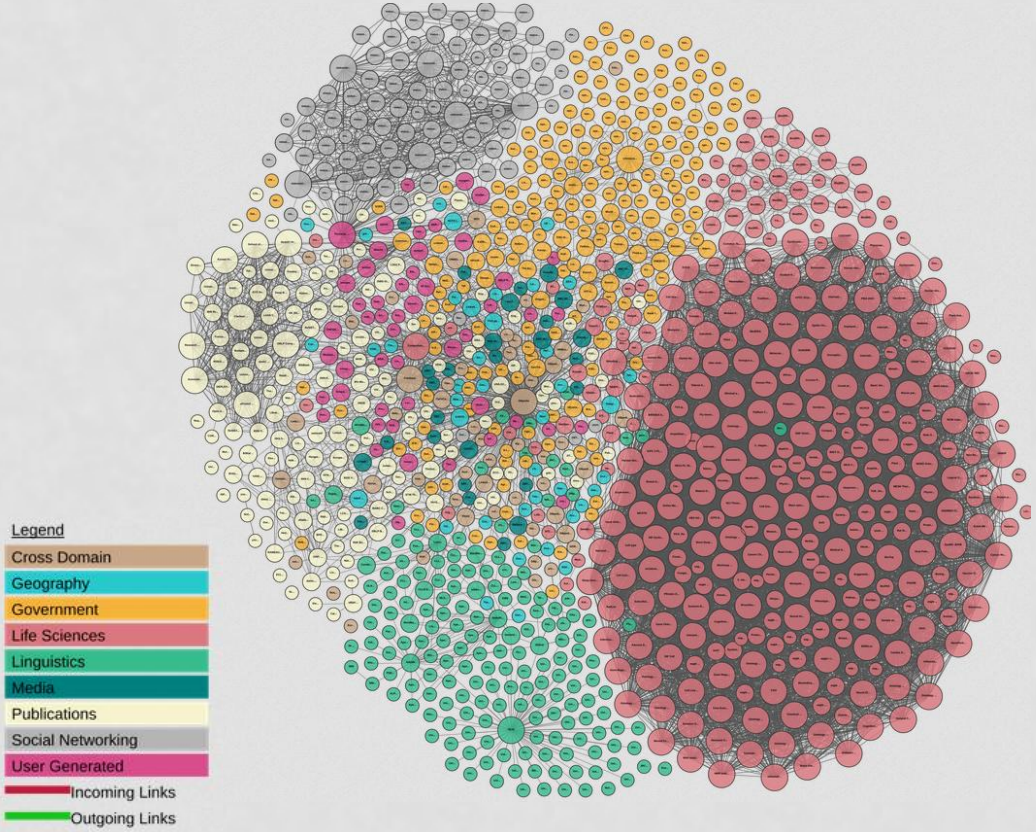
OUTLINE

- Introducing Linked Open Data
- LOD in EeB and BLCEM
- LOD Challenges & Questions
- EU DM Guidelines
- H2020 Use Case…

INTRODUCING LOD

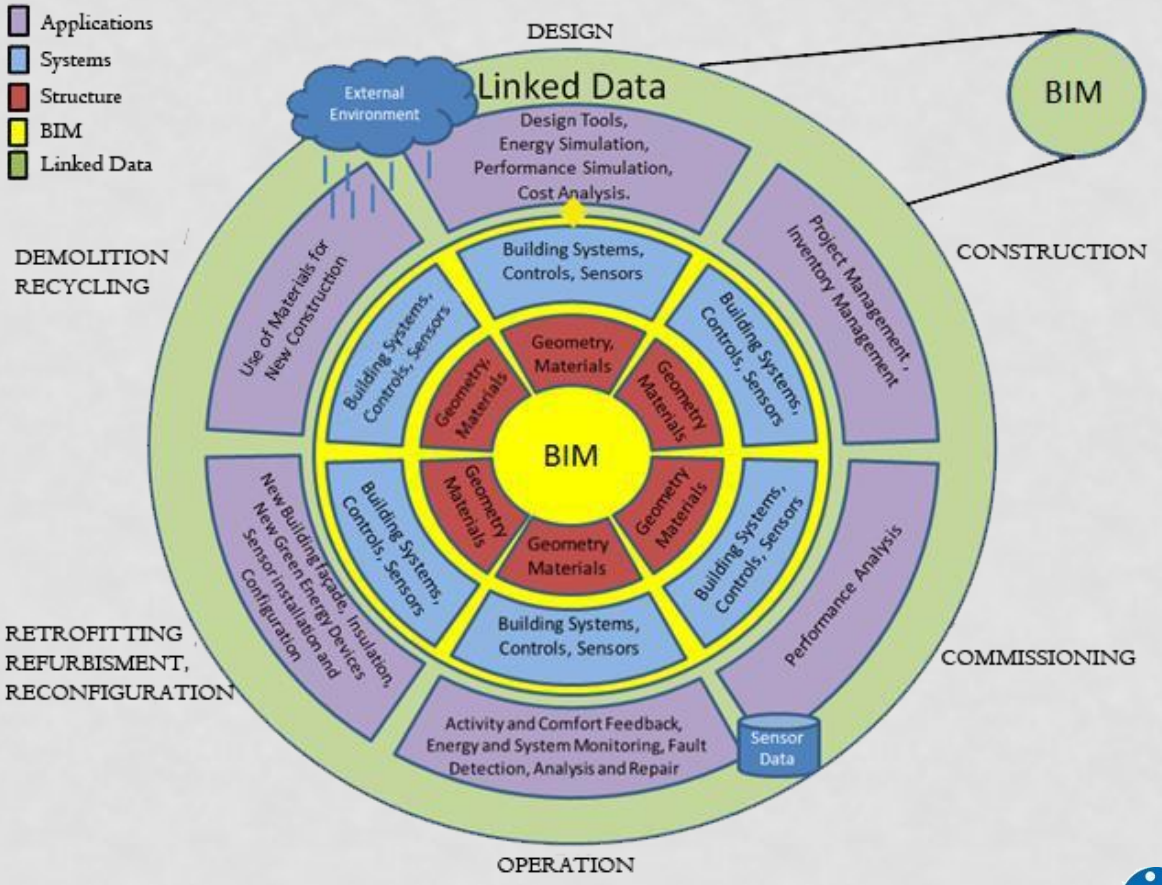
Linked Open Data Cloud



- Publishing of structured data
  - interlinked
  - more useful through semantic queries.
- It builds upon standard Web technologies to share information in a way that can be read automatically by computers.
- This enables data from different sources to be connected and queried.

LOD & BLC STAGES

- Building Life Cycle Energy Management Stages



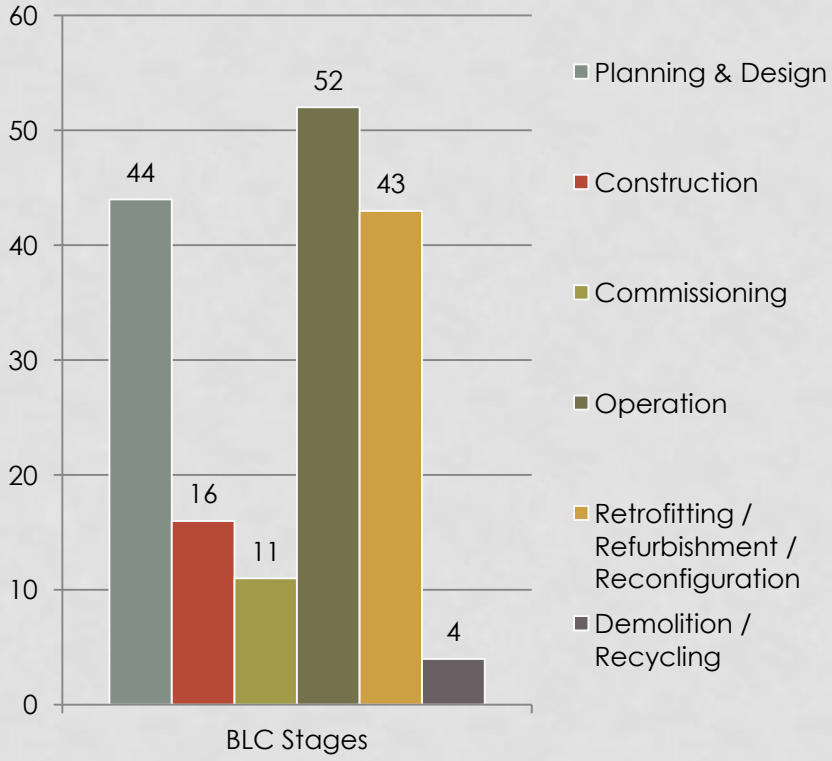
BLC STAGES & DATA DOMAINS (I)

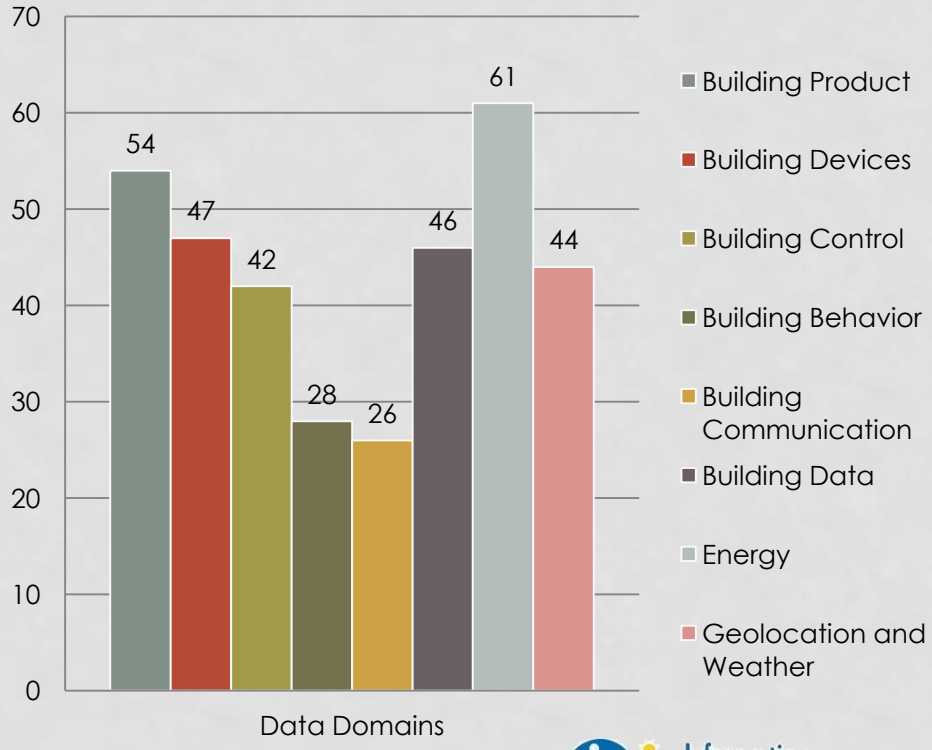
- Data Domains -> BLC

- Product
- Device
- Data
- Communication
- Behavior
- Control
- Geolocation
- Weather
- Energy

BLC STAGES & DATA DOMAINS (II)

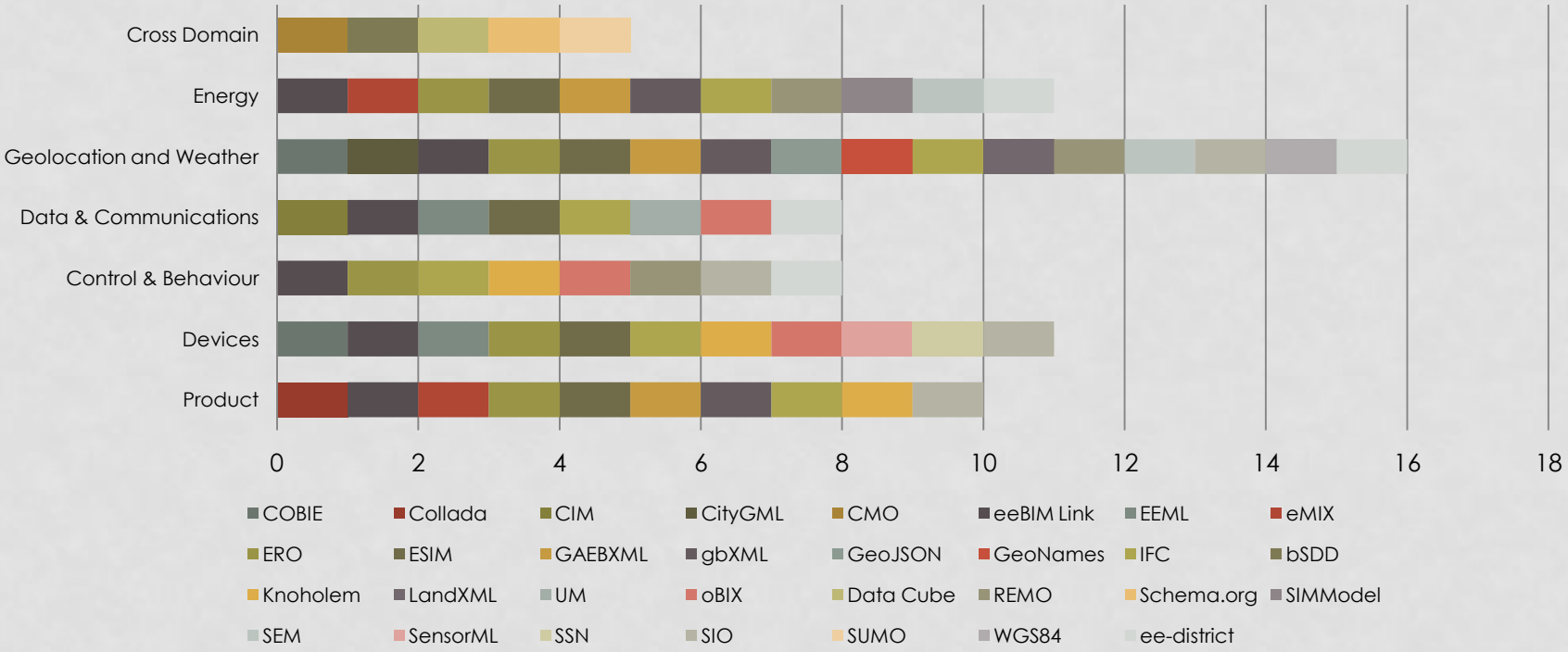
- Analysis of 100+ EeB Projects in EU Programmes (65 produced data)





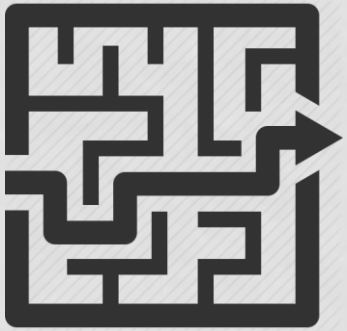
DATA DOMAINS & DATA MODELS

- 31 Different Data Models – Major Overlappings



LOD CHALLENGES

- Availability of content;
- Ontology availability, development and evolution;
- Scalability;
- Multilinguality;
- Visualization and
- Stability of Semantic Web languages.



LOD OPEN QUESTIONS

- *How to improve or even automate the **identification of ontology alignments** (see word matching algorithms)?*
- *How to foster **reuse** of existing ontology definitions?*
- *How to manage linked data, in particular in a collaborative environment where data is constantly updated? How to keep **consistency**; deal with **access rights** and **data versioning**?*
- *How is it possible to **effectively query** information from highly **heterogeneous data sources**?*
- *Do we still need a **shared vocabulary** (maybe as a simplified version), which often means a compromise for a specific use case, or does LOD allow to focus on highly optimized, use case specific ontologies?*

HOW TO DEAL WITH THAT?

A Proper Data Management is required:

- F.A.I.R. DM in Horizon 2020*
  - findable,
  - accessible,
  - interoperable and
  - re-usable
- Open Research Data Pilot (ORD)

F.A.I.R. DM IN HORIZON 2020

Includes:

- The handling of research data during & after the end of the project
- What data will be collected, processed and/or generated
- Which methodology & standards will be applied
- Whether data will be shared/made open access, and
- How data will be curated & preserved (including after the end of the project)

F.A.I.R. DM METHODOLOGY

F.A.I.R. Principles (Template)

- *Making data*
  - ***findable**, including provisions for metadata*
  - ***openly accessible***
  - ***Interoperable***
- *Increase data **re-use** (through clarifying licences)*

Further to the FAIR principles, DMPs should also address:

- Allocation of resources
- Data security
- Ethical aspects
- Other issues that may exist

HOW DO WE APPLY IT?

Collaborative Recommendations and Adaptive Control for Personalised Energy Saving
(2016: H2020-EE-07 2016 IA)

- Obj. 1: Stimulate behavioural change for energy saving…
- Obj. 2: Make energy usage data accessible to consumers ...
- Obj. 3: Demonstrate that individual comfort levels can be maintained while achieving energy savings.
- Obj. 4: Validate the relative effectiveness of different types of behavioural change interventions for different types of users, in different types of settings and in different climatic conditions.
- Obj. 5: Make the enCOMPASS platform, digital tools, services and acquired energy data available …
- ***Participating in the ORD Pilot as a Project***

DMP & LOD IN ENCOMPASS (I)

- Collection of energy-related data (mainly consumption) in
  - households,
  - schools and
  - public buildings

- In Pilots located in
  - Germany (Haßfurt)
  - Greece (Athens & Thessaloniki)
  - Switzerland (Gambarogno)

DMP & LOD IN ENCOMPASS (II)

Initial Approach – Definition of:

- *Purpose of data collection*
- Relation to the objectives
- Types & Format of Data
- *Re-use of existing data*
- *Origin of data*
- *Users of the data*

Second Approach – FAIR compliance.

MAKING DATA FINDABLE

- Annotation using public metadata standards
  - DDI will be used for socio-economic data where possible, and
  - OGC's will be used for sensor generated data.
- Provided the data is not covered by NDAs and it does not violate ethics, it will be published using the Zenodo platform, which enables the association of a DOI to the generated data sets.
- Data sets will be catalogued by a structured approach to a naming convention defined as follows:

enCOMPASS_TYP_AAA_CC_PP_BTY_BLDID_vXX_(short_title)

This convention might be revised according to the specific needs arising during the project.

MAKING DATA ACCESSIBLE

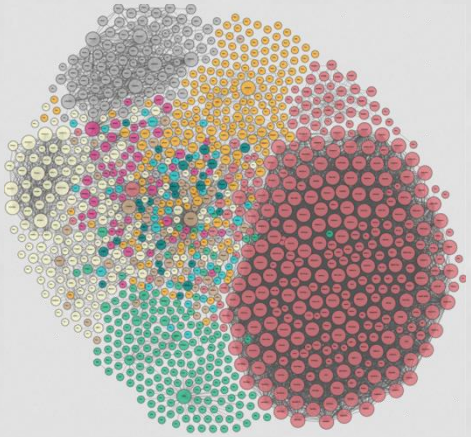
- Data will be published using an open platform such as Zenodo, aiming for compliancy with the OpenAIRE initiative.
- Anonimization & user(s) clearance must be issued by the data owners
- Restricted data will not be published online and will not be made available to the public.

MAKING DATA INTEROPERABLE

The interoperability of the collected data will be ensured by the compliance to standard ontologies as much as possible (DDI and OGC's)

INCREASE DATA RE-USE

- Open Access is supported by the use of Zenodo (Clarifying licenses).
- Data will be available to the public as long as the Zenodo repository will be available.
- Feeding the Cloud…



ENCOMPASS CONSORTIUM

POLITECNICO DI MILANO

NABU

ktu kaunas university of technology 1922

iti Information Technologies Institute

SETMOBILE

stadtwerk haßfurt

EIPCM EUROPEAN INSTITUTE FOR PARTICIPATORY MEDIA

Scuola universitaria professionale della Svizzera italiana SUPSI

PARADOX ENGINEERING UNLOCKING THE VALUE OF YOUR DATA

EKT ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΤΕΚΜΗΡΙΩΣΗΣ NATIONAL DOCUMENTATION CENTRE

GRAVITY Research & Development

SES Società Elettrica Sopracenerina

KALEIDOS GAMES

WATT+VOLT

Thank you

QUESTIONS???

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