Ontology Design Patterns and XD

Eva Blomqvist eva.blomqvist@liu.se



Relation Di	covery on The Semantic Web	
	How does city relate to country ? Ask	Scarlet!
Relation types: All Types Inheritance Disjointness Named Relations	Strategy: Other parameters:	Examples: River vs. waterway Cocaine vs. narcotic Water vs. Solid Branch vs. Tree Coal vs. Industry Fish vs. Lobster Cholesterol vs.
city and country appear to	gether in 54 ontologies.	OrganicChemical Apple vs. Meat
The following relations were		
City - subClassOf -> Co	city - subClassOf -> country unty indfraser.co.uk/geo_ont.daml	



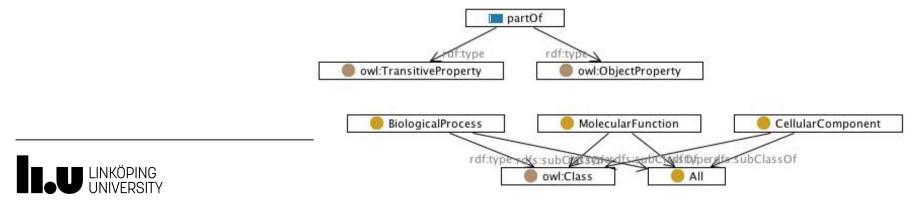
What we can do with OWL

- ... (maybe) we can check the consistency, classify, and query our knowledge base
- ... but, remember the Scarlet example
 - City subClassOf Country
- Logical consistency is not the main problem
 - e.g. rdfs:subClassOf an be wrongly used and still we have consistency
- Why is OWL not enough?
 - OWL gives us logical language constructs, but does not give us any guidelines on how to use them in order to solve our tasks.
 - E.g. modeling something as an individual, a class, or an object property can be quite arbitrary



Solutions?

- OWL is not enough for building a good ontology, and we cannot ask all web users neither to learn logic, or to study ontology design
- Reusable solutions are here through Ontology Design Patterns, which help reducing arbitrariness without asking for sophisticated skills ...
- ... provided that tools are built for any user ③

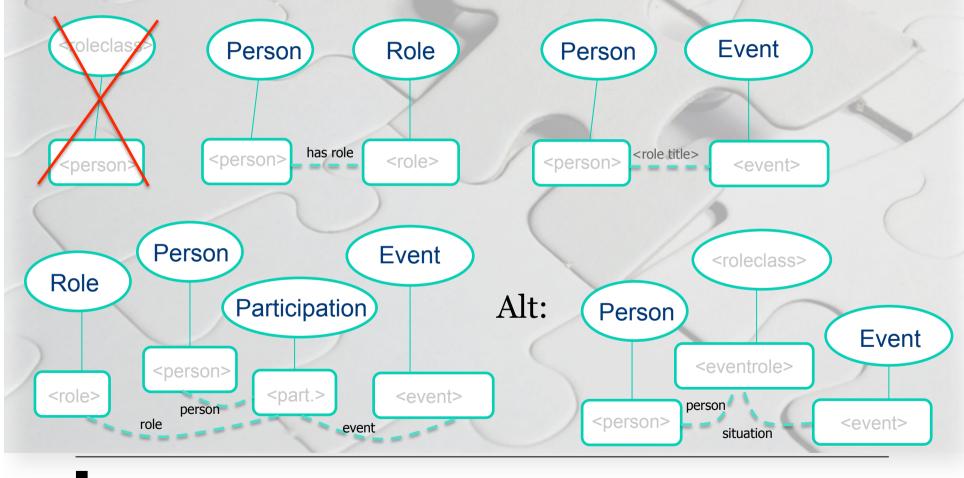


Various types of ODPs

- Logical patterns "workarounds" and shortcuts in modelling
 - Example: n-ary relations
- Content patterns components with a non-empty signature, sometimes domain specific
 - Example: how to model roles
 - Can be used as "templates" or ideas for your own solution, or as components that are specialised
- Correspondence patterns, transformation patterns...



Example - Role patterns (ODP)



6

LINKÖPINGS UNIVERSITET

Catalogues of ODPs

- Content ODPs are collected and described in catalogues, books, papers...
- The <u>ontologydesignpatterns.org</u> initiative maintains a repository of ODPs

	Ontology Design Patterns . org (ODP)		
Patter	OntologyDesignPatterns.org is a Semantic Web portal dedicated to ontology de	sign patterns (ODPs).	
	The portal was started under the NeOn project @, which still partly supports its development of the NeOn	elopment.	
ies.			
	What's new		
121	The 2nd Workshop on Ontology Patterns to be held on November 8, in conjuncti eXtreme Design camp in Bologna	ion with ISWC2010. Submission deadline extended to September 1st!	
arn amplary	Navigation	Contribute	News
ng issue	List of Patterns	Submit Pattern	Latest ODP News!
ern	You can find lists here, detailing all available ontology design patterns.	Start here if you want to submit an ontology pattern.	Latest ODP News!
out the	Pattern types	Post Modeling Issue	2nd Workshop on Ontology Patterns (WOP) accepted at IS
DP	Ontology patterns are of several types. Here are details about pattern types and their taxonomy.	If you have an unsolved modeling problem you wish to share with the community, post it here!	29 May 2010 12:12:43 - by EvaBlomqvist VOCamp in Paris - #vocampparis2010@
100	Domains	Submit an Exemplary Ontology	6 April 2010 13:13:28 - by FrancoisScharffe
rn?	Ontology patterns can cover, or be related to, a particular domain. Here is a list.	Start here if you want to submit an exemplary ontology.	Collaborative eXtreme Design Camp in Bologna
emplary		Post Review About a Pattern	13 February 2010 13:13:39 - by AldoGangemi
pattern	Modeling Issues See all loaded modeling issues. Modeling issues are linked to ontology	Review a submission to contribute to the certification process.	New pattern type: Lexico-syntactic ODPs
	patterns that solve a defined problem.	Post Your Feedback	8 February 2010 10:10:24 - by EnricoDaga
8	Training Area	Post Your Feedback If you have issues about the web site, can't find information you need,	Vocamp @ Washington D.C. supported by WOP 2
s a ODPs	Learn about ODPs!	or simply wish to propose enhancements, you can give feedback here	30 June 2009 15:15:34 - by ValentinaPresutti
Ps		about the ODP portal.	Workshop on Ontology Patterns (WOP) accepted at ISWC 23 May 2009 11:11:32 - by EvaBlomqvist
ODPs	Events See a list of events related to ontology design patterns.	Request Account	The Loreley of Ontology Design Patterns @
tic ODPs	See a list of events related to onlology design patterns.	To make changes to the ODP wiki portal, you need to be logged in	2 April 2009 10:10:52 - by VioletaDamjanovic
ntologies	Reviews		EvalWF has been released r
30	Here you can browse both open reviews and quality committee		Evaluer has been released ge



The eXtreme Design methodology



Ontology Engineering Methodologies

- Mostly focus has been on overall life-cycle and "model" of the methodology rather than *how* to actually perform it
- Few are focused on reuse and the networked nature of web ontologies
- One of the most cited:
 - Ontology development 101 Nov & McGuinnes (2001)
 - Pre-OWL methodology
 - Traditional in the sense
 - It doesn't have a specific task focus
 - It is a waterfall like method
 - Although detailed in some steps, no details on requirements or testing etc.
 - Basic steps for modelling
 - (1) Domain an scope (2) Consider reuse (3) Enumerate terms
 (4) Develop class hierarchy (5) Define the properties
 (6) Define restrictions and constraints (7)Create instances



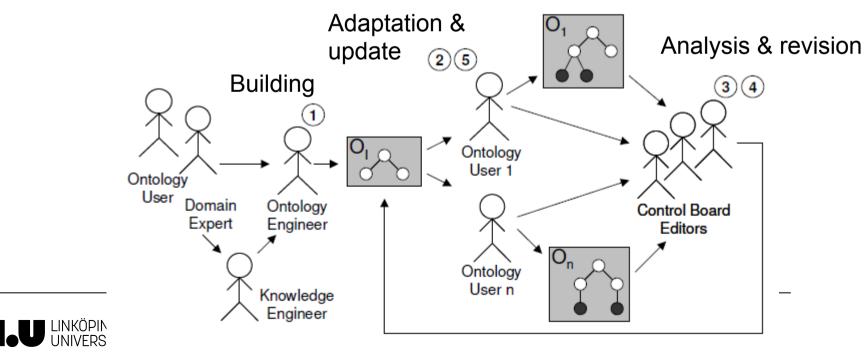
Example: METHONTOLOGY (~1997)

- Waterfall-like process consisting of (overlapping) phases
 - 1. Specification document requirements, scope, level of formality etc.
 - 2. Knowledge Acquisition gathering and studying sources of information
 - Conceptualization structure the terminology identified in 1, going from glossary to logical formulas
 - 4. Integration find and select other ontologies to reuse
 - 5. Implementation represent in formal language using tool
 - 6. Evaluation verification and validation
 - 7. Documentation



Example: DILIGENT (~2004)

- Based on theories for argumentation
- Intended for
 - Empowering domain experts in ontology engineering
 - Continous and distributed construction and update



Why the name "XD"?

- Inspired by XP but with focus on good design
- An agile methodology for web ontology design
- Developed as part of the NeOn methodology



Copyright 3 2003 United Feature Syndicate, Inc.



XD principles

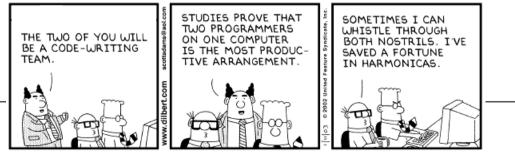
- Customer/domain expert involvement and feedback
- "Customer" stories to derive CQs (+ restrictions/constraints, reasoning requirements)



Copyright 3 2003 United Feature Syndicate, Inc.

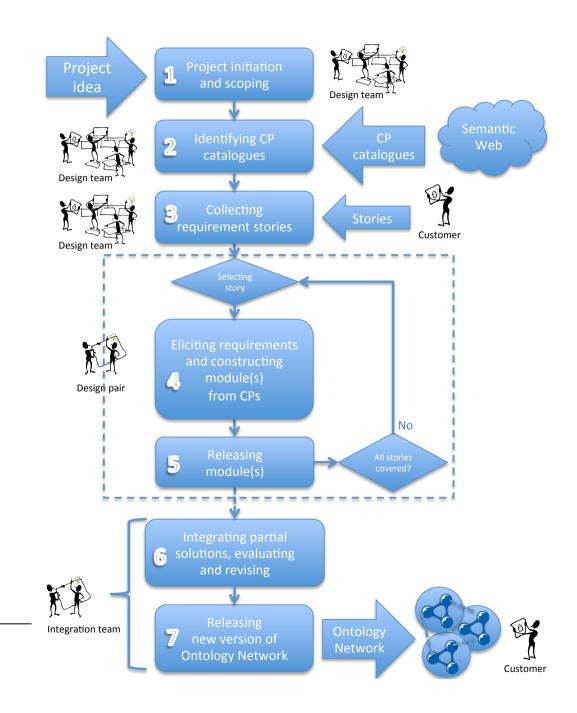
- ODP reuse and modular design (ontology networks)
- Collaboration and integration
- Task-oriented design, verified by tests
- Pair design

LINKÖPING UNIVERSITY

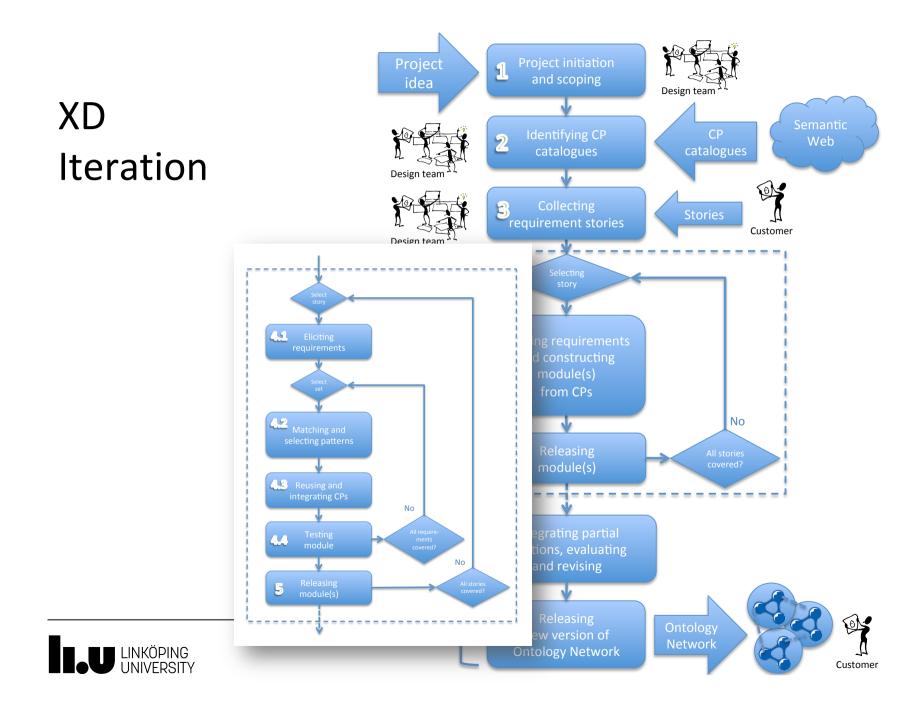


Copyright 3 2003 United Feature Syndicate, Inc.

XD Iteration







Things to note about XD

- Can be adapted to various settings
 - Pairs or individual development?
 - Roles of ontology engineers and other experts
 - Adapt the level of communication and control
- You quickly have a tangible result
 - Rapid prototyping of ontologies?
- Integration step is crucial and may involve lots of refactoring



www.liu.se

