SEMIC conference 2025

Interoperability for impact

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WORKSHOP

INSPEC - challenges of reusing standards for semantic modelling

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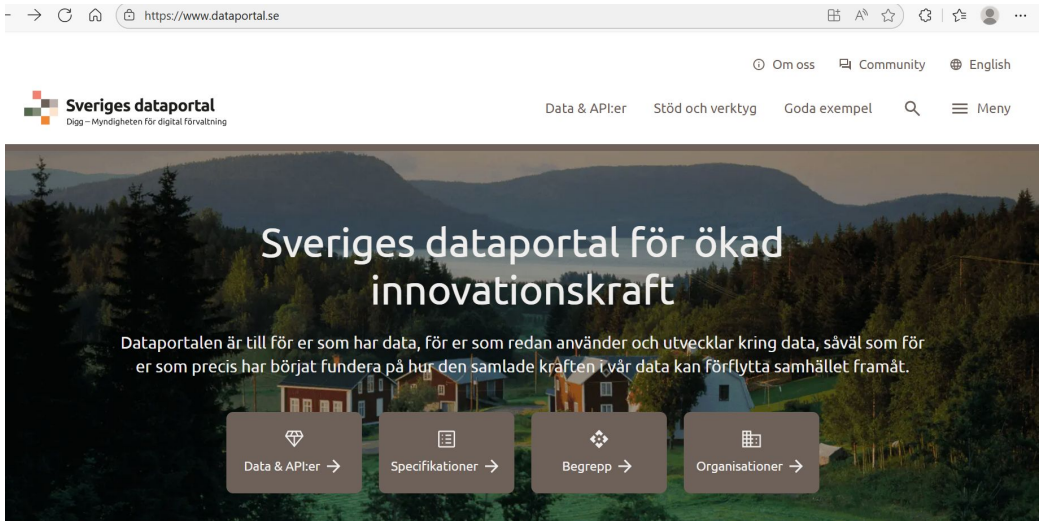
Challenges associated with specifications today

- Often have different structure (PDF, XML, Word)
- Parts of specifications and specifications are described in different ways (code lists, free text, data models, rules)
- Not easy to find, accessible, interoperable and reusable
- Typically not optimized for machine readability



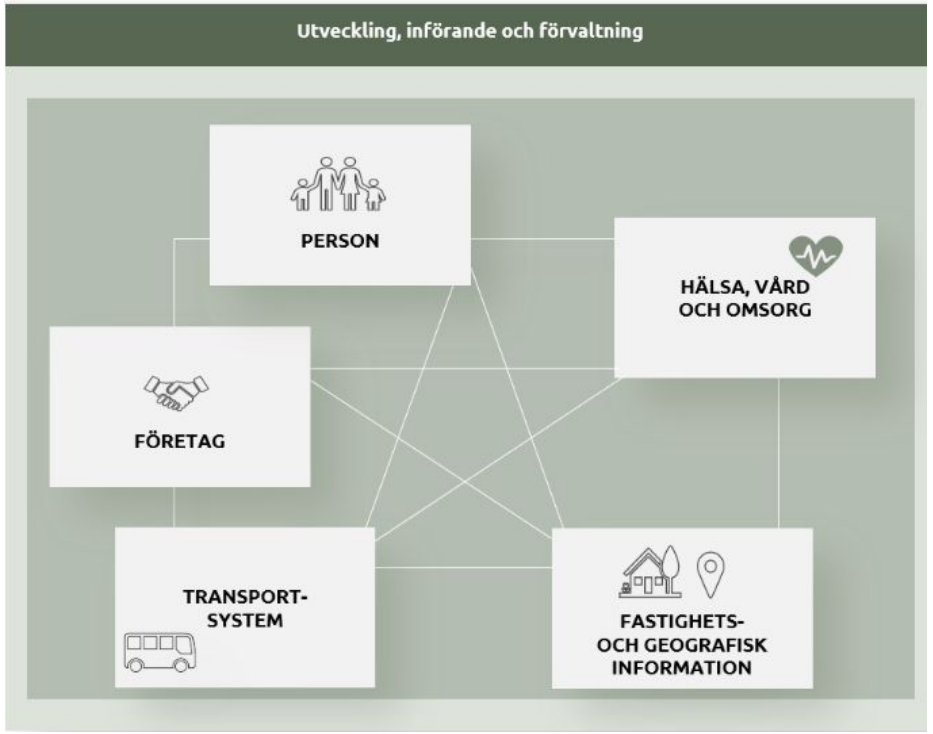
Prestudy on how to support semantic modelling/ interoperability in Sweden

- National registry of information models

- National registry of information models parts

Why are national base data interesting?

- Data produced by public actors
- Used by multiple consumers
- Are important to society
- Should be able to be used effectively and easily
- Should be standardized, interoperable and have descriptions made available



Seven requirements on information modelling

1. Enable a central registry of information models (specifications)
2. Harvesting of information models / not only a central tool
3. Handle parts of information models as linked data to allow reuse
4. Enable a central registry over information model parts
5. Extract information model (parts) from UML class diagrams
6. Central tool for building information models and their parts
7. Diagram representation of information models

Benefits to achieve

- Create open, machine-readable data specifications for common use
- Standardize metadata and data structures
- Facilitating cross-domain digital services
- Reduce duplication of work through reuse of vocabularies and profiles

Initiative focusing on structural metadata and interoperability

1. **Completed:** develop a profile for how a specification should be structured to promote interoperability and reuse of semantic building blocks**:** *Interoperable Specifications Profile | INSPEC – Interoperable Specifications Profile (http://w3id.org/inspec)*
2. **Ongoing work:** how INSPEC could be applied in practice through practical cases
3. **Next steps:** maturing solution aiming for production environment at dataportal.se, look at needs for tools

Application of INSPEC - three cases and potential benefits

Swedish National Base Data

Refers to foundational datasets like population registers, addresses, and personal identity information, widely reused across public administration

INSPEC offers uniform descriptions and context for foundational datasets like registers and identity information. Data consumers can reliably interpret these core datasets, reducing misinterpretations and errors when integrating or analyzing data.

Application of INSPEC - three cases and potential benefits

Secure Digital Communication (SDK)

SDK is a Swedish framework implementing encrypted, structured messaging for sensitive data exchange between Swedish authorities, municipalities, and regions.

INSPEC clarifies message formats, field definitions, and validation rules, enabling data consumers to understand what information they receive, how to process it, and the business context behind each data point.

Application of INSPEC - three cases and potential benefits

Terminologies from Statistics Sweden (SCB)

SCB provides standardized code lists, such as SSYK (occupational codes) and SNI (industry codes), which are central for data-driven public service and statistics.

INSPEC enrich code lists with clear definitions, hierarchical links, and usage notes. Data consumers can easily look up and apply codes correctly in their systems, aiding semantic interoperability and consistent decision-making.

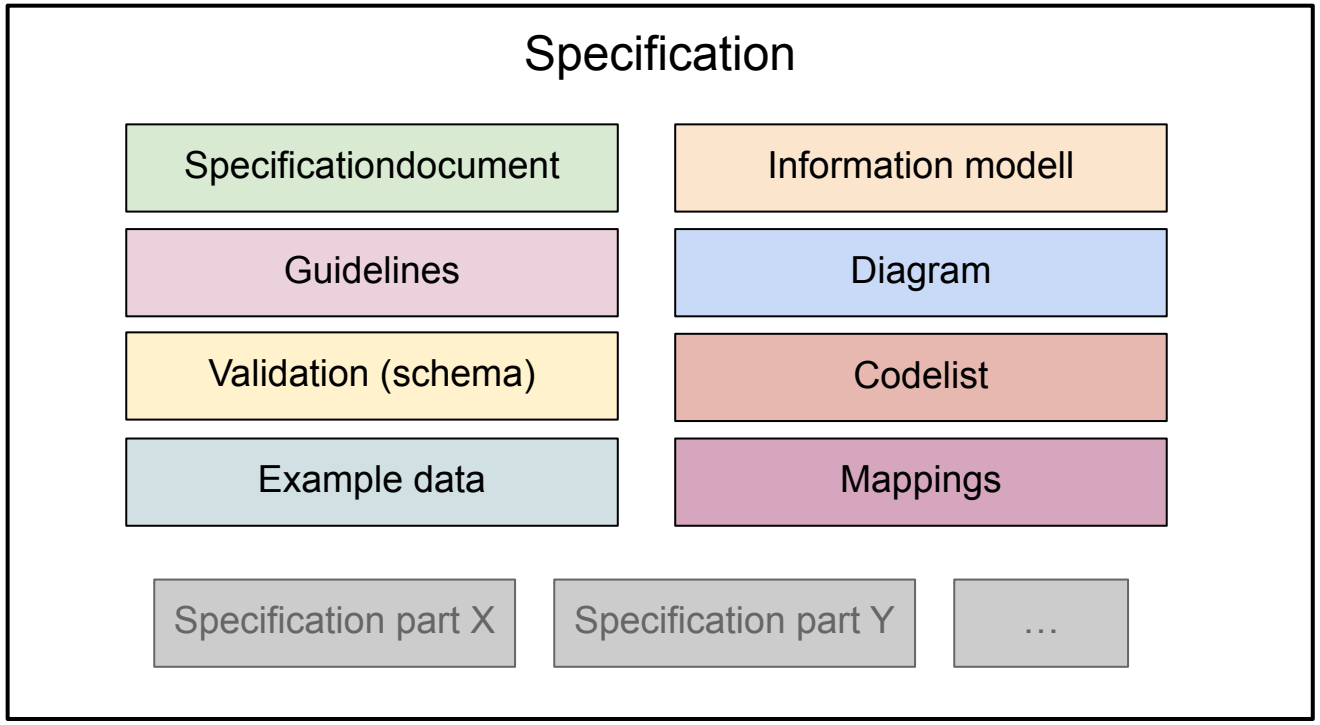
High level observations for semantic modelling

A. Semantic modelling practises will not be accepted overnight!

B. Avoid reinventing the wheel - Linked data principles fits well

C. Expose and foster **reuse** of semantic modelling **parts**

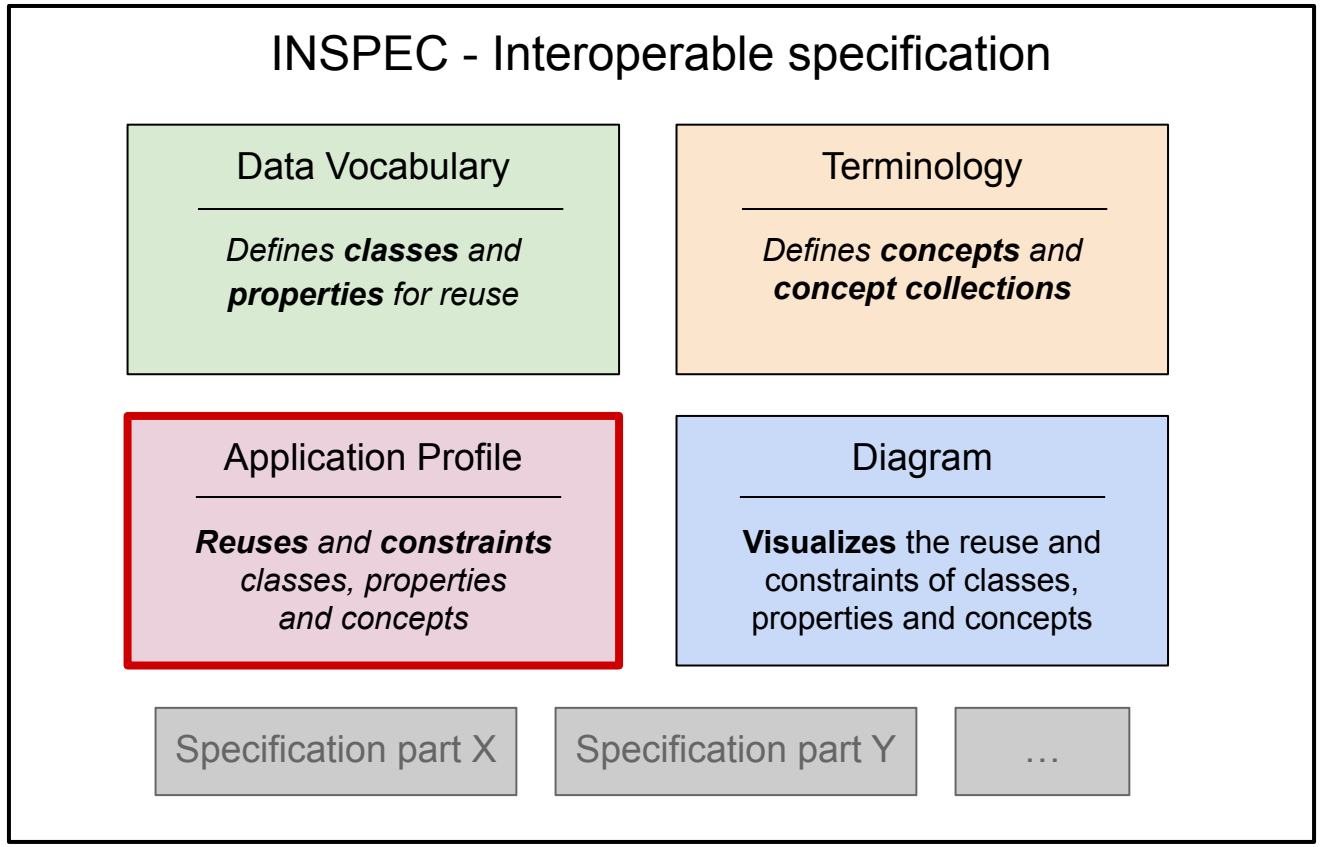
A. Semantic practises will not be accepted overnight!



Introduce the concept of a specification as a **package** that can contain many things.

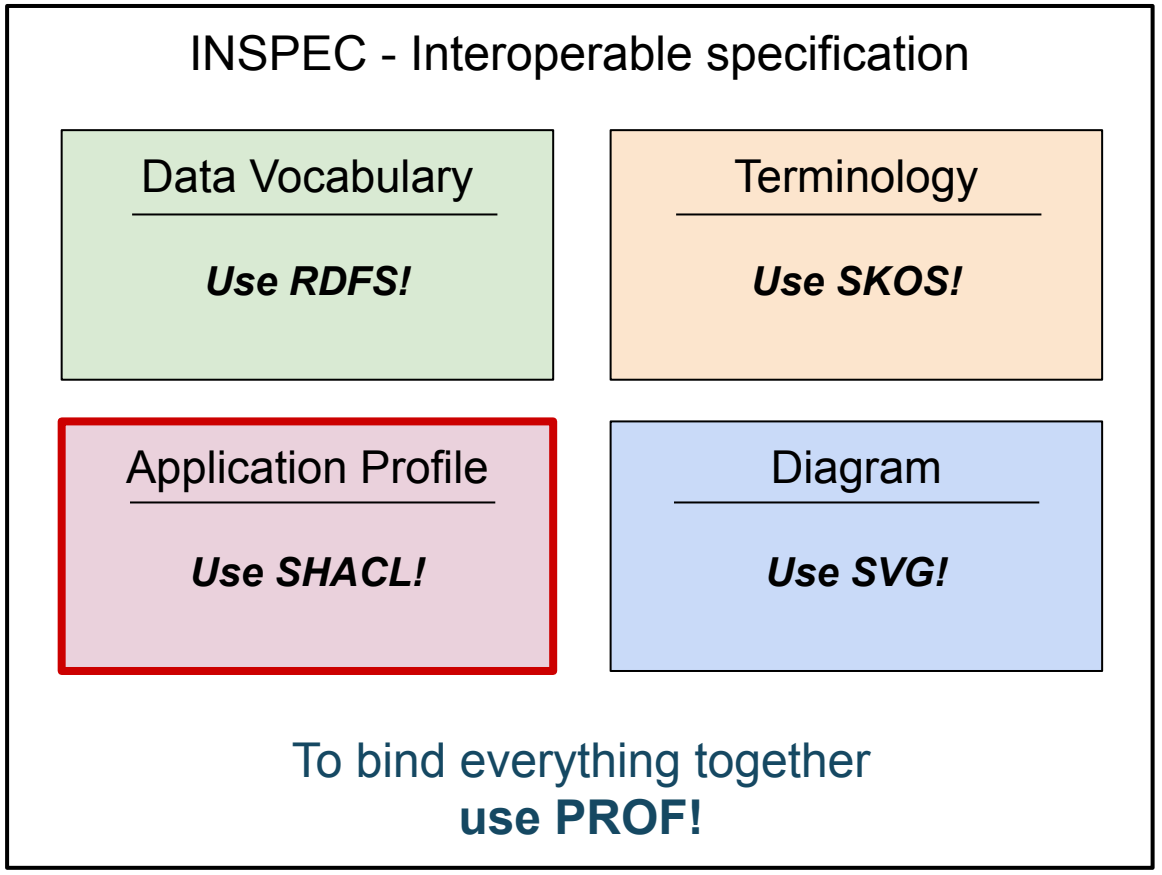
Some specifications will qualify as semantic

A. INSPEC attempts to define semantic specifications



A specification is semantic if:
it has an **application profile** that combines data vocabularies and maybe terminologies

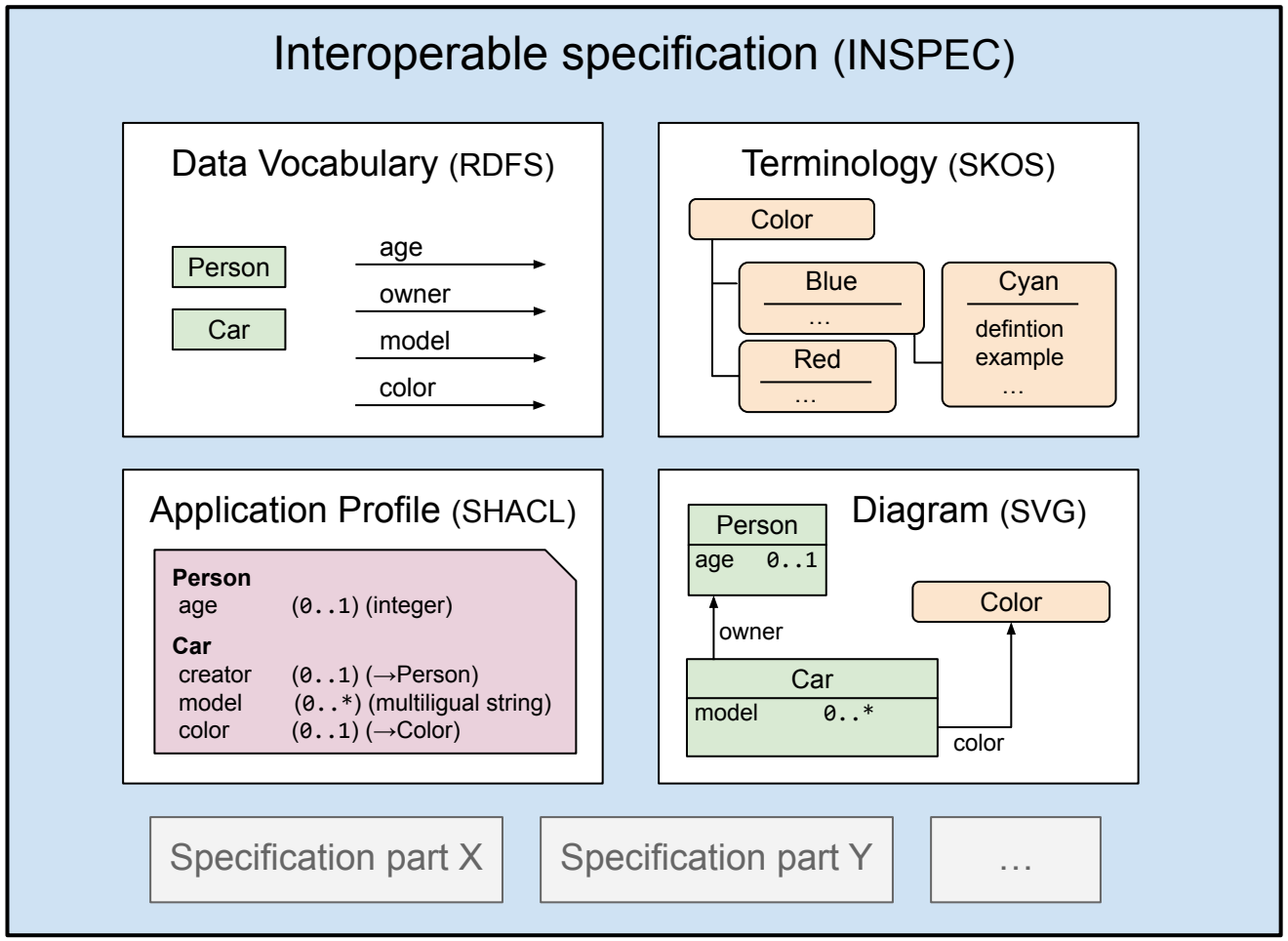
B. Avoid reinventing the wheel - Linked data works



We try to fit existing standards (or initiatives) together into a bigger whole.

We collect the rules for this to work into a profile (INSPEC)

B. How the parts fit together



The diagram is directed towards humans, the application profile provides the same information in a more machine processable manner

C. Expose and foster reuse of semantic modelling parts

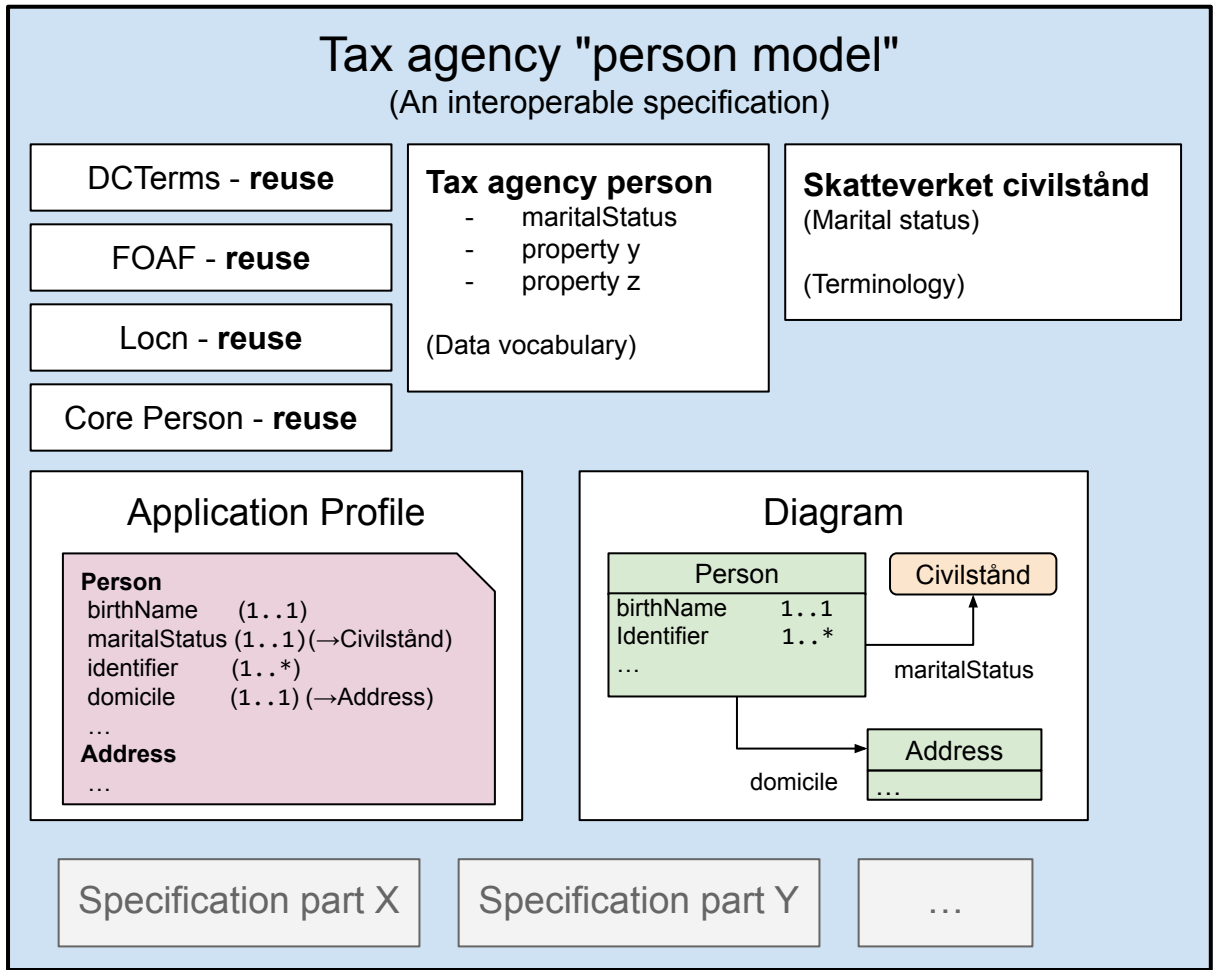
Case 1:

- reuse of classes and properties
- reuse of terminologies (SKOS Concept Schemes)

Case 2:

- reuse / extend application profiles
  (e.g. how to express that DCAT-AP-SE3 extends DCAT-AP3 in a machine processable way)

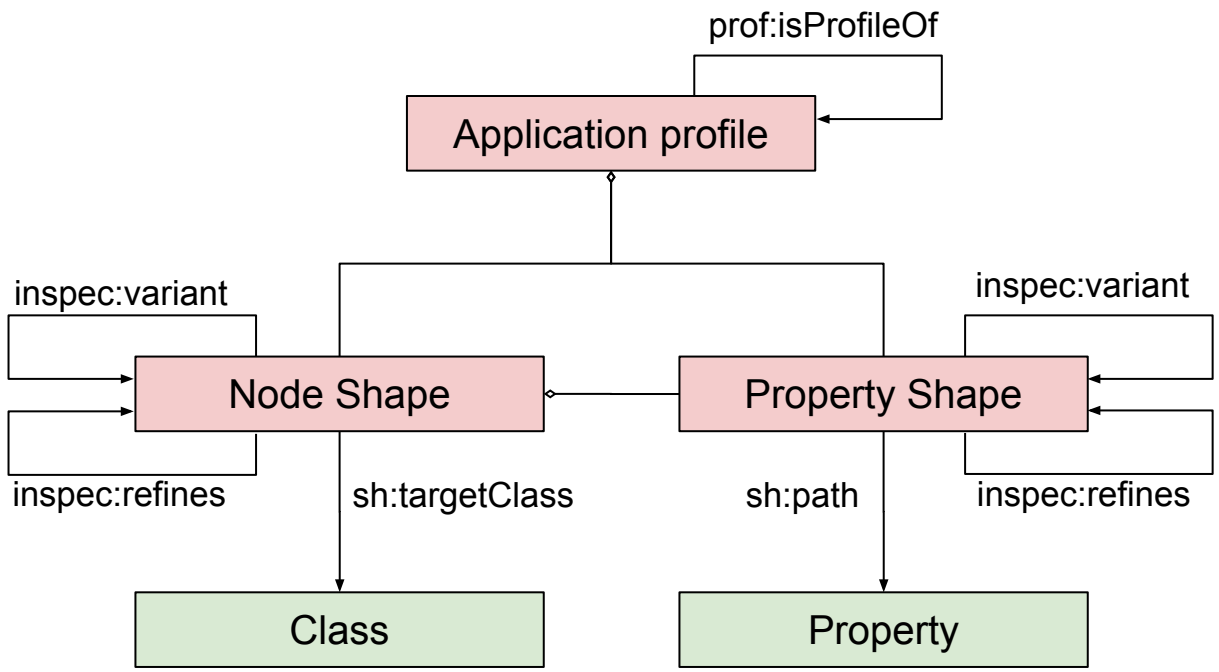
Case 1 - Reuse classes, properties and terminologies



We reuse classes and properties from data vocabularies
We reuse terminologies

In both cases they need to have been introduced in other (foundational) specifications

Case 2 - Reuse / extend application profiles



We can lend parts of application profiles across specifications by pointing to them via either inspec:variant or inspec:refines

Requires stable URIs for SHACL shapes

Generic challenges / next steps we foresee

Generic Semantic modelling challenges:

- Information about things vs. Data Structures
- Subclassing vs. Profiles

How to handle INSPEC complexity

- Many different standards combined may be hard to understand
- Extra rules for SHACL to work as Applicaiton Profiles, is that ok?
- Tooling around INSPEC to help compliance

Compatibility with other modelling paradigms

- Use OSLO framework to interpret UML
- CSVW (we have plans)
- FHIR?
- …

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QUESTIONS?

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THANK YOU

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