A DCMI constraint language for Description Set Profiles

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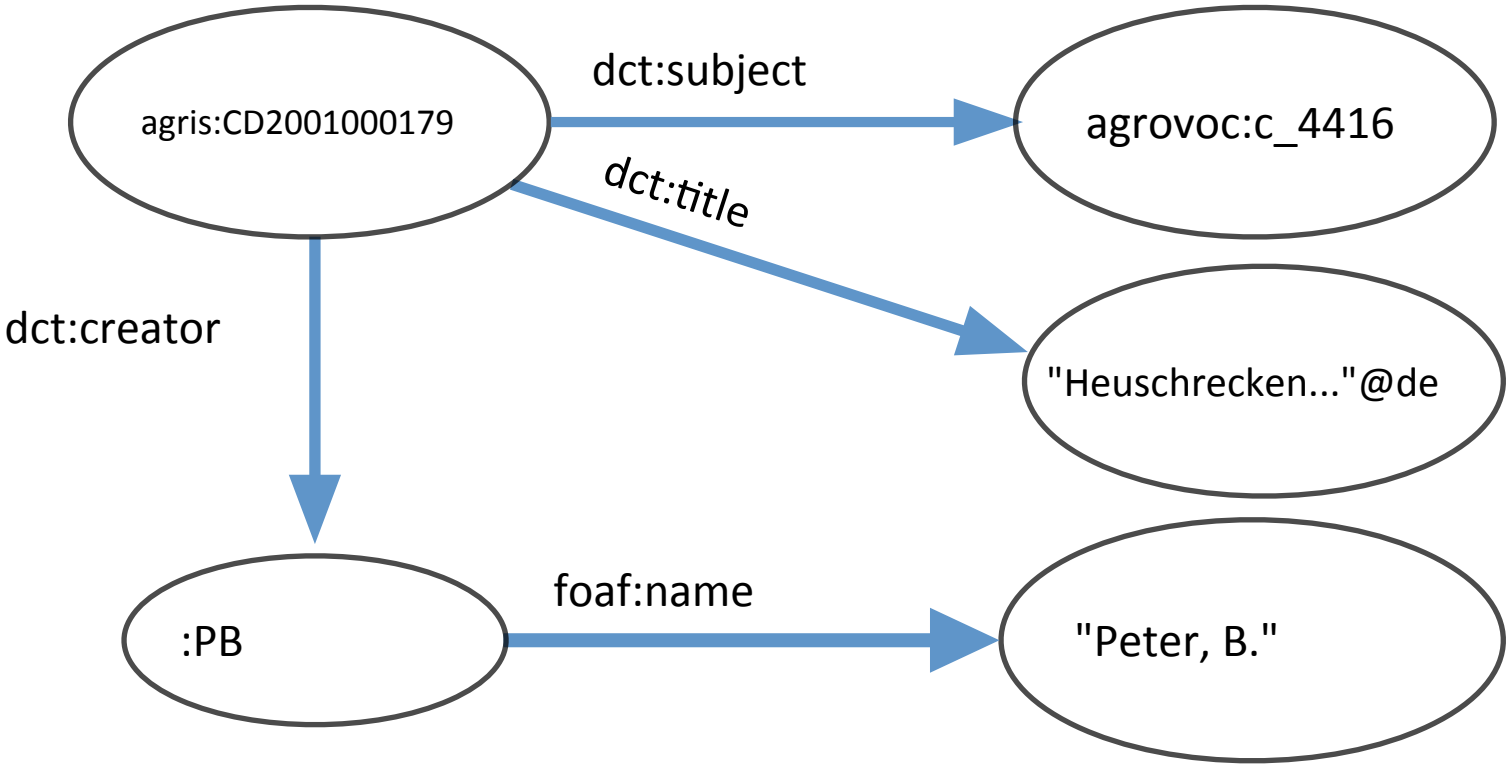
From Record Format to RDF vocabulary

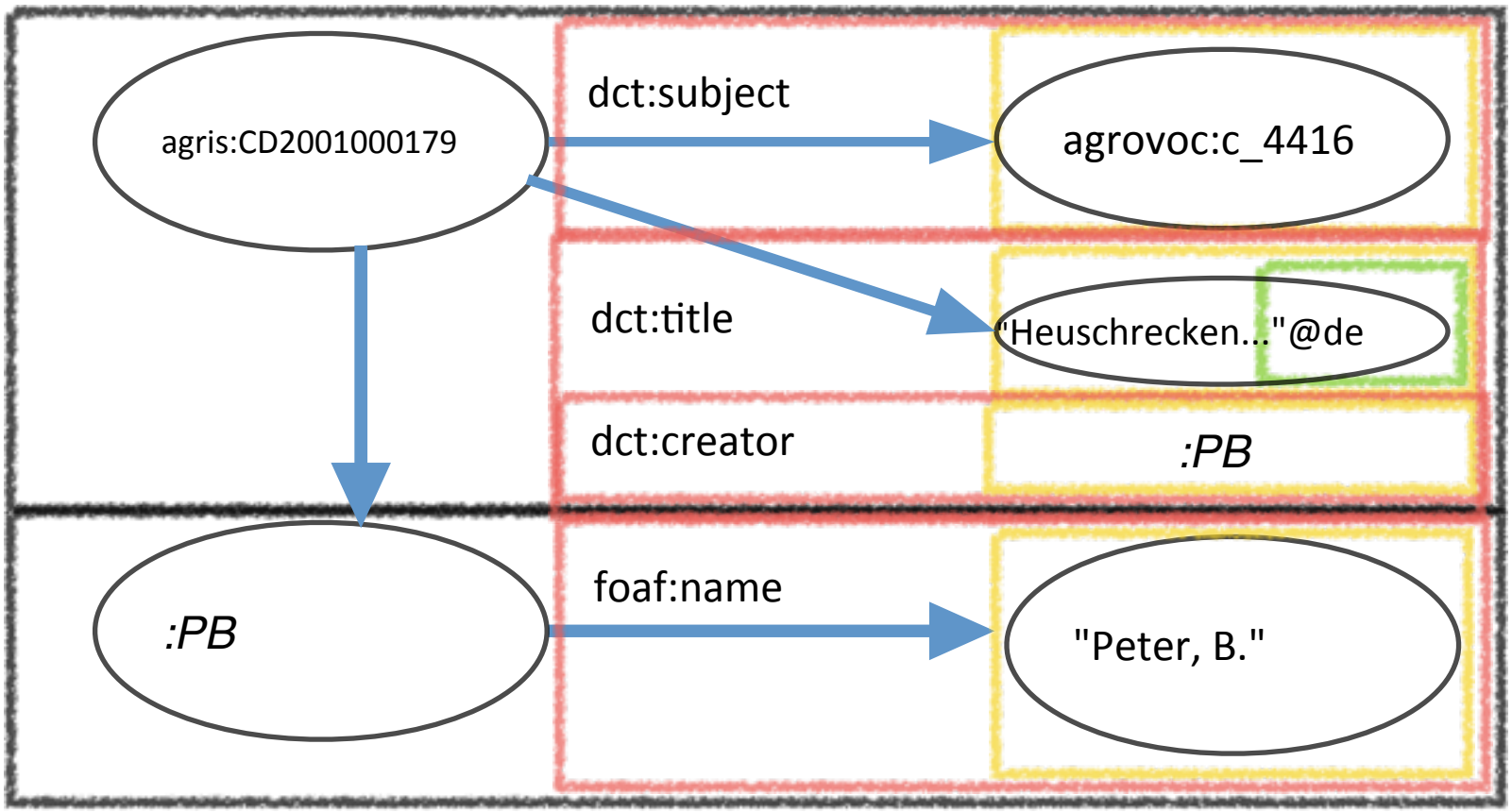
- **1995** Dublin Core as “simple metadata record”
- **1999** Dublin Core as an RDF vocabulary
- **2000** “Application profiles” mix-and-match
- **2003-2007** DCMI Abstract Model
  - Basis for templating validatable record formats
  - Formats straightforwardly mappable to RDF triples

Bridging two mindsets

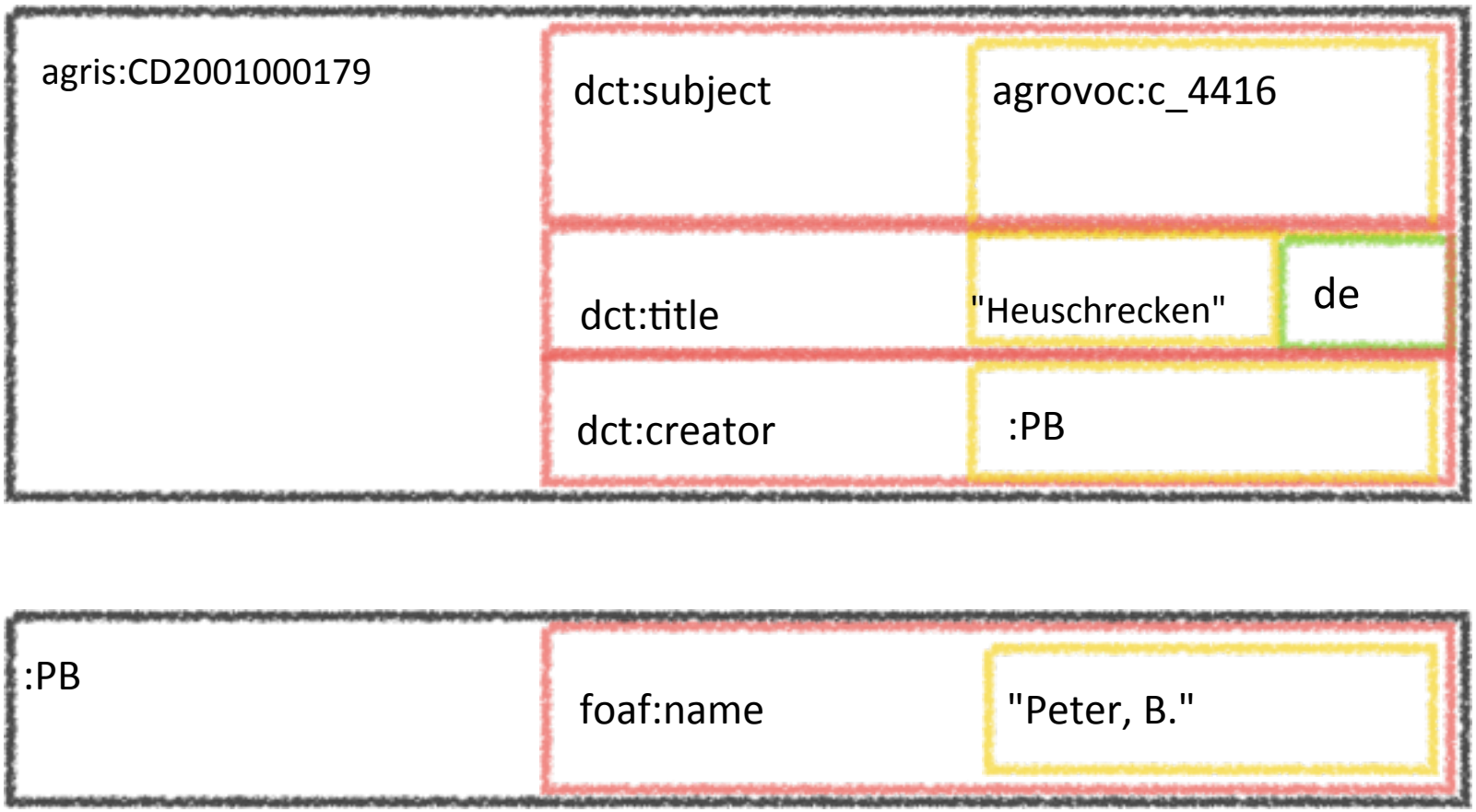
- Oriented to ***Record Formats***
  - Bounded sets of fields to be "filled in" with information
- Oriented to ***Graphs***
  - Unbounded webs of information connected by statements



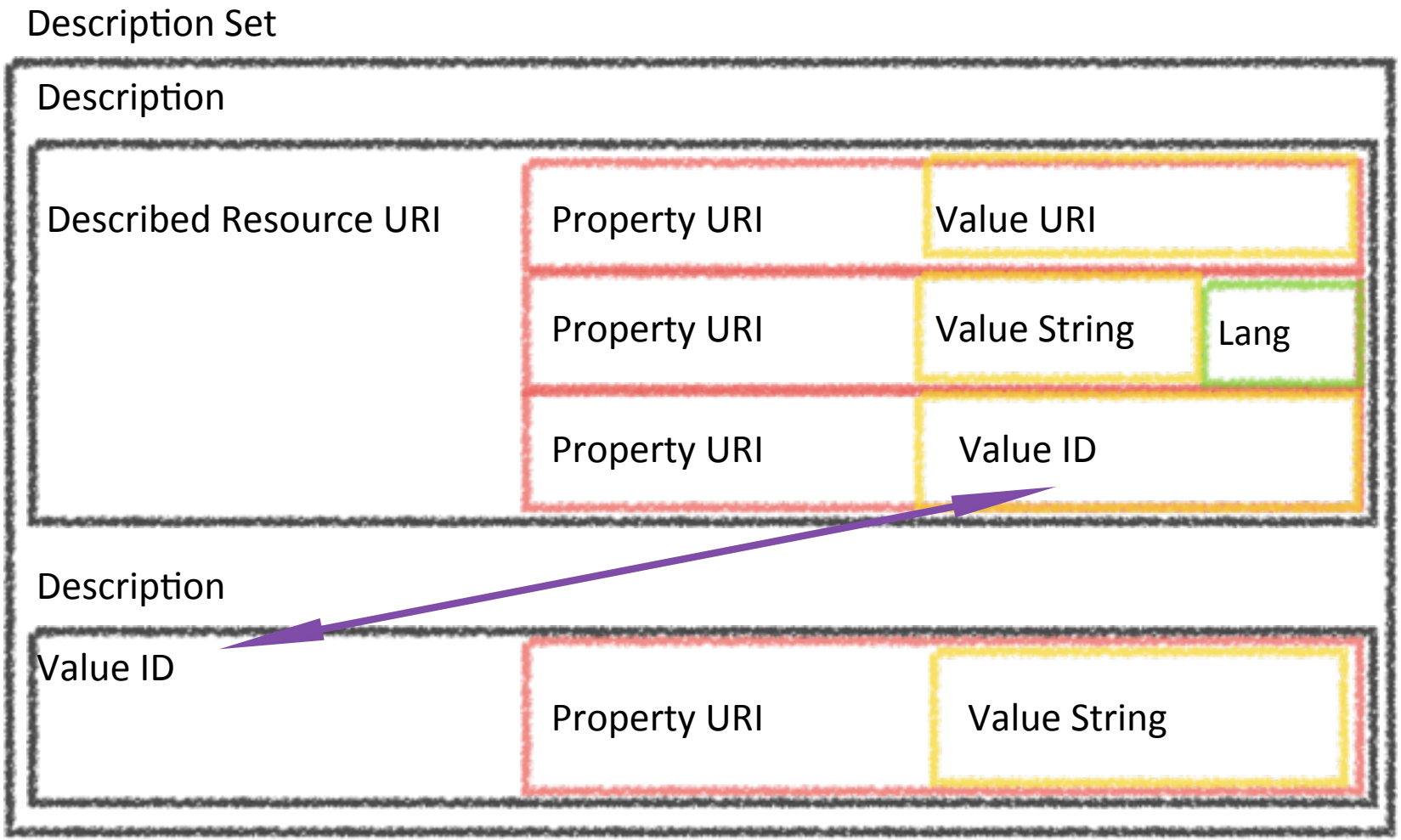
Let's take a graph...



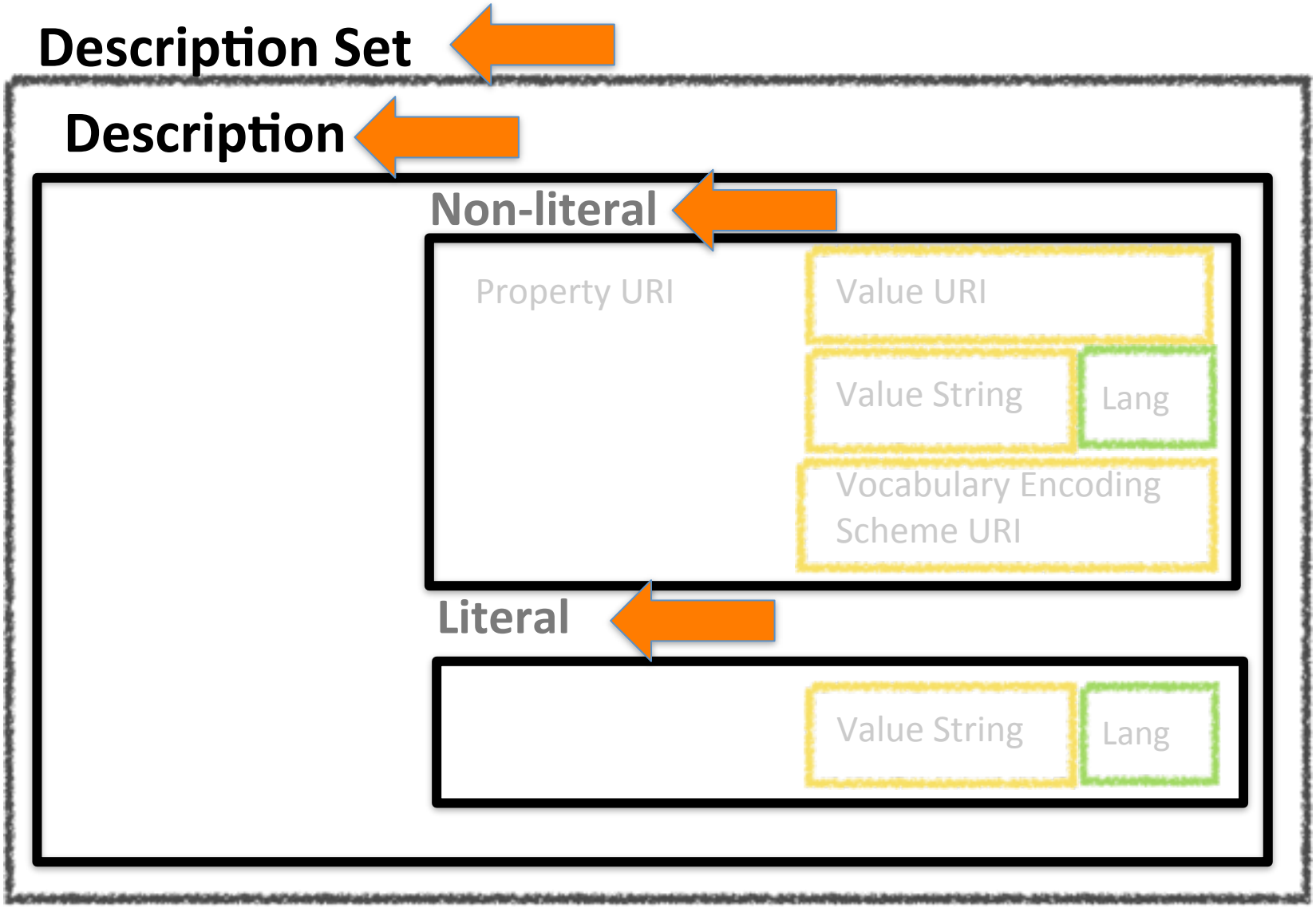
...view it in terms of a “record”...



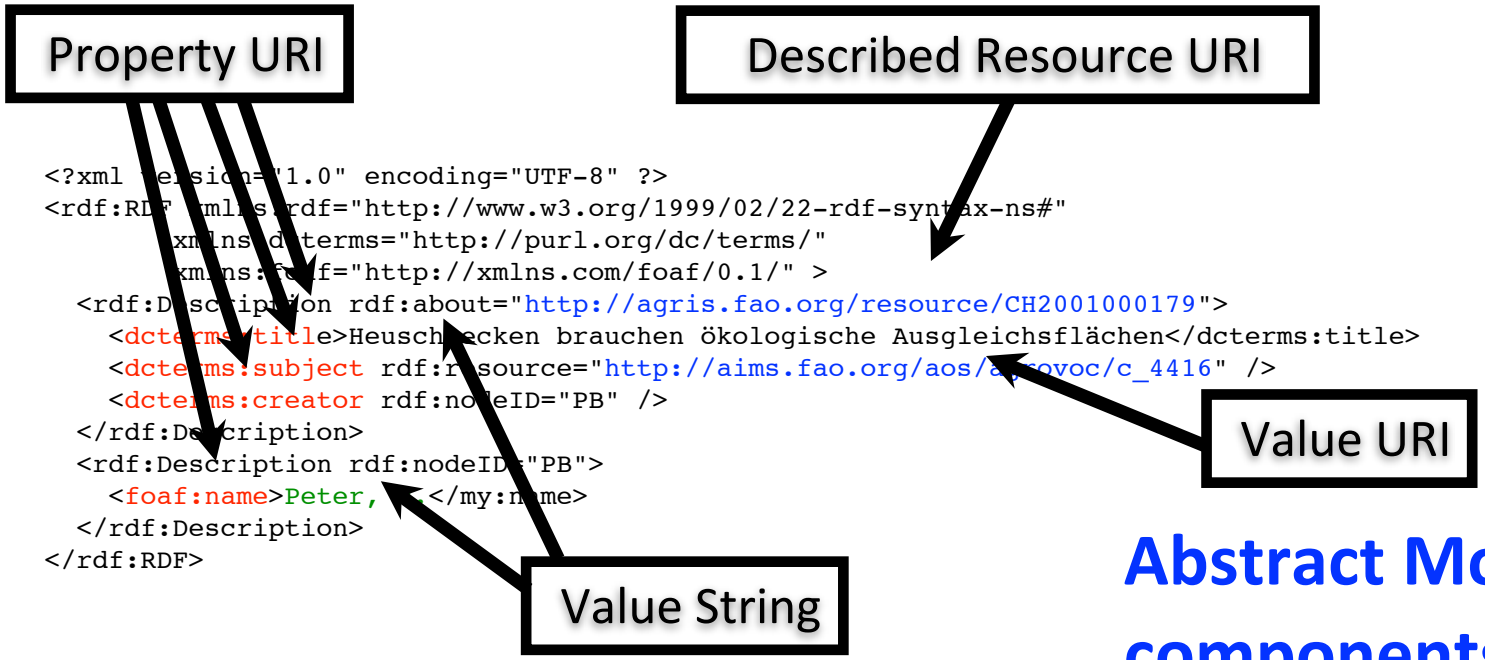
...focusing on components that can be validated...



..and abstract those components to a generalized model.



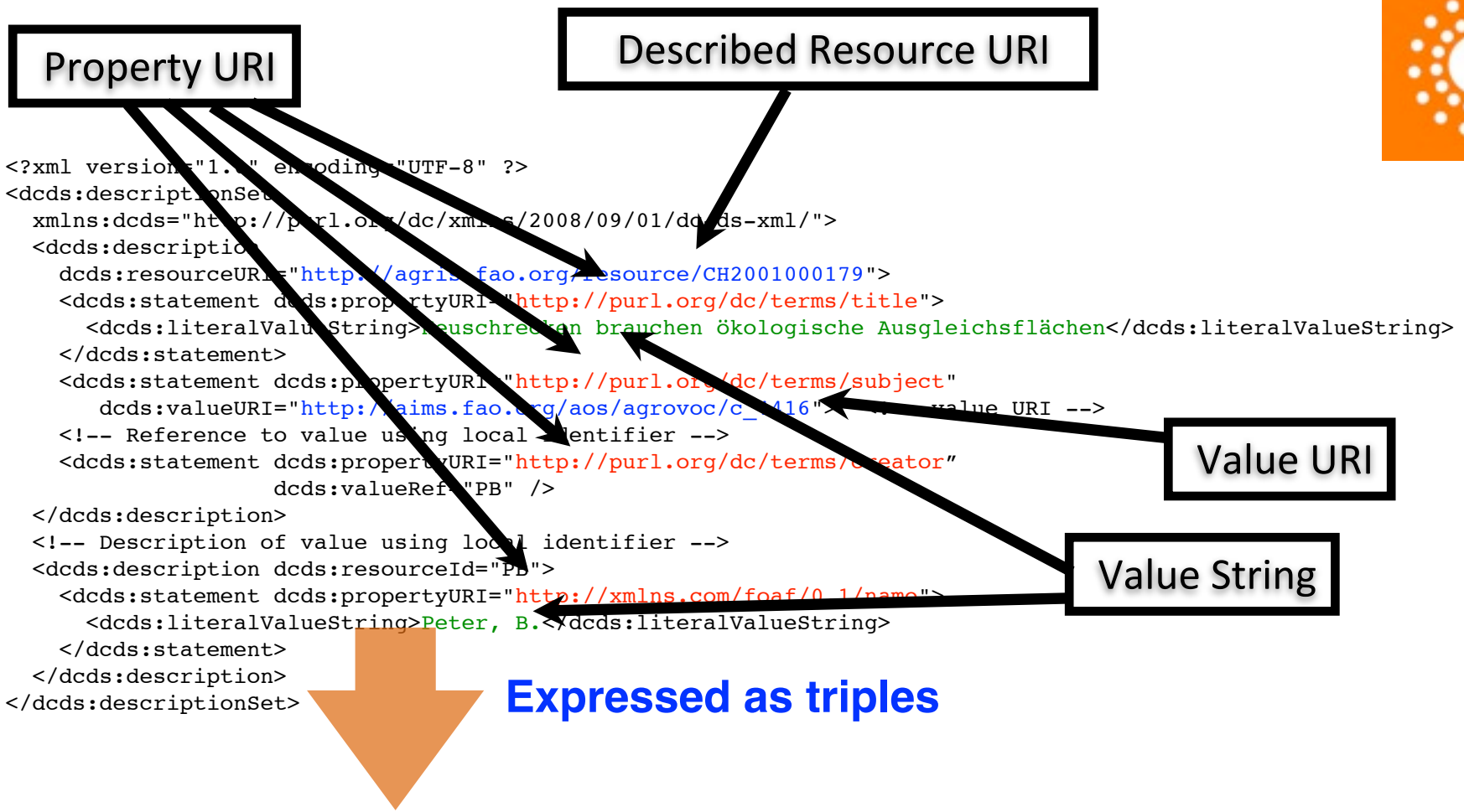
...using grouping constructs with no equivalent in RDF.



Abstract Model components embedded in application syntaxes

Expressed as triples

Subject	Predicate	Object
agris:CD2001000179	dct:subject	agrovoc:c_4416k
agris:CD2001000179	dct:title	"Heuschrecken..."@de
agris:CD2001000179	dct:creator	:PB
:PBS	foaf:name	"Peter, B."



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2008 *draft* Description Set Profile Constraint Language

- Constraints commonly required for validation:
  - *minOccurs/maxOccurs*
  - *resourceClass* (what is the Description about?)
  - *standalone* (describe Person without describing Book?)
  - *valueURI* (mandate a particular controlled vocabulary)

Templates for Description Sets
Constraints on Templates

```
Description Set [template]
    Description [template]
        Statement [template]
            Property  [constraint]
                <http://purl.org/dc/terms/subject>
            VocabularyEncodingSchemeURI [constraint]
                <http://aims.fao.org/aos/agrovoc>

        Statement [template]
            Property  [constraint]
                <http://purl.org/dc/terms/title>
            MinOccurs [constraint]
                1
            MaxOccurs [constraint]
                1

        Statement [template]
            Property  [constraint]
                <http://purl.org/dc/terms/creator>

    Description [template]
        Resource Class [constraint]
            <http://xmlns.com/foaf/0.1/Person>
        Statement [template]
            Property  [constraint]
                <http://xmlns.com/foaf/0.1/name>
```

- Data using this Description Set Profile describes:

  a Resource with *exactly one* [DC] *title*,

  the [DC] *subject* of which is a *URI from AGROVOC*.

  Authors, i.e. members of the [*FOAF] class Person* that have *[FOAF] names*.

Templates and Constraints

- Description Template constraints: Identifier, Standalone, Minimum occurrence, Maximum occurrence, Resource class membership
- Statement Template constraints: Minimum occurrence, Maximum occurrence, Type
  - Property constraints: Property list, Sub-property
  - Literal Statement Template constraints:
    - Literal value constraints: Literal list, Literal language, Literal language list, Syntax Encoding Scheme, Syntax Encoding Scheme list
  - Non-literal Statement Template constraints:
    - Non-literal value constraints: Description template reference, Class membership
      - Value URI constraints: Value URI occurrence, Value URI list
      - Vocabulary encoding scheme (VES) constraints: VES occurrence, VES list
      - Value string constraints: Minimum occurrence, Maximum occurrence (plus all other constraints that apply to literal values - see above)

Record

Resource A

```
{
    "items" : [
        {
           "id": "http://bibfra.me/work/u2",
           "title" : "Bluebeard",
           "titleRemainder" : "a novel",
           "type" : "Book"
           "classification" : "025.3 M465f 2008",
           "author" : "http://bibfra.me/auth/person/kurt_vonnegut",
           "subject": [ "http://bibfra.me/auth/subject/foo",
                                "http://bibfra.me/auth/subject/bar" ],
           "language": "english",
           "summary": "Broad humor and bitter irony collide in this fictional
autobiography of Rabo Karabekian, who, at age seventy-one, wants to be left alone on his
Long Island estate with the secret he has locked inside his potato barn. But then a
voluptuous young widow badgers Rabo into telling his life story—and Vonnegut in turn
tells us the plain, heart-hammering truth about man's careless fancy to create or destroy
what he loves.",
            "hasInstance": "http://bibfra.me/instance/u2-1"
        },
```

Resource B

```
        {
           "id": "http://bibfra.me/instance/u2-1",
           "type": "HardcoverBook",
           "edition": "1st",
           "volumes": "1",
           "pages": "300",
           "date" : "1987-09-02",
           "publisher" : "http://bibfra.me/auth/org/delacorte_press",
           "ISBN": "9780385295901",
           "image": "http://ecx.images-amazon.com/images/I/51vbo8zwJlL._SL160_.jpg"
        }
    ]
}
```

Description Set

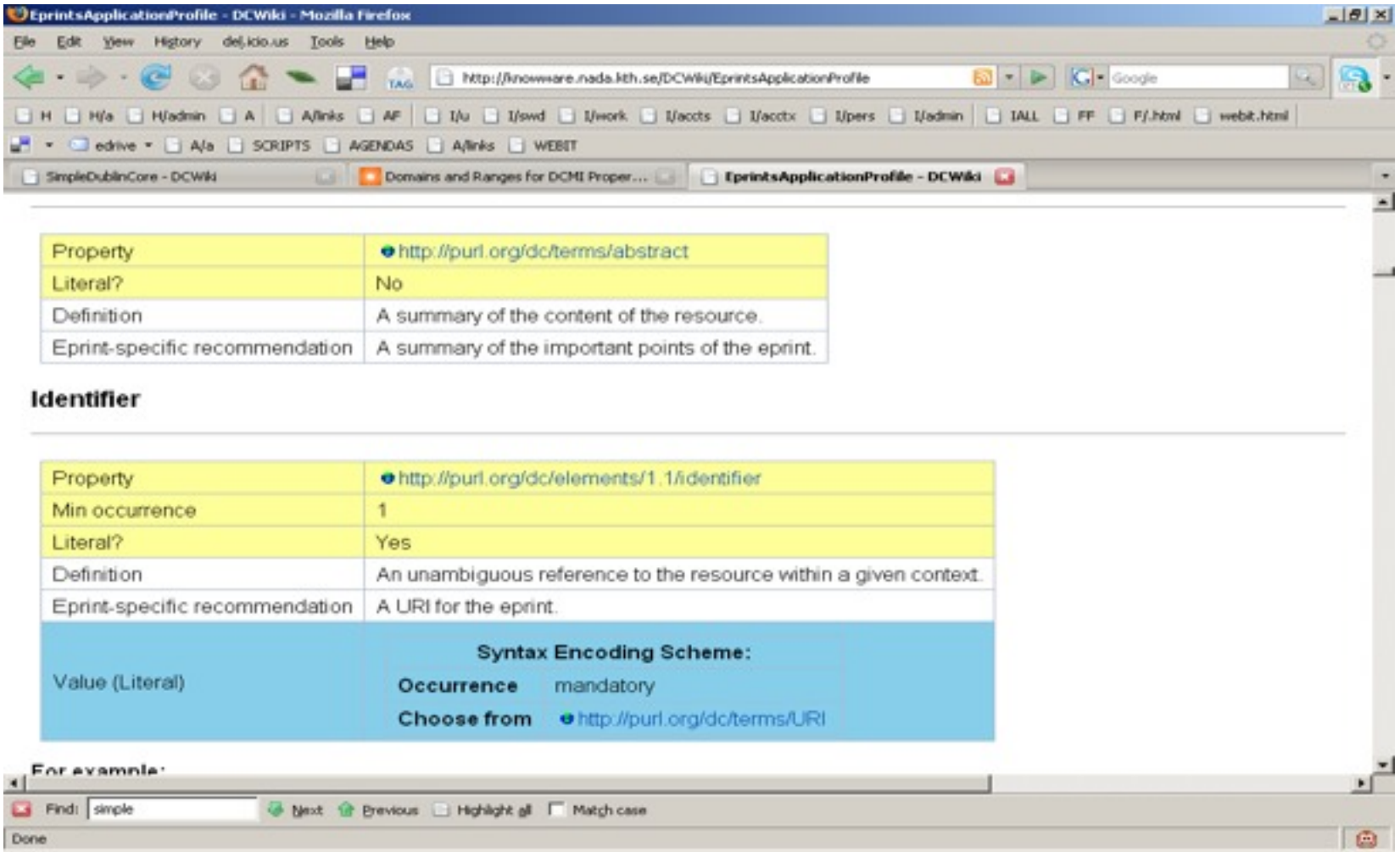
Templating Descriptions

```
{
    "items" : [
        {
           "id": "http://bibfra.me/w
           "title" : "Bluebeard",
           "titleRemainder" : "a nov
           "type" : "Book"
           "classification" : "025.3
           "author" : "http://bibfra
           "subject": [ "http://bibf
                                  "h
           "language": "english",
           "summary": "Broad humor a
autobiography of Rabo Karabekian, wh                                    s
Long Island estate with the secret h
voluptuous young widow badgers Rabo
tells us the plain, heart-hammering                                     oy
what he loves.",
           "hasInstance": "http://bibfra.me/instance/u2-1"
        },
        {
           "id": "http://bibfra.me/i
           "type": "HardcoverBook",
           "edition": "1st",
           "volumes": "1",
           "pages": "300",
           "date" : "1987-09-02",
           "publisher" : "http://bib
           "ISBN": "9780385295901",
           "image": "http://ecx.imag
        }
    ]
}
```

id	URI	"must be http://bibfra.me..."
title	String	"must be one"
titleRemainder	String	
type	String	from controlled vocabulary
classification	String	
author	URI	
subject	URI	
lang	String	
summary	String	
hasInstance	URI	"one and only one"

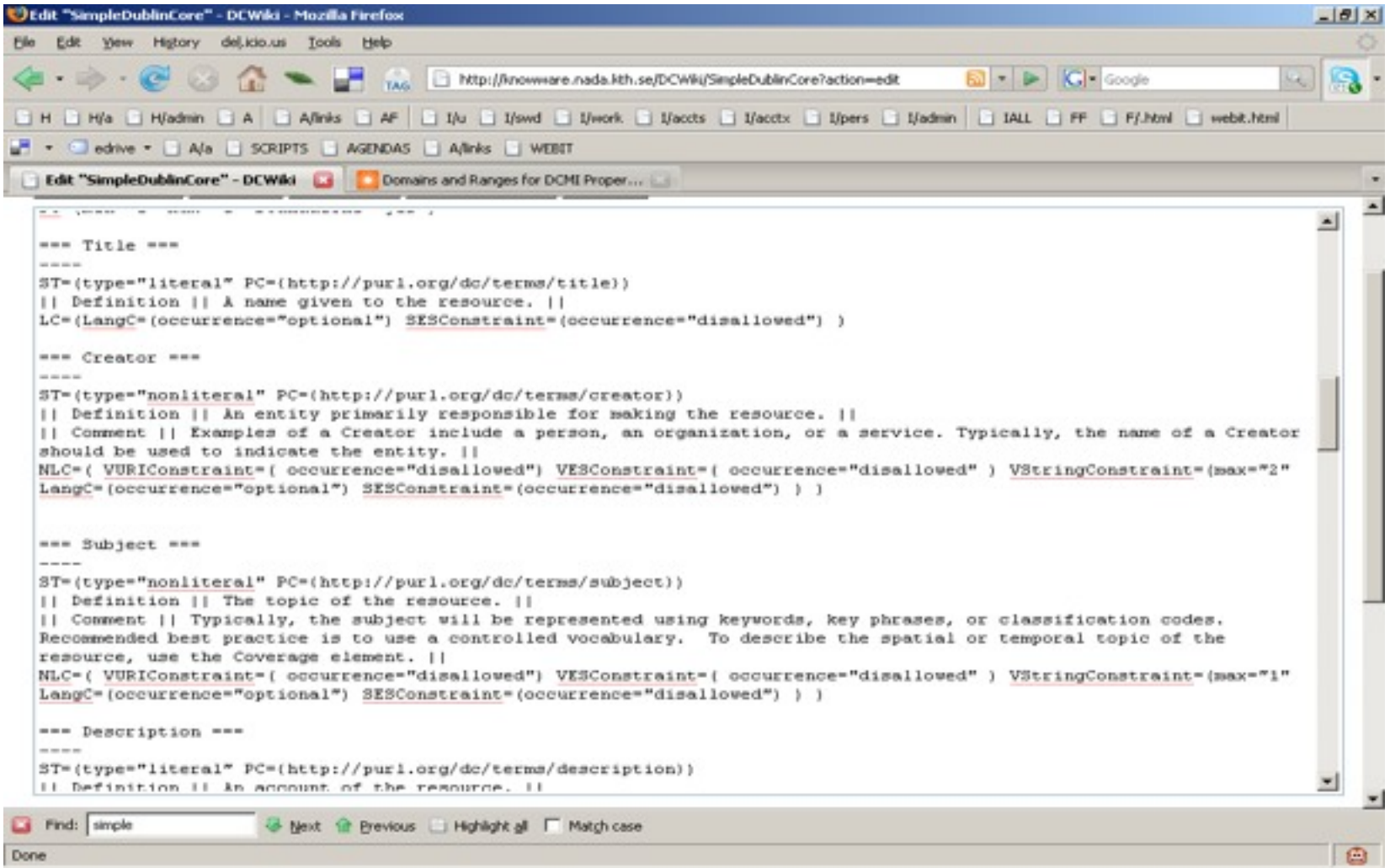
id	URI	"must be http://bibfra.me..."
type	String	from controlled vocabulary
edition	String	
volumes	String	integer
pages	String	integer
date	Date	use Bibframe date-time format
publisher	URI	
ISBN	String	must be valid ISBN
image	URI	

Show the user readable/editable document...



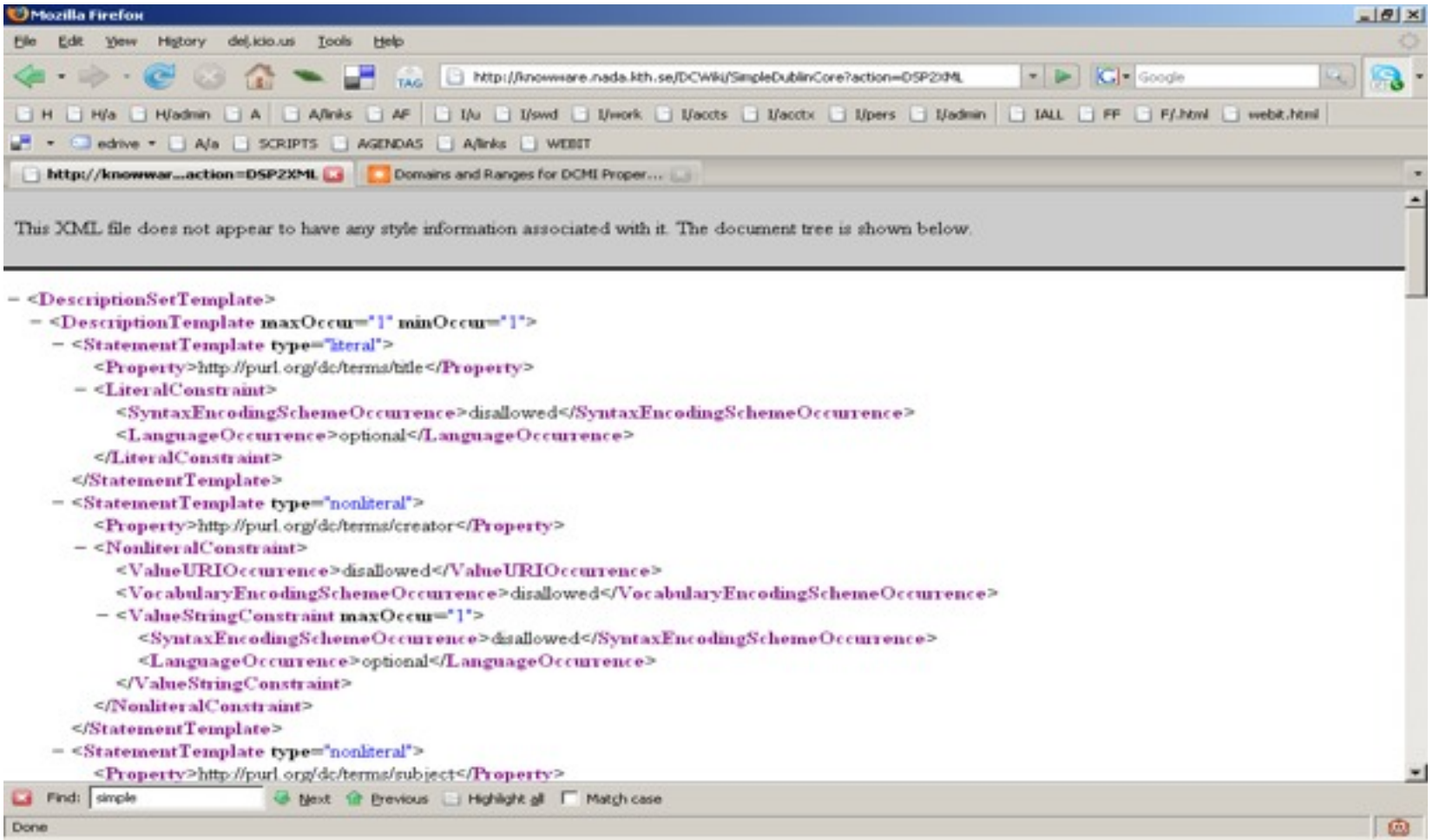
http://dublincore.org/documents/2008/10/06/dsp-wiki-syntax/DescriptionSetProfile-dist.zip

...with embedded constraints...



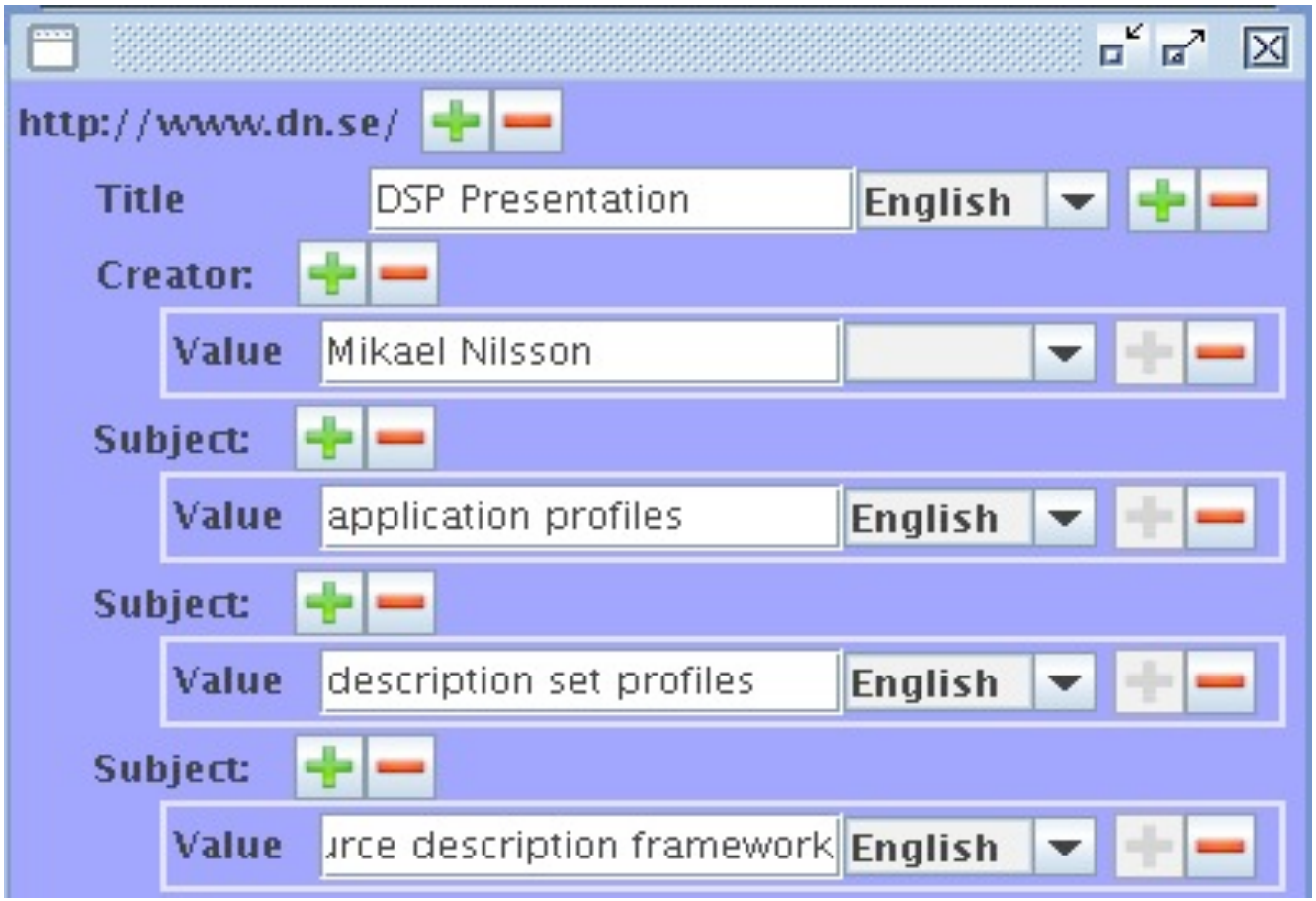
http://dublincore.org/documents/2008/10/06/dsp-wiki-syntax/DescriptionSetProfile-dist.zip

...extractable to a generic representation...



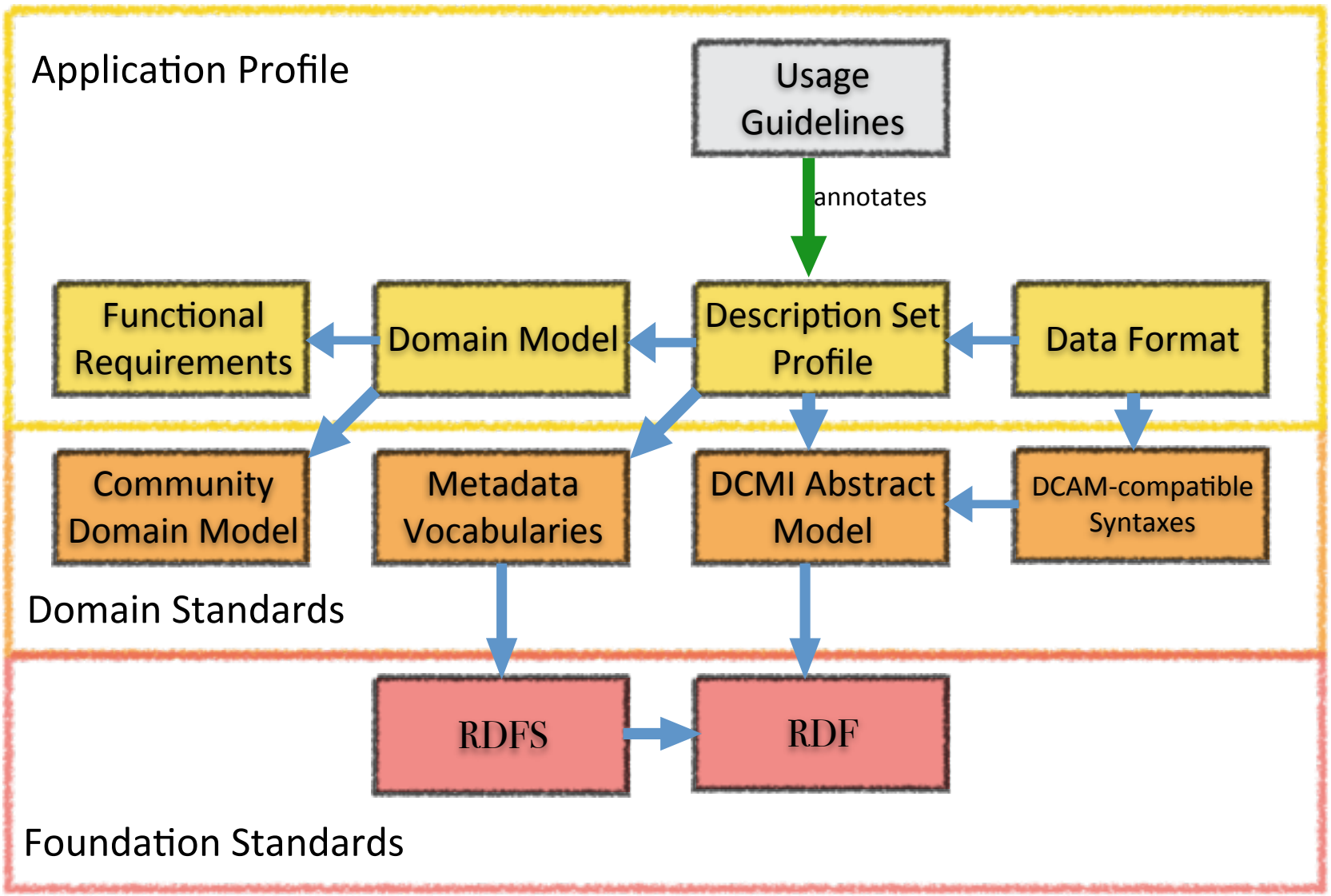
http://dublincore.org/documents/2008/10/06/dsp-wiki-syntax/DescriptionSetProfile-dist.zip

...usable to generate editor, validator, etc.

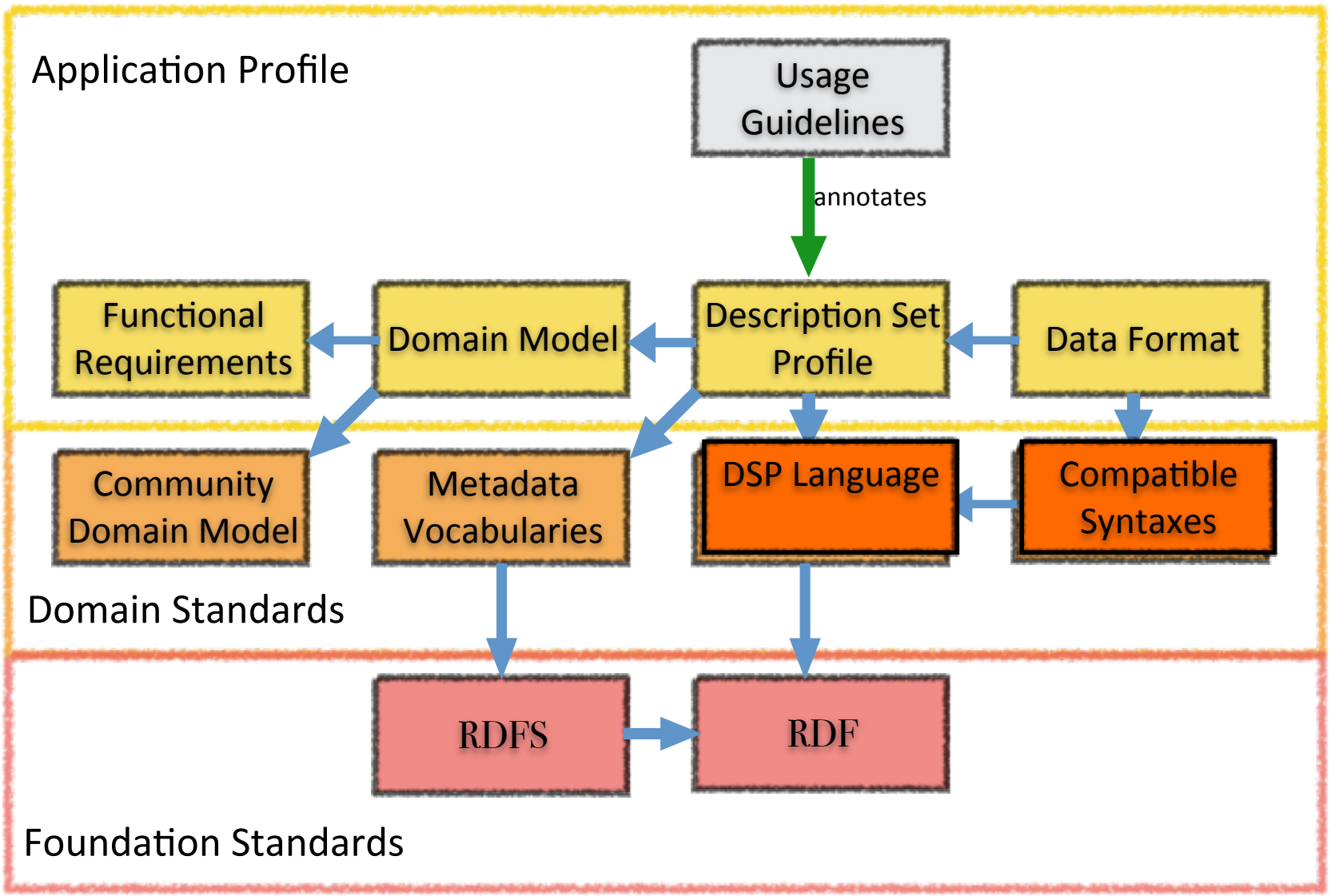


http://dublincore.org/documents/2008/10/06/dsp-wiki-syntax/DescriptionSetProfile-dist.zip

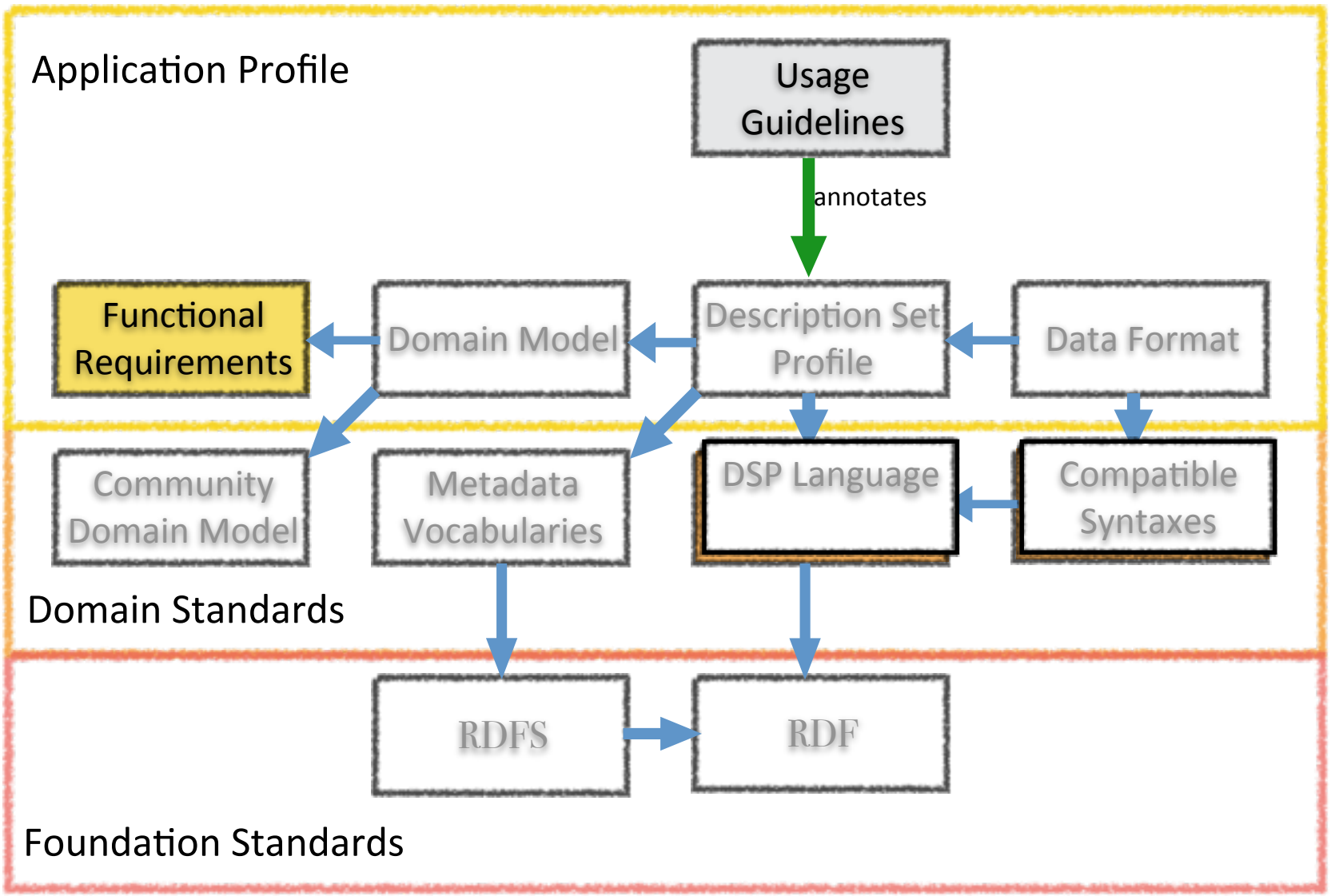
Singapore Framework for Dublin Core Application Profiles (2007)



An updated Description Set Profile templating language?

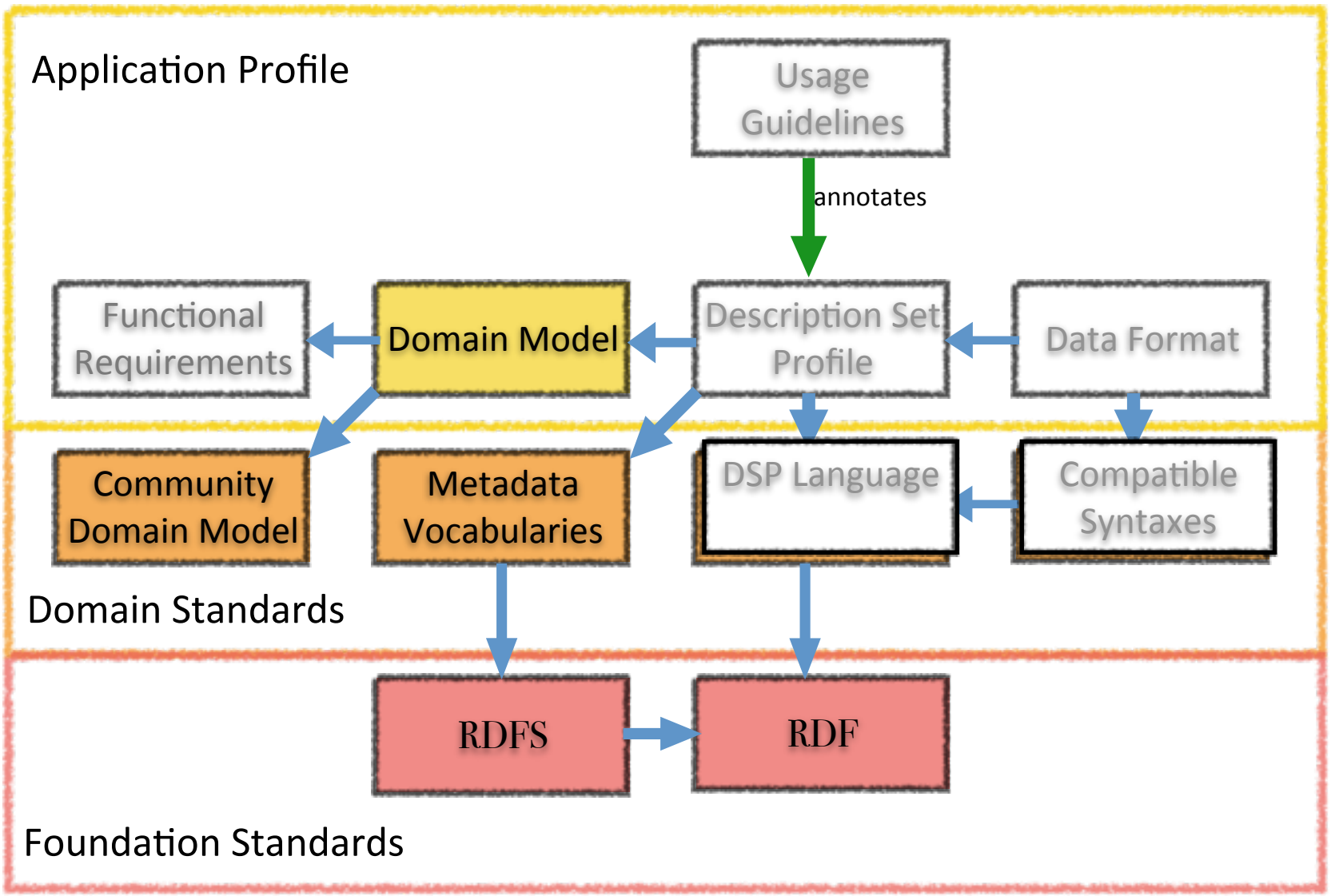


Base a Description Set Profile on specific requirements!



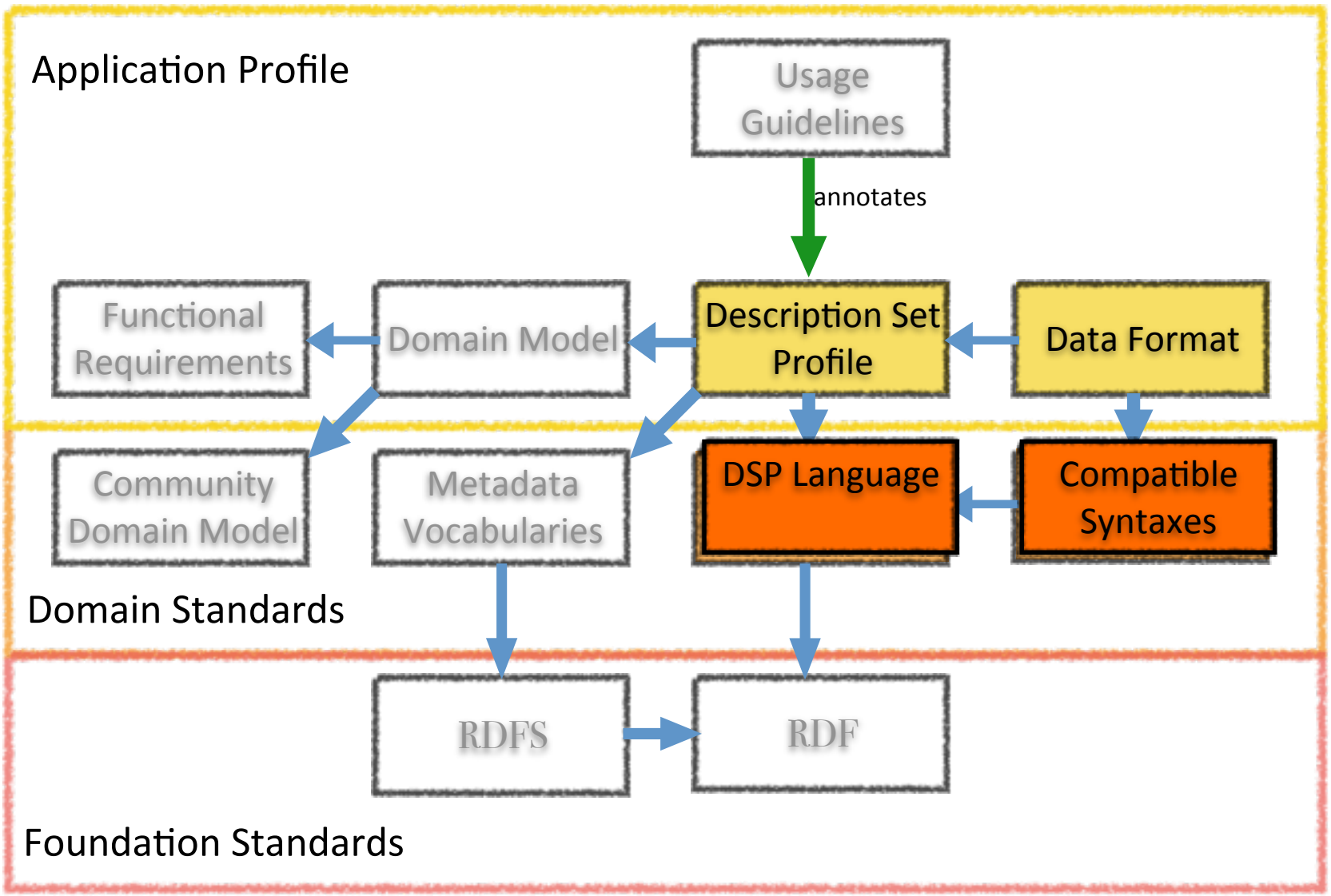
Model “reality” with a light touch!

Principle of Minimal Semantic Commitment (using DC and similar vocabularies)



Constrain the *data* (*not* the vocabularies)!

For consistency and quality control



DSP design philosophy

- Design data for peaceful coexistence
- Pragmatic control of data quality
  - Go easy on sweeping ontological generalizations.
  - Constrain data produced.
  - Expect unexpected uses.
- Simple models have bigger audiences

DSP Requirements

- Authored in an idiom usable by normal people
- Constraints reusable for data automatic validation

September 4 discussion at DC-2013, Lisbon

- SPARQL a good candidate as a rules language for expressing constraints
- But users may need generic constraints language:
  - for authoring Application Profiles
  - for understanding Application Profiles
- Something like DC-DSP...?
  - using a syntax straightforwardly convertible into SPARQL queries?
  - as user-facing terminology for documenting Application Profiles?

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