Olomouc
Czech Republic
April 27–30, 2018

Atlases & Cognition & Usability

Deconstruction of atlas choropleth map (Hidden structure of atlas cartography, Olomouc1)

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Few definitions of ‘deconstruction’ term

1. **Deconstruction**, form of philosophical and literary analysis, derived mainly from work begun in the 1960s by the French philosopher Jacques Derrida, that questions the fundamental conceptual distinctions, or ‘oppositions’, in Western philosophy through a close examination of the language and logic of philosophical and literary texts - https://www.britannica.com/topic/deconstruction, 2018-mar-31
2. Although **deconstruction** has roots in Martin Heidegger’s concept of *Destruktion*, to deconstruct is not to destroy. Deconstruction is always a double movement of simultaneous affirmation and undoing. It started out as a way of reading the history of metaphysics in Heidegger and Jacques Derrida, but was soon applied to the interpretation of literary, religious, and legal texts as well as philosophical ones, and was adopted by several French feminist theorists as a way of making clearer the deep male bias embedded in the European intellectual tradition - Internet Encyclopedia of Philosophy, https://www.iep.utm.edu/deconst/, 2018-mar-31
3. **Deconstruction: the act of breaking something down into its separate parts in order to understand its meaning, especially when this is different from how it was previously understood - https://dictionary.cambridge.org/ru/словарь/английский/deconstruction, 2018-mar-31**

is used in presentation

Outline (Olomouc1)

1. Main problem: Absense of (commonly accepted) language of map
2. Methodology used
3. Deconstruction. Language and Knowledge
4. Deconstruction. Power
5. Collecting together (part), see also Atlas Extender (Olomouc2, 2018-apr-30)
6. Conclusions

1. Main problem: Absense of (commonly accepted) language of map (map language?, cartographic language?)

Structure of AoS and NAU (SAS) similarity search

Modeling Relation (MR)

Similarity Relation (SR)

MR1

MR1

AoS design scheme (SDS)

MR3

Canonicalized AoS design scheme (CanSDS)

SR3

Canonicalized NAU design scheme (CanUDS)

MR3

NAU design scheme (UDS)

MR2

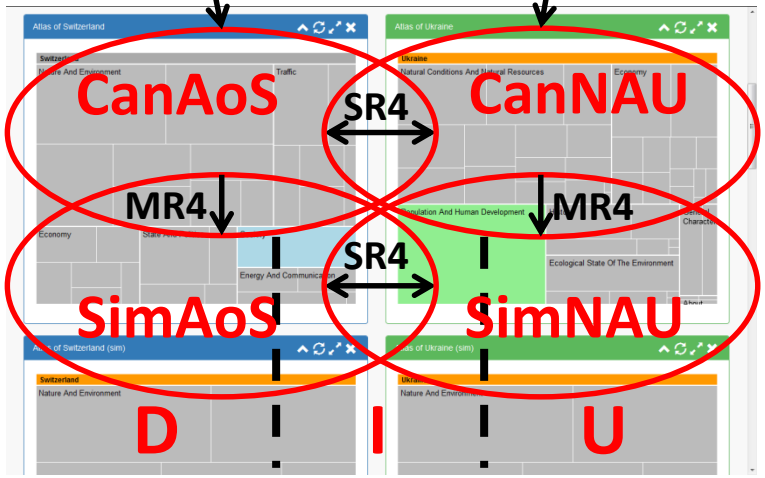
MR1

MR2

MR2

MR1

MR2



(Chabaniuk, et al., 2017a) Chabaniuk Viktor, Dyshlyk Oleksandr, Sieber Rene, Schulz Thomas. Towards similarity of electronic atlases: An empirical study.- Ukrainian Geographical Journal, 2017, No. 2, pp. 46-53.

From **(Chabaniuk, et al., 2017a) Chabaniuk Viktor, Dyshlyk Oleksandr, Sieber Rene, Schulz Thomas. Towards similarity of electronic atlases: An empirical study.- Ukrainian Geographical Journal, 2017, No. 2, pp. 46-53**

Term ***similarity*** is typically defined as a quality of 'having characteristics in common' or being 'alike in substance or essentials' (Klir, 1985). According to this definition, two entities are considered similar if they are equal or, at least, comparable in some of their properties, but not necessarily in all of them. In addition, it is assumed that the properties in which the two entities are equal have some significance in a given context. Different kinds of similarities can thus be defined for a set of entities, depending upon the properties that are considered significant for a particular purpose

When a similarity relation is defined on a set of systems, it is usually referred to as a ***modeling relation***. Two systems are similar if they preserve some common traits and can be transformed to each other by appropriate transformations applied to other traits (Klir, 1985)

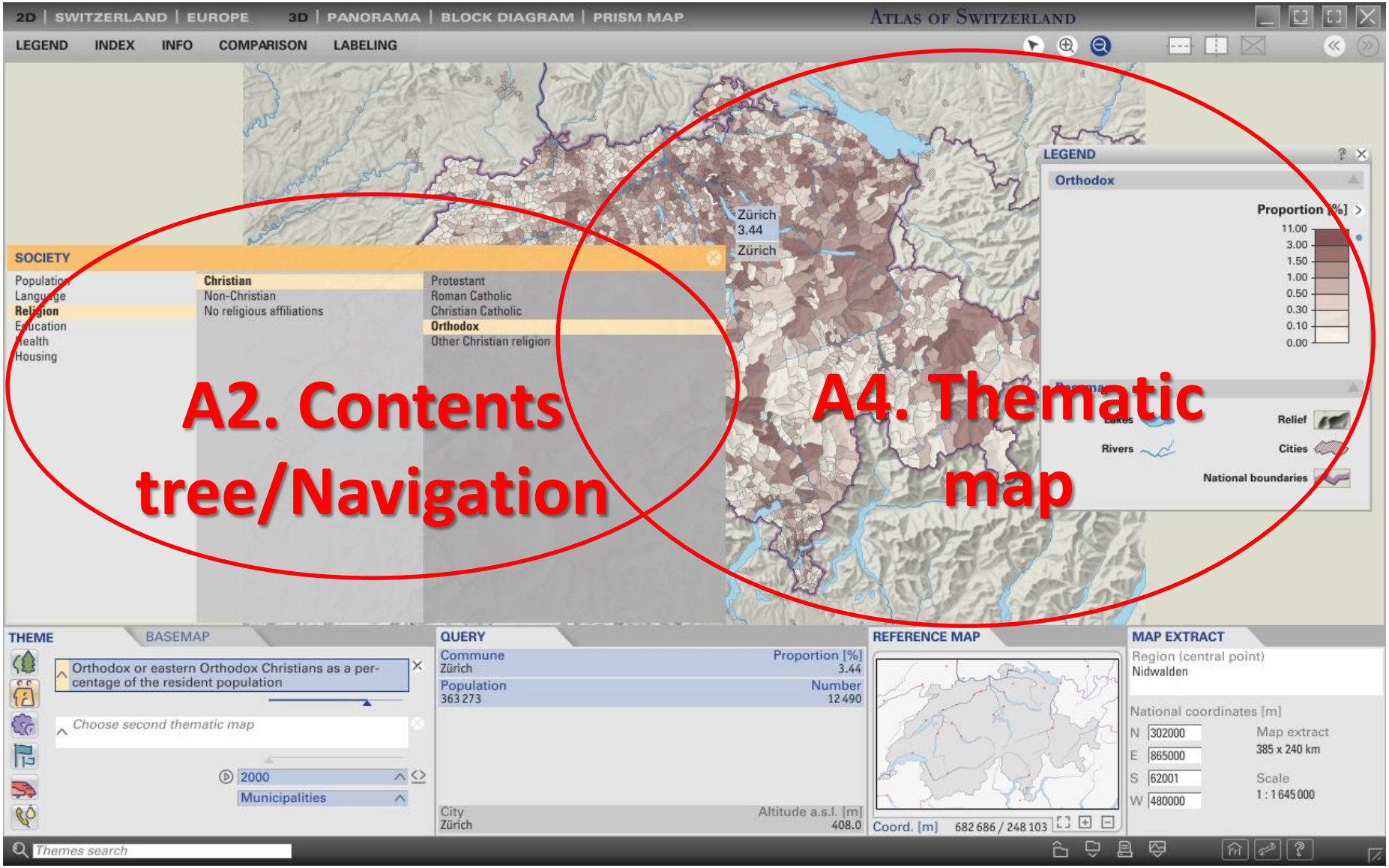
Motivation 1*: Solving the problem of operability loss of atlas systems created in a specific computer environment*

Motivation 2*: Knowledge discovery in atlas cartography in particular, and in cartography in general*

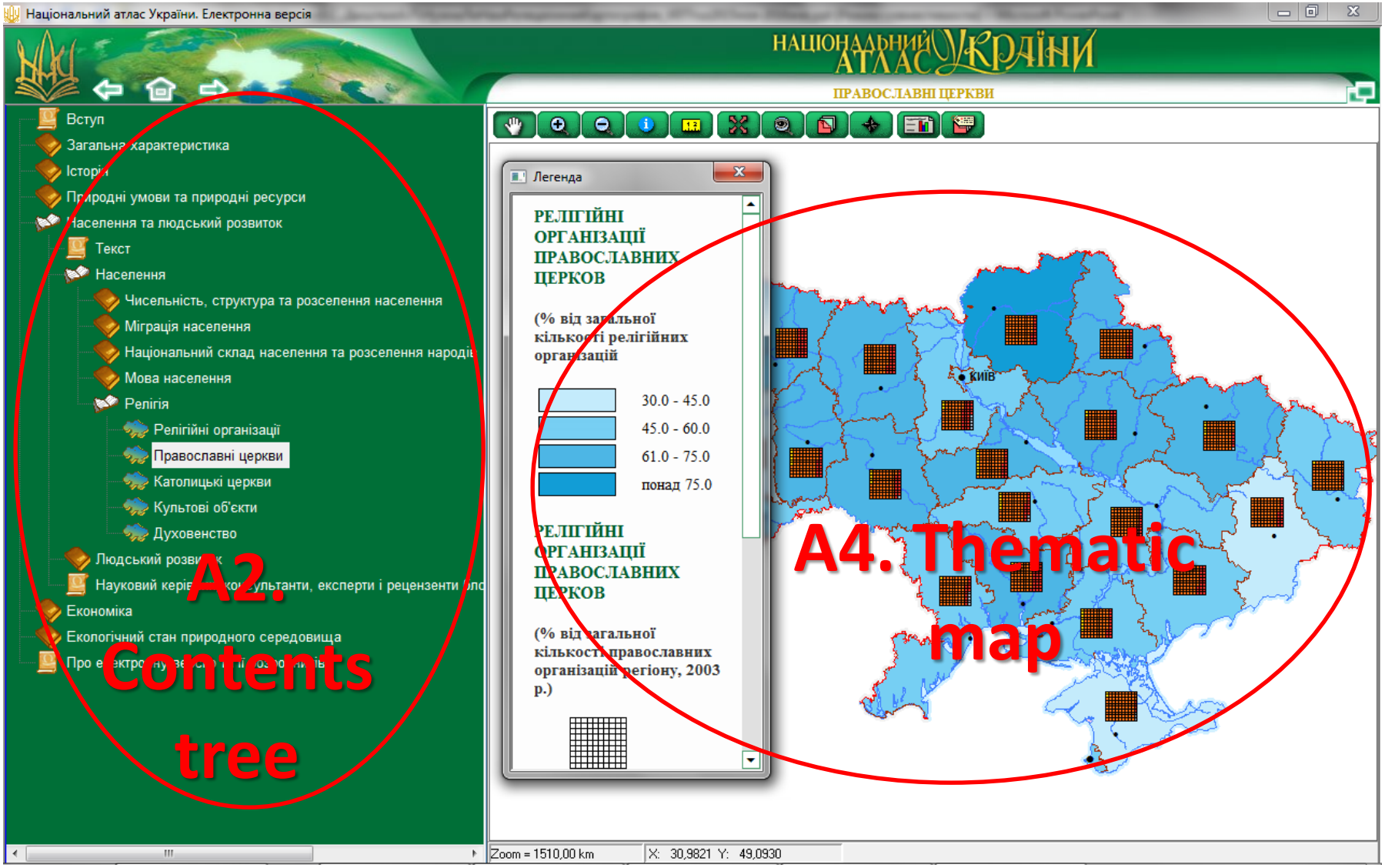
Motivation 3*: Creation the distributed atlas systems or atlas networks*

(Klir, 1985) Architecture of Systems Problem Solving. New York: Springer

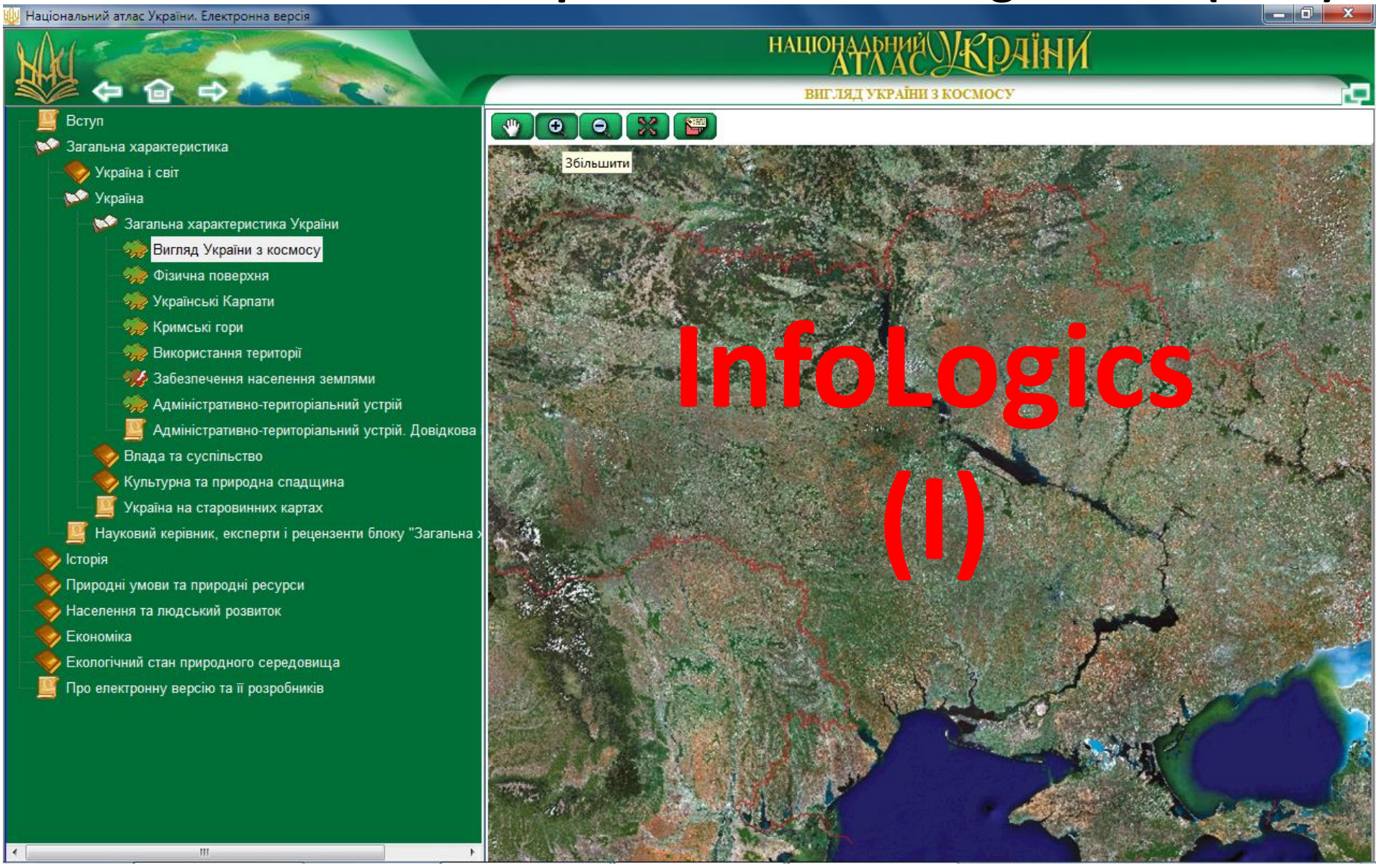
We compared Contents trees and Thematic maps (AoS)



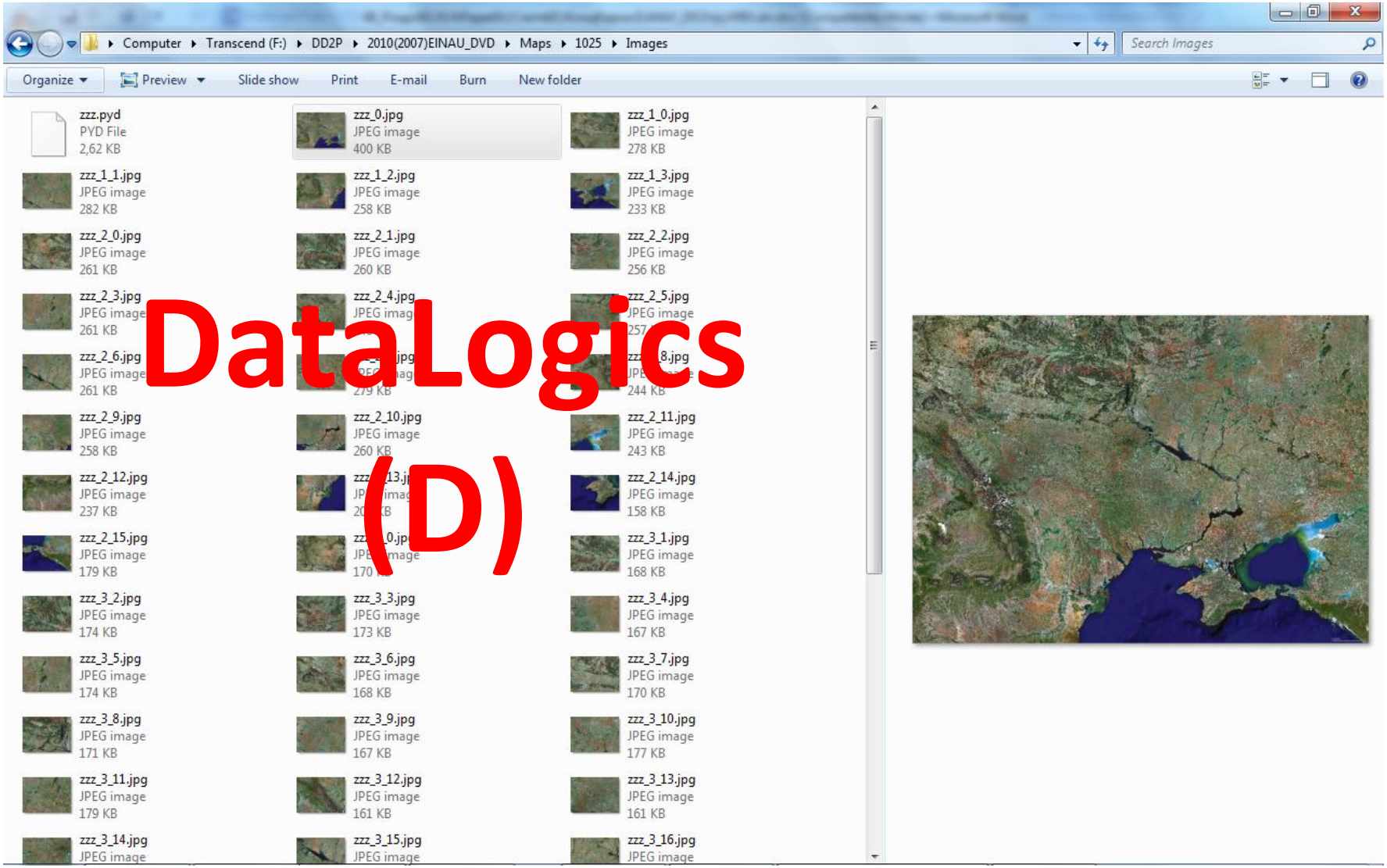
We compared Contents trees and Thematic maps (NAU)



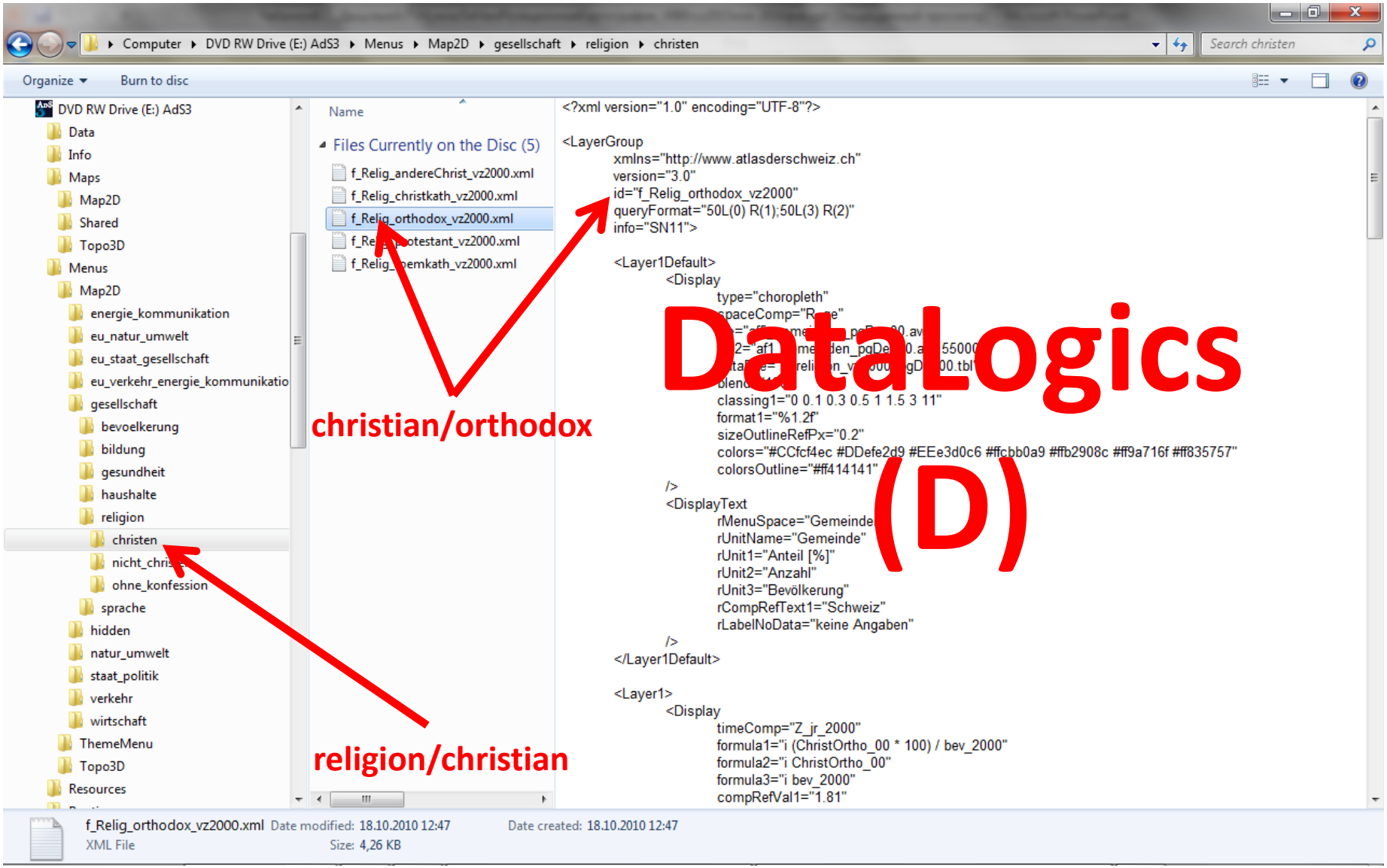
Conceptual framework of ‘classical’ Atlas systems. Explanation of InfoLogics level (NAU)



Conceptual framework of ‘classical’ Atlas systems. Explanation of DataLogics level (NAU)



Conceptual framework of ‘classical’ Atlas systems. Explanation of DataLogics level (AoS)



Conceptual framework of ‘classical’ Atlas Systems (AtS)

Part of reality (geo-system), modeled/represented by AtS of classical static type (NAU)

Datalogics/ Technology

Infologics/ Language

UsageLogics /Organization

General stratum — γAtS (theories, paradigms)

Conceptual stratum — βAtS (metamodels)

Application stratum — αAtS (models, NAU_Edited)

Operational stratum — AtS (NAU)

After (Chabaniuk, Dyshlyk, 2014) Conceptual Framework of the Electronic Version of the National Atlas of Ukraine.- Ukrainian Geographical Journal, 2014, No. 2, pp. 58-68 (in Ukrainian)

Conceptual framework of ‘classical’ AtS. Explanation of ‘strata’

Part of reality (geo-system),
modeled/represented by AtS

DataLogics/
Technology

InfoLogics/
Language

UsageLogics
/Organization

Education, science etc.

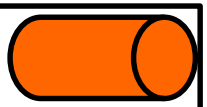
γAtS (theories, paradigms)

Research phase

βAtS (metamodels)

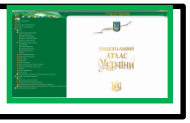
Development phase

αAtS (models, NAU_Edited)



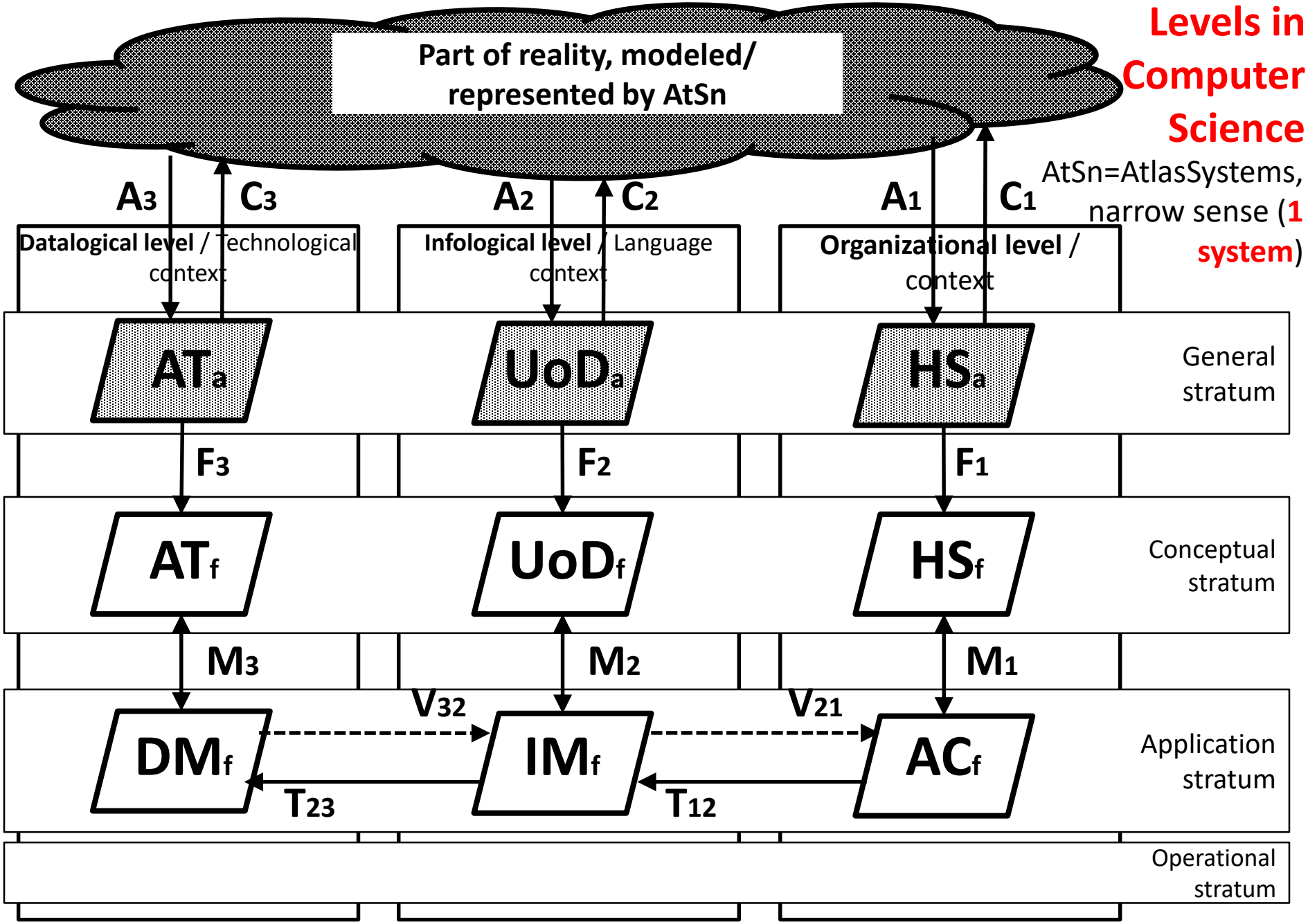
Operation phase

AtS (NAU)



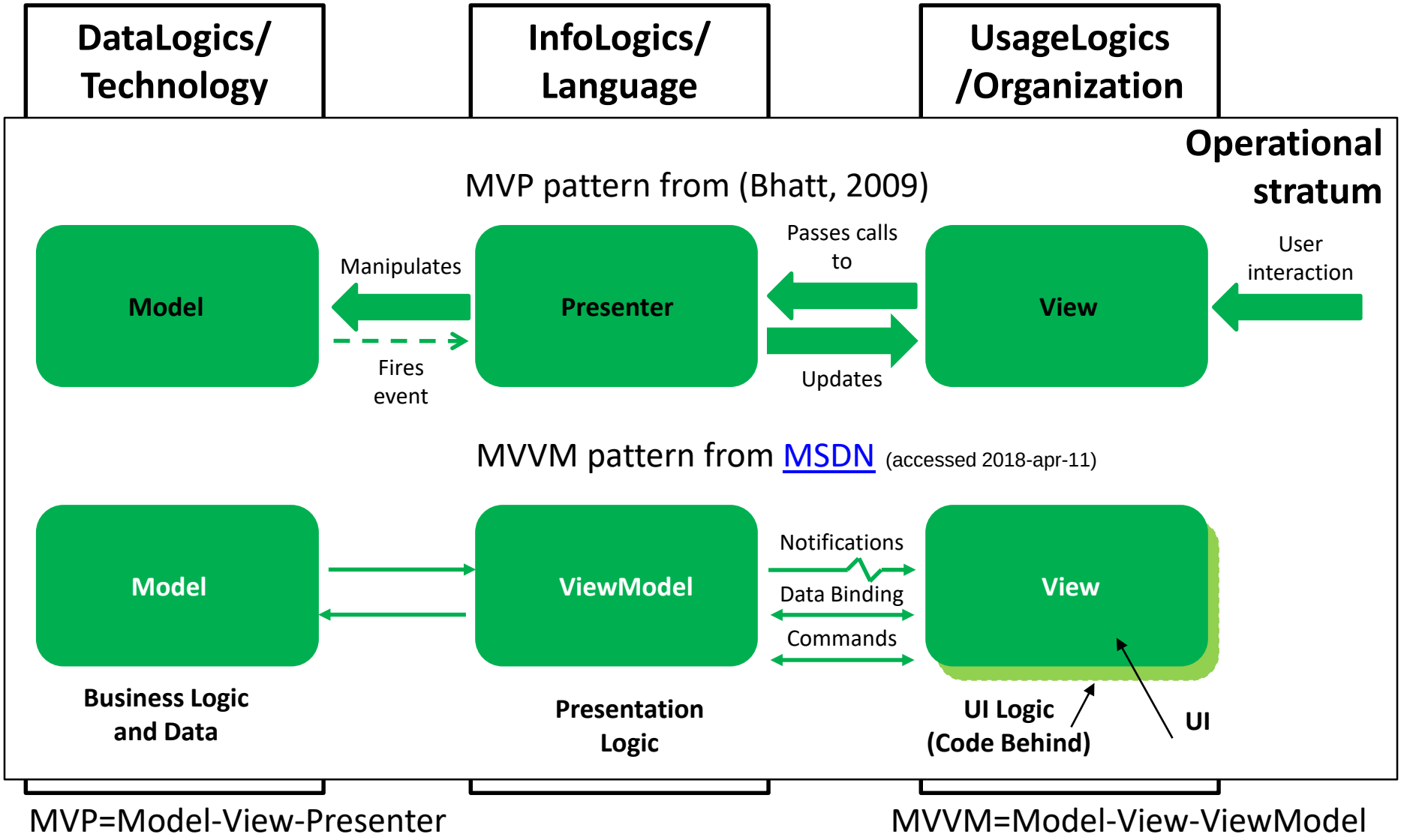
Levels in Computer Science

AtSn=AtlasSystems, narrow sense (**1 system**)



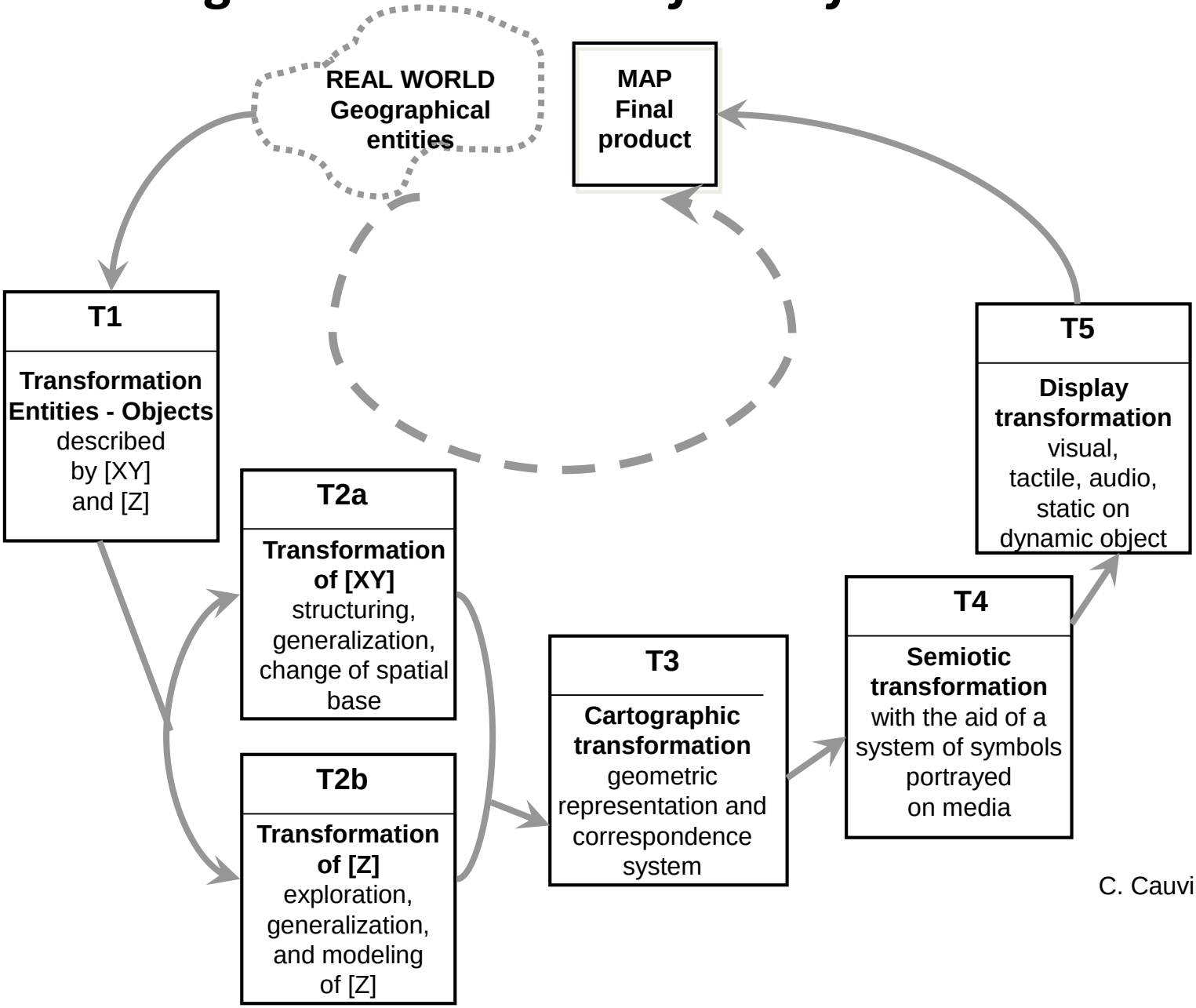
(Iivari, 1989) Levels of abstraction as a conceptual framework for an information system, pp. 323-352 // Falkenberg Eckhard D., Lindgreen Paul, Eds. Information System Concepts: An In-depth Analysis.- North-Holland, 1989.- 357 p.

Explanation of ‘levels’ for Operational Stratum (two presentation layer software patterns)



(Bhatt, 2009) MVC vs. MVP vs. MVVM.- July 18, 2009 (http://nirajrules.wordpress.com/2009/07/18/mvc-vs-mvp-vs-mvvm/, accessed 2018-apr-11)

Figure 2.8. *Families of transformations*



(Cauvin et al., Vol. 1, 2010; fig. 2.8) Cauvin Colette, Escobar Francisco, Serradj Aziz. Thematic Cartography. Volume 1: Thematic Cartography and Transformations.- ISTE-Wiley, 2010 (Adapted and updated from two volumes Cartographie Thématique 1 et 2.- LAVOISIER, 2007).- 463 (486) p.

DataLogics/ Technology

InfoLogics/ Language

UsageLogics /Organization

Conceptual stratum

βTree (Canonicalized Tree)

AoS and NAU Contents Trees similarity empirical search

<<usage>>

Application stratum

```
<branch id="b020301">
 <branchTitle>Christian</branchTitle>
 <branchDescription/>
 <branchLink/>
 <branchType>1</branchType>
...
 <leaf>
  <leafTitle>Roman Catholic</leafTitle>
  <leafDescription/>
  <leafLink>../maps/NAU_AoS/index_RomanCatholic_AoS.html</leafLink>
  <leafType>3</leafType>
 </leaf>
```

MR1(AoS)

MR1(NAU)

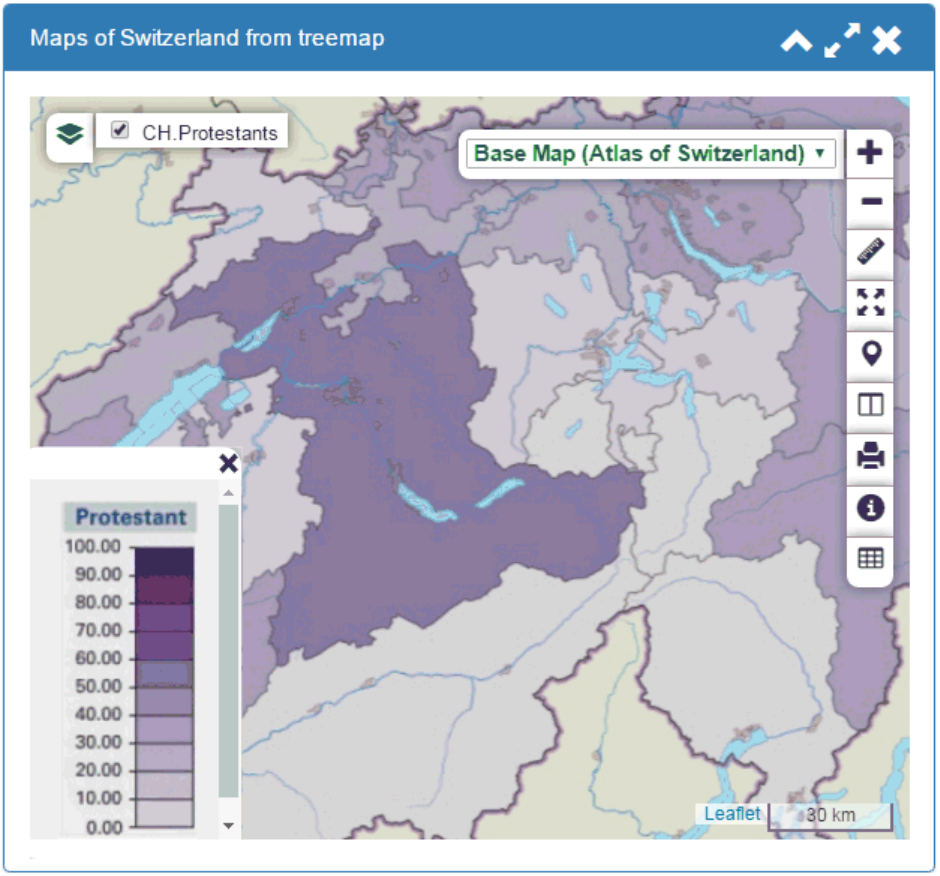
```
<branch id="b040105">
 <branchTitle>Religion</branchTitle>
 <branchDescription/>
 <branchLink/>
 <branchType>0</branchType>
 <leaf>
  <leafTitle>Religious organizations</leafTitle>
  <leafDescription/>
  <leafLink>../maps/NAU_AoS/index_Percent_NAU.html</leafLink>
  <leafType>8</leafType>
 </leaf>
```

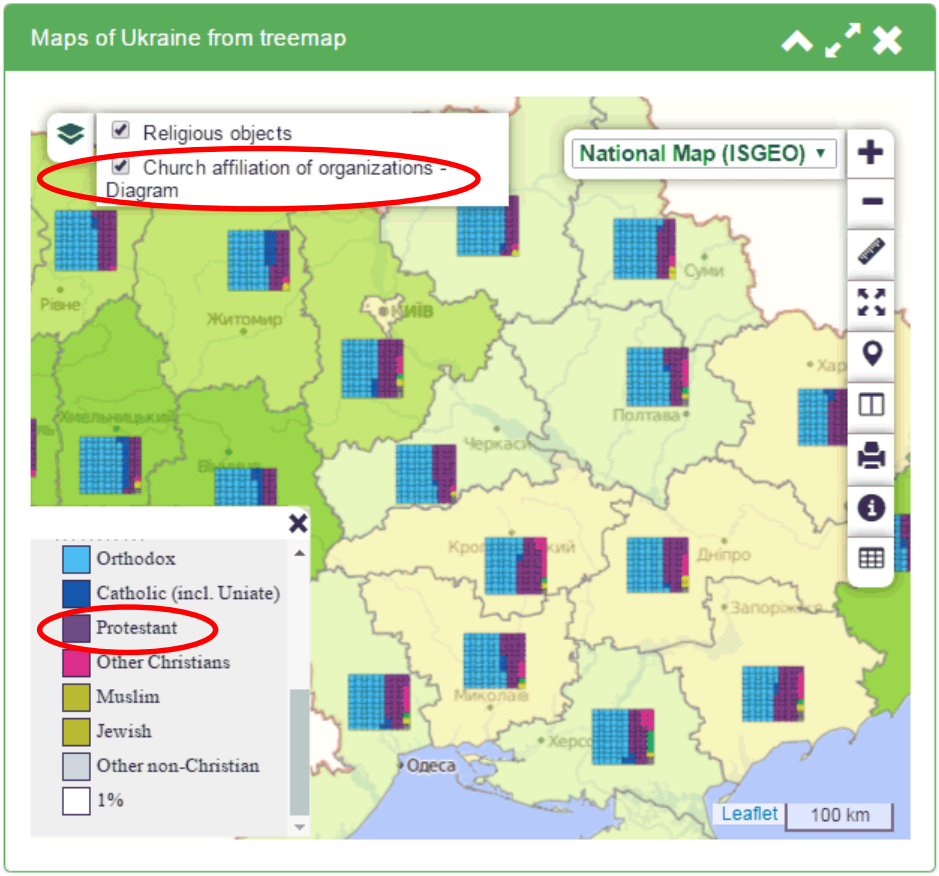
αTree

Operational stratum

ωTree

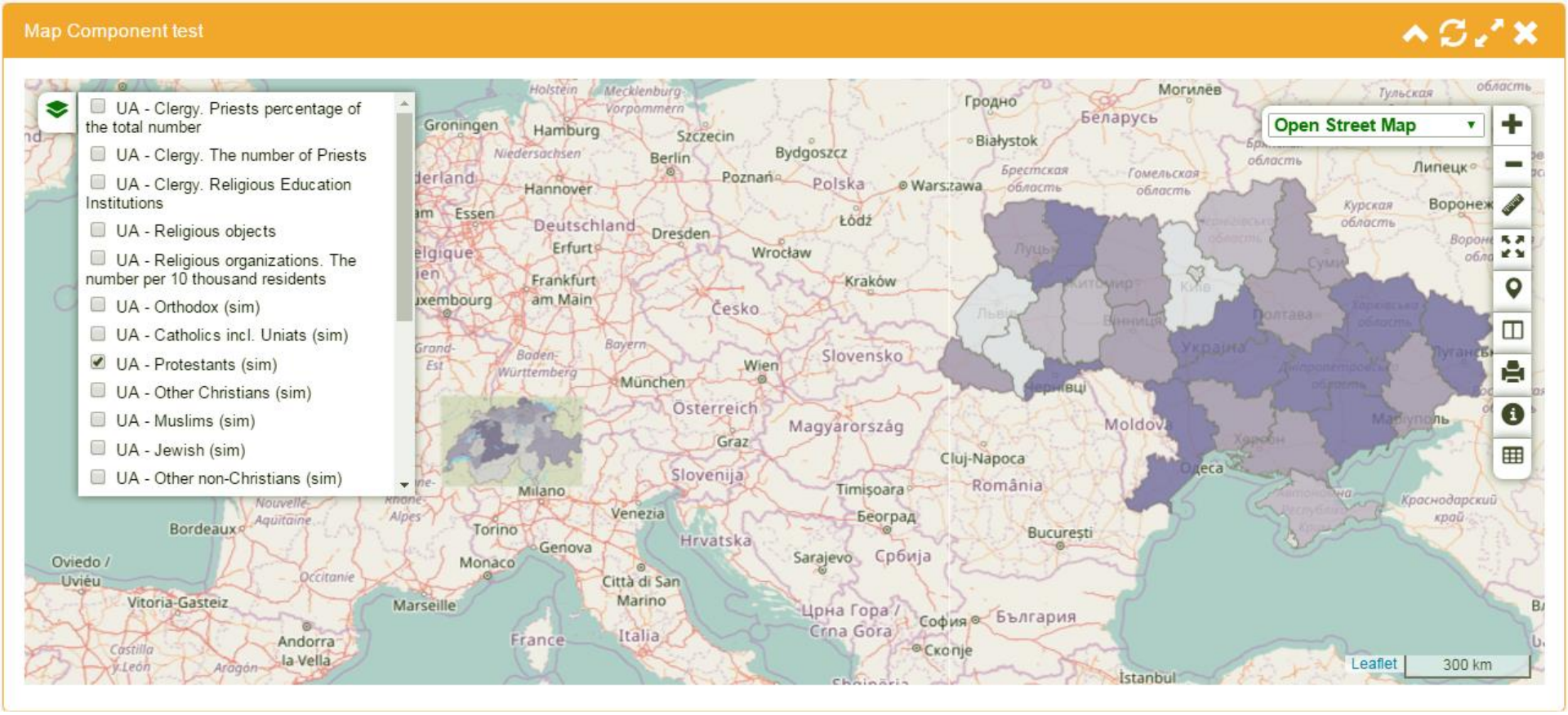
Subject Problems: Datalogical, Infological





‘Protestants’ thematic map in NAU before similarization (right)

Subject Problems: Datalogical - solved, Infological (Language) - unsolved



‘Protestants’ thematic map in NAU after similarization (right)

From Conclusions of (Chabaniuk, et al., 2017a):

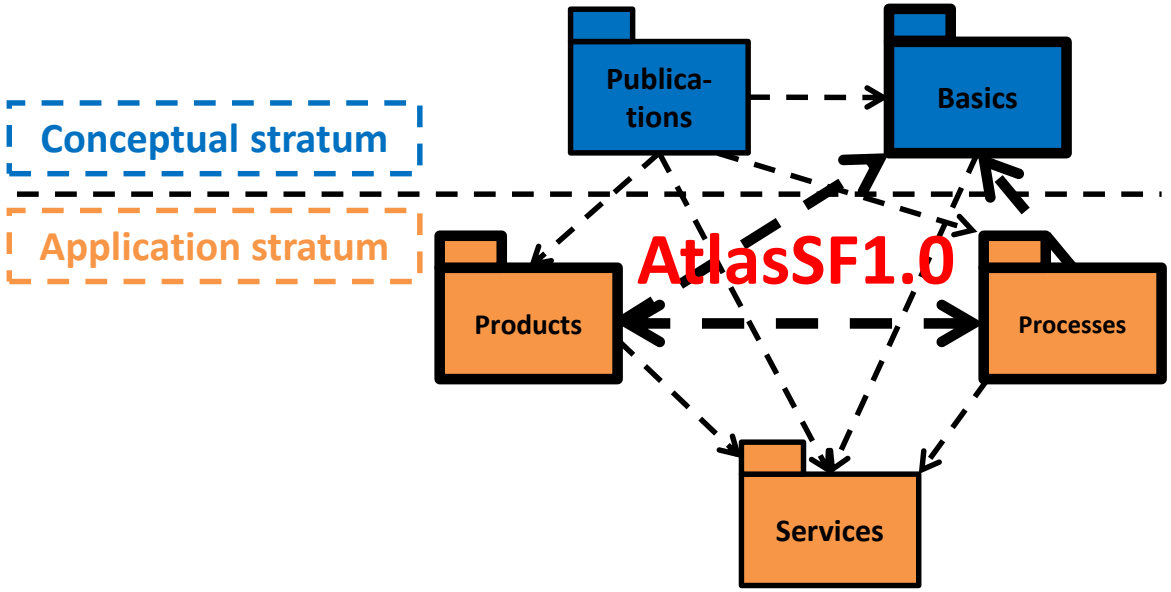
“Infological notions form the Infological level of atlases. This level can be associated with (or named by) Language context. It is clear that we need as minimum two interrelated infological languages: map language and atlas language. Unfortunately map languages are not popular in cartography. Sometimes cartographers even don’t think about language, which they are using. These map languages are not formalized, so we don’t have possibility to compare them. We also don’t have possibility to compare scientifically (based on some theory) ‘sentences’, constructed on un-formal map languages. An atlas language does not exist.”

2. Methodology used

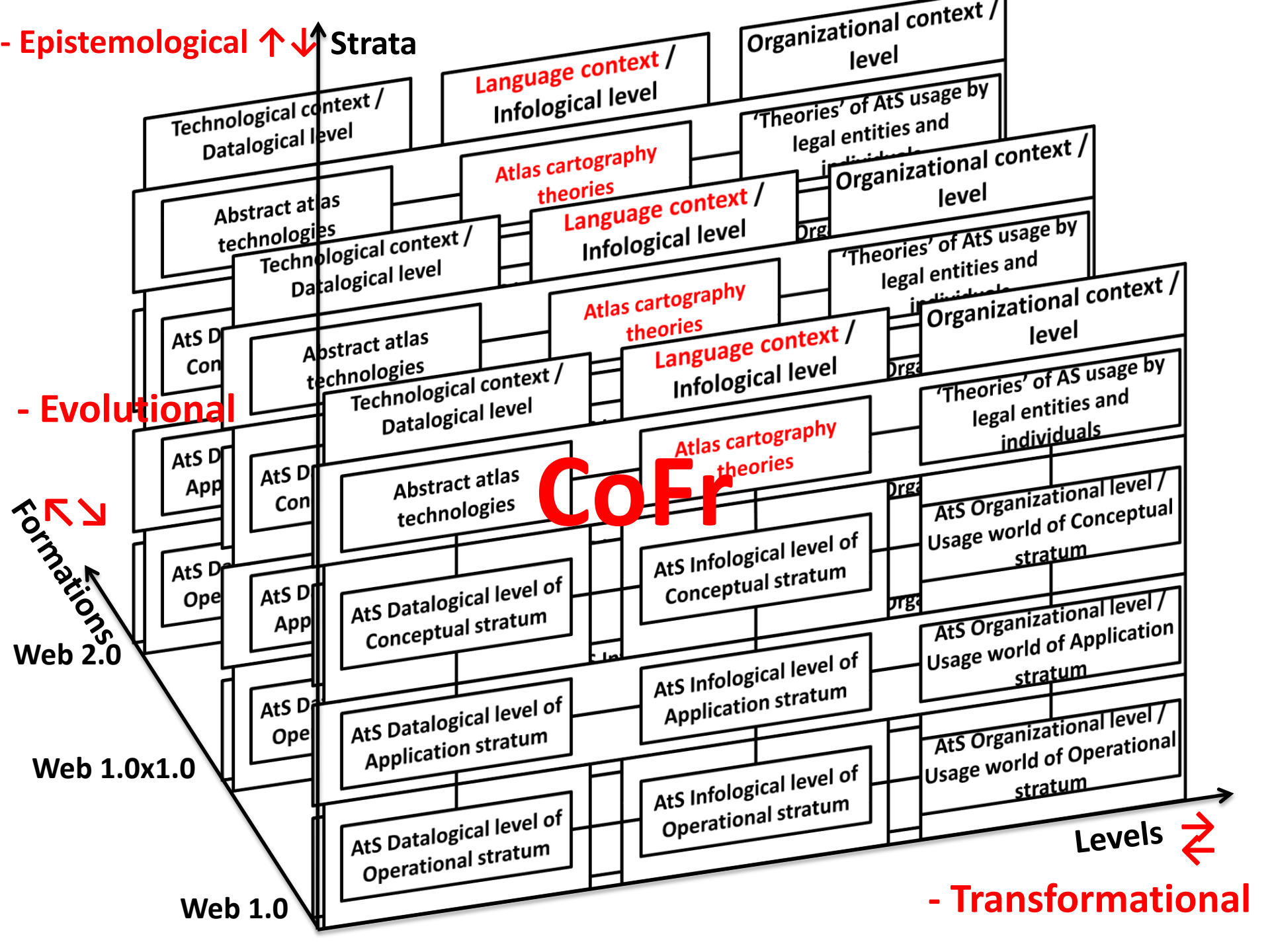
Relational Cartography (RelCa) Solutions and Conceptual Frameworks (SoFr and CoFr)

SoFr instance - AtlasSF1.0

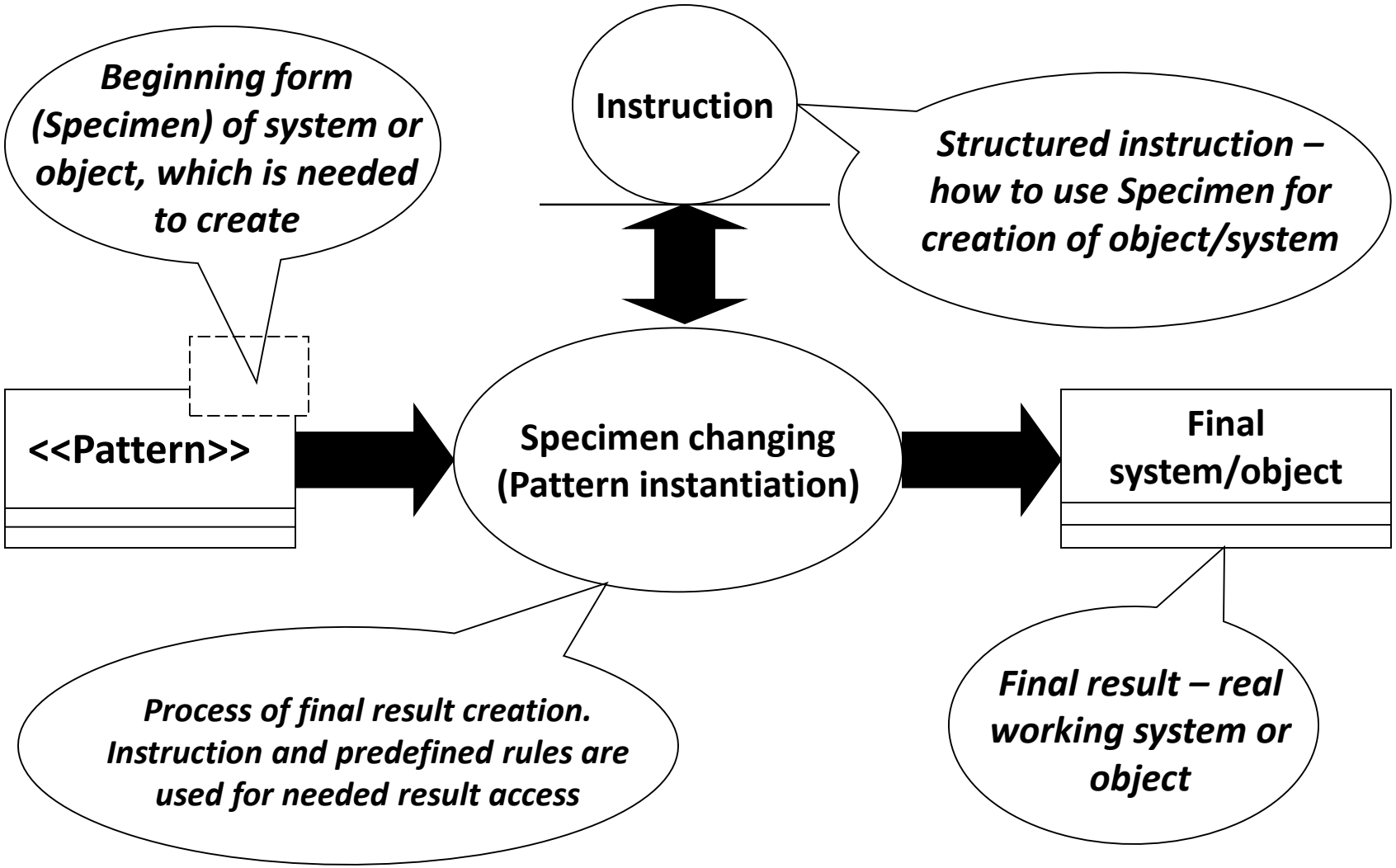
(Atlas Solutions Framework Web 1.0)



(Chabaniuk, 2018) Elements of Classical Relational Cartography. Unpublished monograph. See also published articles


- Epistemological
Strata
Technological context / Datalogical level
Language context / Infological level
Organizational context / level
Abstract atlas technologies
Atlas cartography theories
'Theories' of AtS usage by legal entities and individuals
- Evolutional
CoFr
AtS Datalogical level of Conceptual stratum
AtS Infological level of Conceptual stratum
AtS Organizational level / Usage world of Conceptual stratum
AtS Datalogical level of Application stratum
AtS Infological level of Application stratum
AtS Organizational level / Usage world of Application stratum
AtS Datalogical level of Operational stratum
AtS Infological level of Operational stratum
AtS Organizational level / Usage world of Operational stratum
Formations
Web 2.0
Web 1.0x1.0
Web 1.0
Levels
- Transformational

Typical process (or model) of pattern usage



(van Gigch J., 1991) System design modeling and metamodeling.- Springer

Metastratum:	Theory of design
Object stratum:	Design
Intervention stratum:	Implementation of design

Metastratum:	Metamodeling
Object stratum:	Modeling
Intervention stratum:	Real world

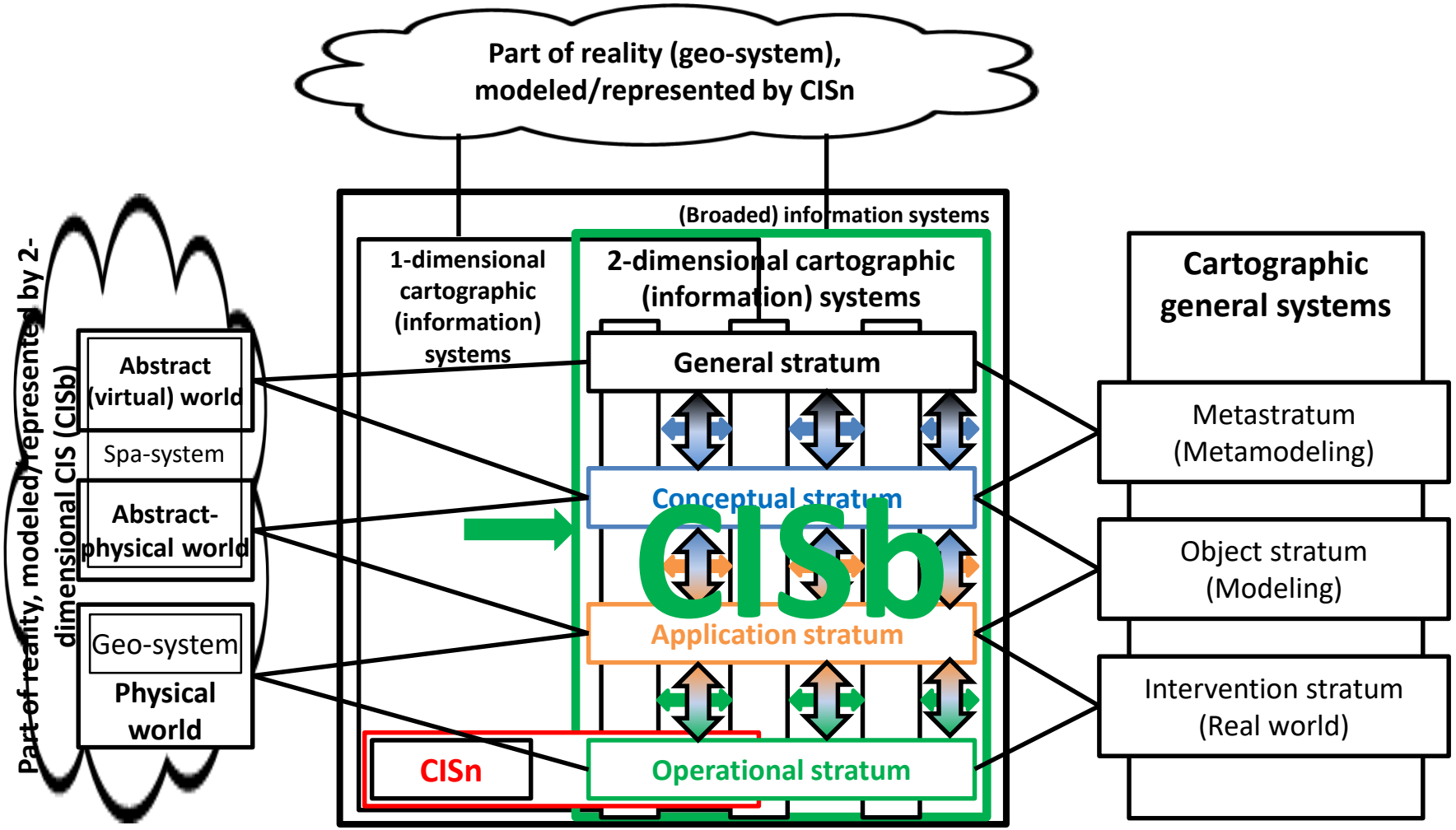
Metastratum:	Models ABOUT the World
Object stratum:	Models OF the World
Intervention stratum:	The World

Metastratum:	Learning to Learn: Questioning the Process of Learning
Object stratum:	Learning: Knowledge Acquisition
Intervention stratum:	The Application of Knowledge Learned

Metastratum:	Elements of General & Conceptual strata
Object stratum:	Elements of Conceptual & Application strata
Intervention stratum:	Elements of Application & Operational strata

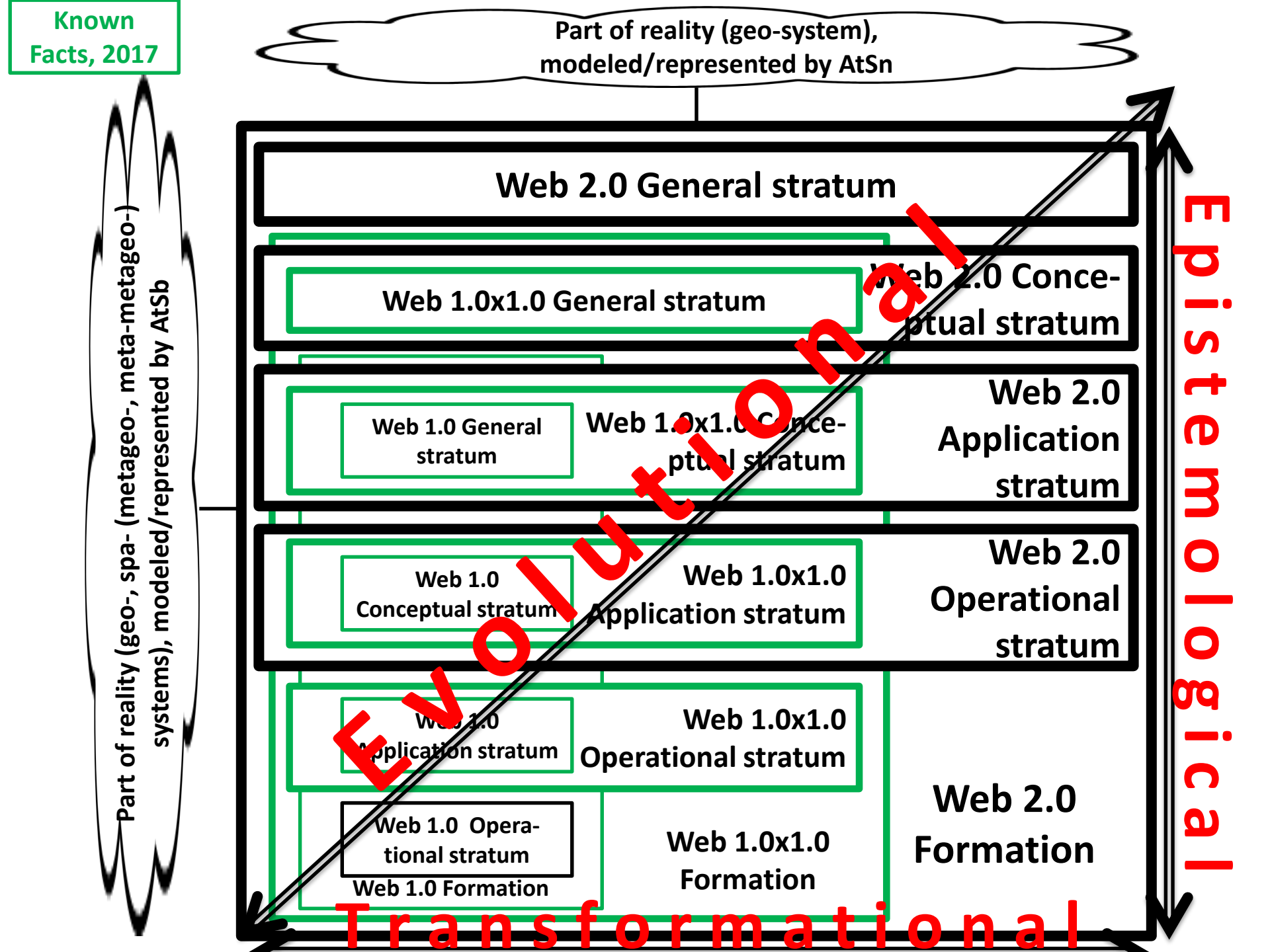
RelCa Conceptual Framework (CoFr)

The relations of investigated systems at the fixed time period

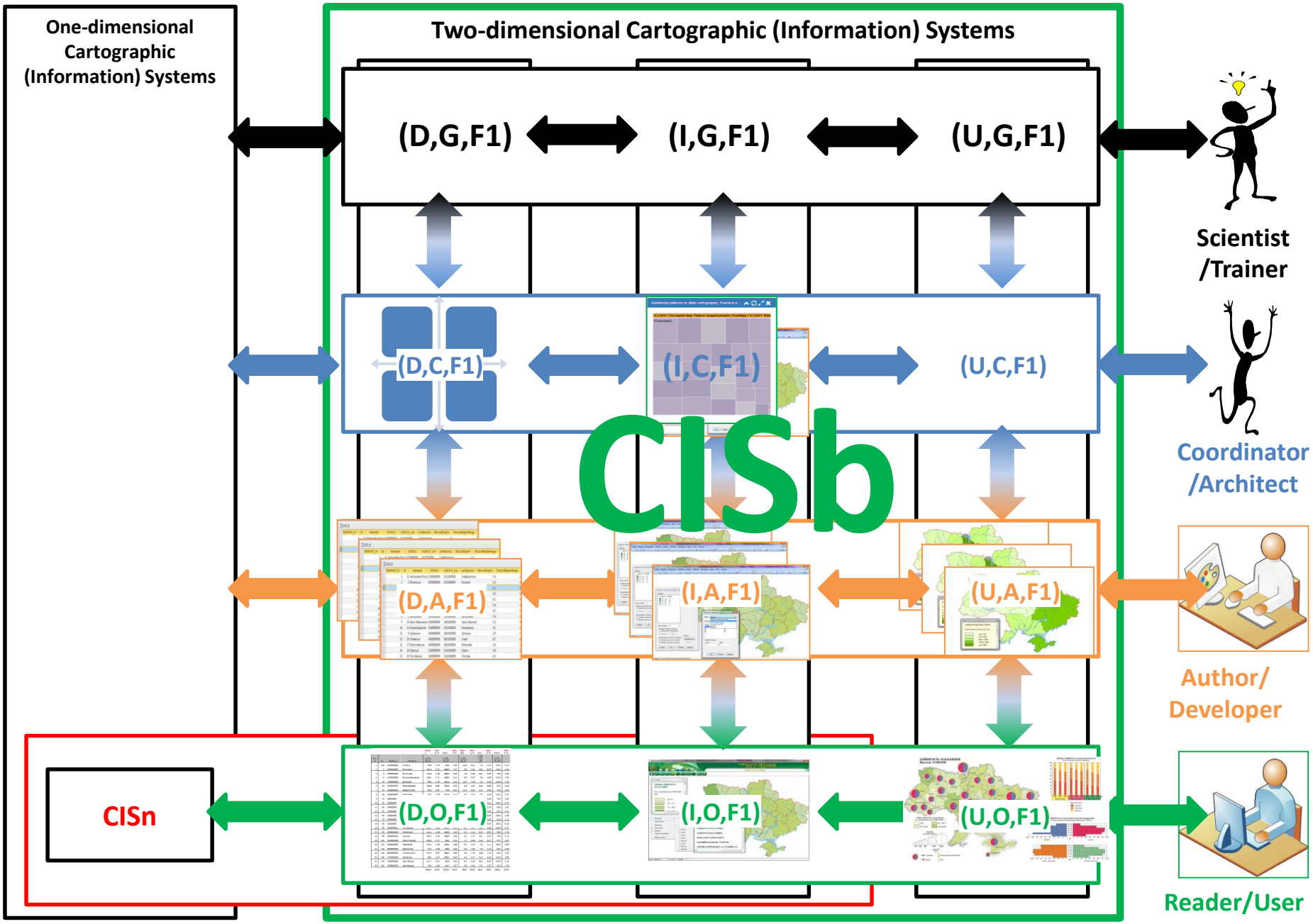


CIS – Cartographic Information System, b – broad sense, n – narrow sense

(Chabaniuk V., Rudenko L., 2018a) Relational Geospatial Technologies and Geospatial Challenges of the XXI Century.- 20 p., in print


Known Facts, 2017
Part of reality (geo-system), modeled/represented by AtSn
Part of reality (geo-, spa- (metageo-, meta-metageo-) systems), modeled/represented by AtSb
Web 2.0 General stratum
Web 1.0x1.0 General stratum
Web 2.0 Conce-ptual stratum
Web 1.0 General stratum
Web 1.0x1.0 Conce-ptual stratum
Web 2.0 Application stratum
Web 1.0 Conceptual stratum
Web 1.0x1.0 Application stratum
Web 2.0 Operational stratum
Web 1.0 Application stratum
Web 1.0x1.0 Operational stratum
Web 1.0 Opera-tional stratum
Web 1.0 Formation
Web 1.0x1.0 Formation
Web 2.0 Formation
Evolutional
Epistemological
Transformational

Deconstruction of atlas choropleth map. Static structure snapshot



We studied the relations existing between the ‘neighboring’ sets of the Choropleth Maps (ChMap) triplets:

ChMap(X, Y, Z) or **(X, Y, Z)**, where

X = Datalogical (**D**), Infological (**I**), Usagelogical (**U**) levels;

Y = Operational (**O** - green color), Application (**A** - orange color), Conceptual (**C** - blue color), General (**G** - black color) strata;

Z = Web 1.0 (**F1**), Web 1.0x1.0 (**F1x1**), Web 2.0 (**F2**) formations.

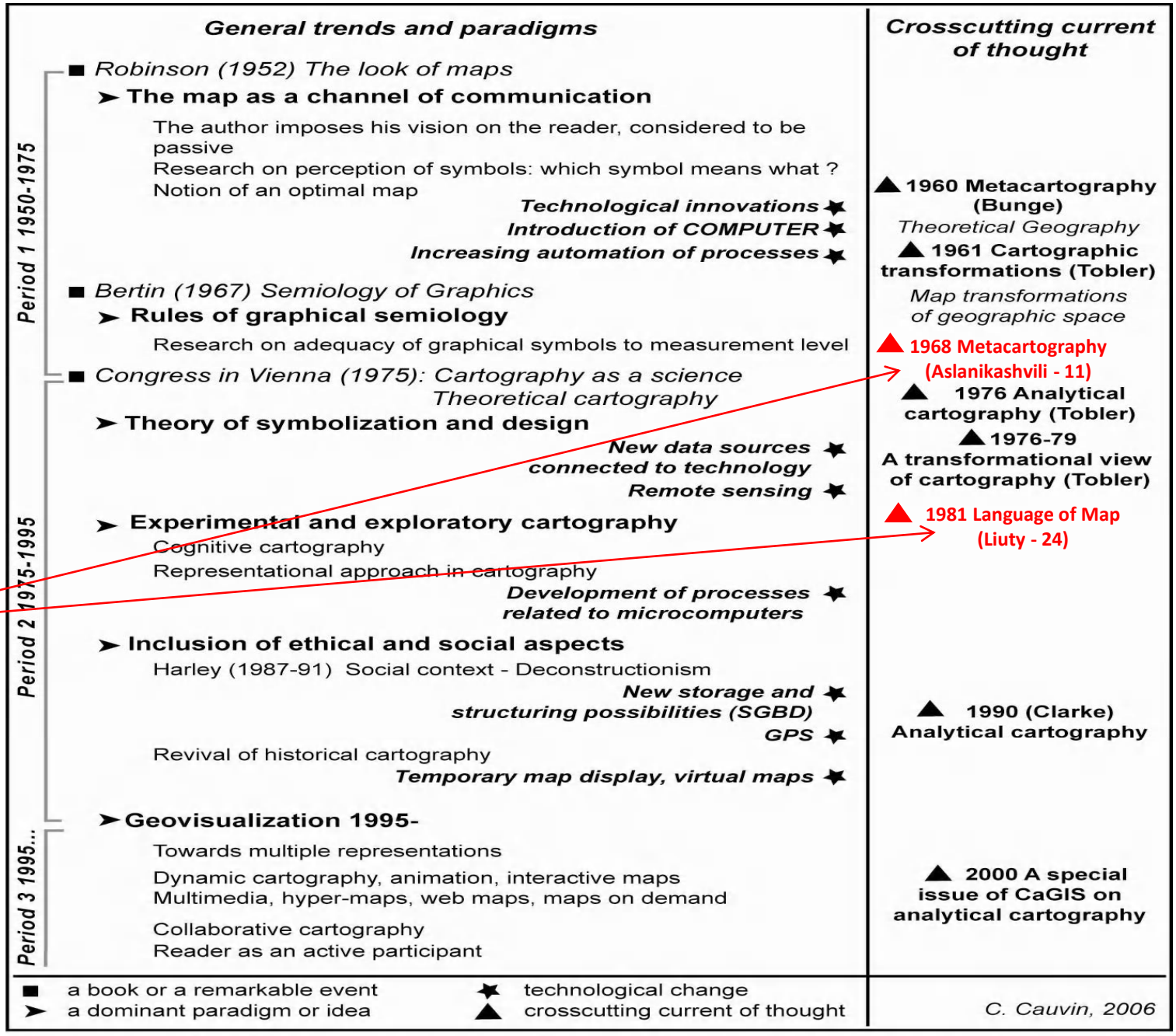
Transformational relations: ↔ ChMap(**D**,Y,Z) ↔ ChMap(**I**,Y,Z) ↔ ChMap(**U**,Y,Z) ↔

Epistemological relations: ChMap(X,**O**,Z) ↕ ChMap(X,**A**,Z) ↕ ChMap(X,**C**,Z) ↕ ChMap(X,**G**,Z) ↕

Evolutional relations: ChMap(X,Y,**F1**) ⤢ ChMap(X,Y,**F1x1**) ⤢ ChMap(X,Y,**F2**) ⤢

3. Deconstruction. Language and Knowledge

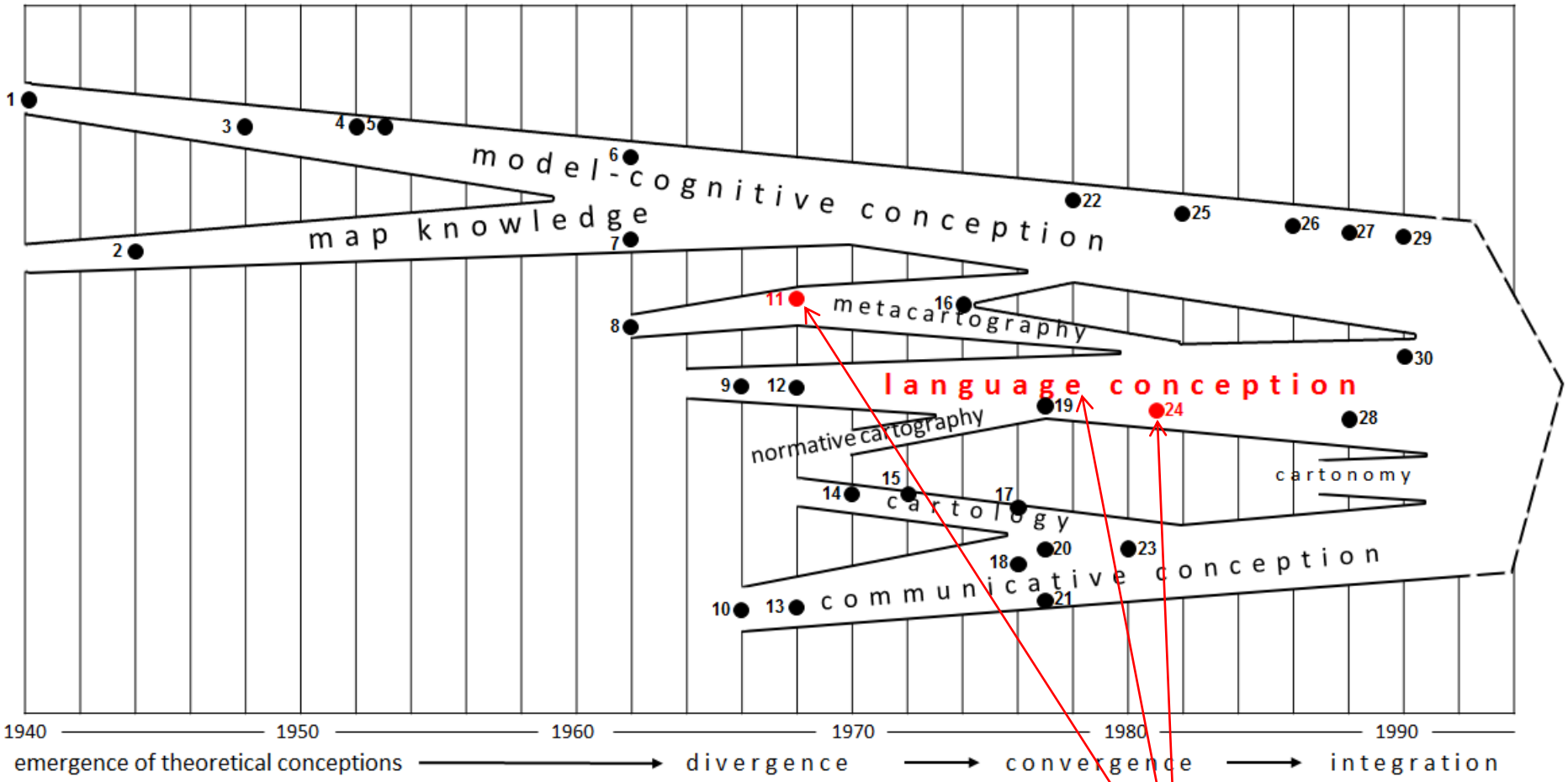
Cartographic trends and paradigms since 1950 (Cauvin, et al., 2010; Vol. 1, Fig. 1.2)



Added by me (ChaVi)

With the exception of books, the dates are only approximate and indicate periods rather than exact years. The advent of new ideas and paradigms does not necessary imply the disappearance of the preceding ones, which persisted more and less actively.

Development of the theoretical process in cartography over the last 50 years (Berlyant, 1996; Fig. 3)



Points with numbers show selected works from a list of 30 works (16 – in Russian) on the theory of cartography.

Highlighted by ChaVi

(Berlyant, 1996) Geoiconics.- M.: Astreya, 1996.- 208 p. (in Russian)

14 non-Russian sources on (Berlyant, 1996 ; Fig. 3)

8. Bunge W. Theoretical geography.- Lund, 1962
10. Arnberger E. Handbuch der thematischen Kartoguafie.- Wien, 1966.
12. Bertin J. Sémiologie Graphique: Les diagrammes, les réseaux, les cartes.- Paris-la Haye , 1967.
13. Kolachny A. Kartographic Information – a fundamental concept and term in modern cartography.- Cartogr. J., № 3. (*correct is Cartogr. J., 1969, Vol. 6, Iss. 1, pp. 47-49 - ChaVi*)
14. Ratajski I. Kartologia.- Pol. prz. kartogr., 1970, № 3.
15. Freitag U. Semiotik und Kartographer. – Kartogr. Nachrichen.- 1971, № 5.
17. Ratajski L. Cartology, its developed concept.- The Polish Cartography, Warszawa, 1976.
18. Robinson A.H., Petchenik B.B. The nature of maps.- Chicago-London, 1976.
19. Pravda J. Kartografichky jazyk.- Geod. a cartogr. Obzor.- 1977, 23 (65).
20. Morrison J.L. The science of cartography and its essential processes.- Cartographica, 1977, 14, № 19.
21. Board C. Map reading tasks appropriate in experimental studies in cartographic communication.- Can. Cartogr., 1978, 15, № 1.
23. Kretschmer I. Theoretical cartography: position and tasks.- Int. Jharb. Cartogr., 1980, 20.
27. Orgissek R. Theoretische Kartografie.- Ghota, 1987.
30. Pravda J. Zaklady koncepcie mapoveho jazyka.- Bratislava, 1990.

(Only?) (Bunge, 1962) & (Bertin, 1967) from (Berlyant, 1996) coincide with references from (Cauvin, et al., 2010; Vol. 1, Fig. 1.2)

In Western cartographic literature language paradigm (conception in (Berlyant, 1996)) is absent

(Azocar Fernandez P.I., Buchroithner M.F., 2014) Paradigms in Cartography: An Epistemological Review of the 20th and 21st Centuries.- Springer, 2014.- 150 (165) p.

p. 118: "Cartographic Language is probably associated with the Cartographic Communication. For this reason it is called a tendency only by (Ramirez, 2004) and (Cauvin, et al., 2010). … In the first decade of the 21st century Cartographic Language has been proposed as a new paradigm in the context of hermeneutics for the stylistic diversity in topographic maps by (Kent, Vujakovic, 2011)."

[Kent, Vujakovic, 2011] Cartographic Language: Towards a New Paradigm for Understanding Stylistic Diversity in Topographic Maps.- The Cartographic Journal, Vol. 48, No. 1, February 2011, pp. 21–40.

Most principal 'language' work for the period 1996-2011. Good review of the field

(Ramirez, 2014) Theoretical Cartography. Book draft (http://www.cfm.ohio-state.edu/raul/document/), 2018-mar-30 - **unaccesible**

Eastern European (Georgia, Russia, Slovakia, …) language paradigm results are not translated on English

- 11 - (Aslanikashvili, 1974) Aslanikashvili A.F. Metacartography. Main problems. Tbilisi: Metsniereba, 1974.- 126 p. (in Russian, 1968 – in Georgian)
- 24 - (Liuty, 2002(1988)) Liuty A.A. Language of map: essence, system, functions.- M.: IG RAS, 2002.- 2nd Ed., corr.- 327 p. (in Russian, 1981 – short version, 1988 – 1st Ed.)
- 30 - Pravda J. Zaklady koncepcie mapoveho jazyka.- Bratislava, 1990. (in Slovakian)

These monographs are not translated on English, so they are not known internationally - also as other non-English sources from (Berlyant, 1996; Fig. 3)

Post-structuralism, (Harley , 1989)

1. (Fox, 2014) **Post-structuralism** covers a number of associated analyses of the relationship between power, language and knowledge, which have in common the view that knowledge is always contextual, partial and fragmentary, but also is never neutral and shapes the power relations between individuals or groupings. Post-structuralists reject the notion of a single "truth", and critisize grand theories or systems of thought that make claims to uncover truth, including religion, science and social scientific realism. They also suggest that this relationship between power and knowledge can have consequences for subjectivity and identity.
2. (Harley , 1989) **Deconstructing the Map**. Sections:

- The Rules of Cartography (knowledge)
- Deconstruction and the Cartographic Text (language)
- Maps and the Exercise of Power (power)

3. (Cartographica, 50:1, 2015) **DECONSTRUCTING THE MAP: 25 YEARS ON???**

(Fox, 2014) Post-structuralism and postmodernism, pp. 464-468 // In Cockerham W.C., Dingwall R. and Quah S.R., Eds. The Wiley-Blackwell Encyclopedia of Health, Illness, Behavior and Society.- Chichester: Wiley.
(Harley , 1989) Deconstructing the Map.- Cartographica, Vol. 26, No. 2, Spring 1989, pp. 1-20.

(van Gigch J., 1991) System design modeling and metamodeling.- Springer

Metastratum:	Theory of design
Object stratum:	Design
Intervention stratum:	Implementation of design

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Metastratum:	Elements of General & Conceptual strata
Object stratum:	Elements of Conceptual & Application strata
Intervention stratum:	Elements of Application & Operational strata

Conceptual Framework (**CoFr**)

Metastratum:	Models ABOUT the World (metamaps - mathematics)
Object stratum:	Models OF the World (maps)
Intervention stratum:	The World (premaps)

Metacartography of W. Bunge (also as languages of A.Aslanikashvili, A.Liuty)

Elements of NAU Technological context (DataLogics)

Conceptual stratum

Development environments, including

MapInfo MapBasic

MapInfo MapX SDK

Development environments, including

isgeoMapSS Software Suite

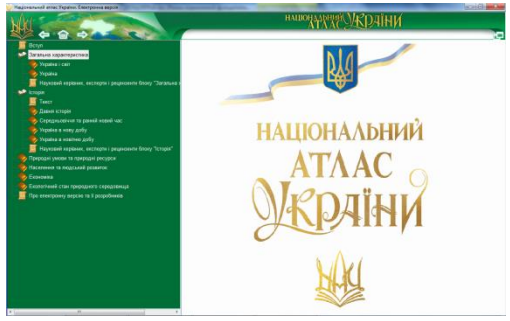
Application stratum

MapInfo Professional

isgeoMap Content Builder

isgeoMap Convertor

Operational stratum

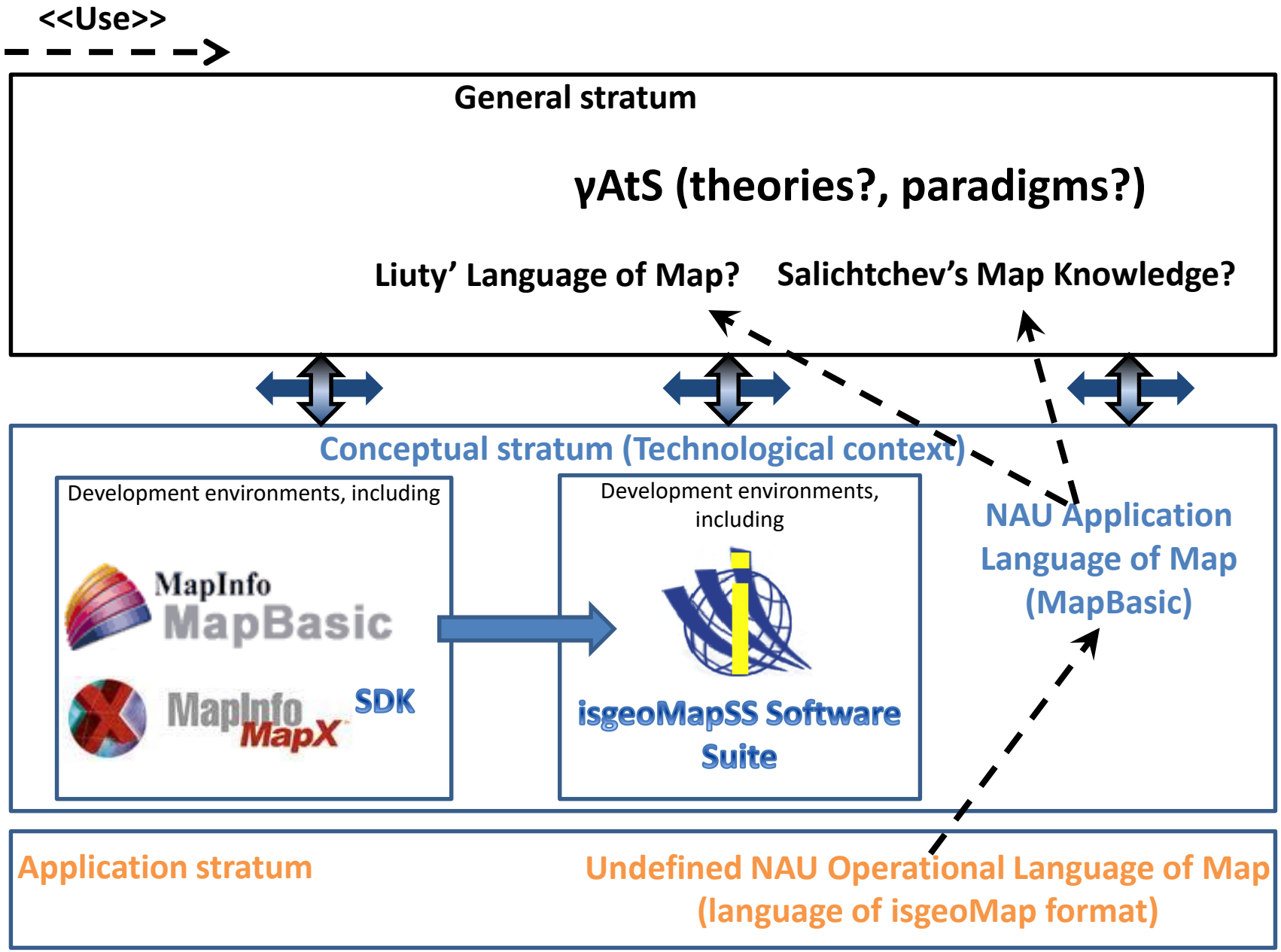


isgeoMap component

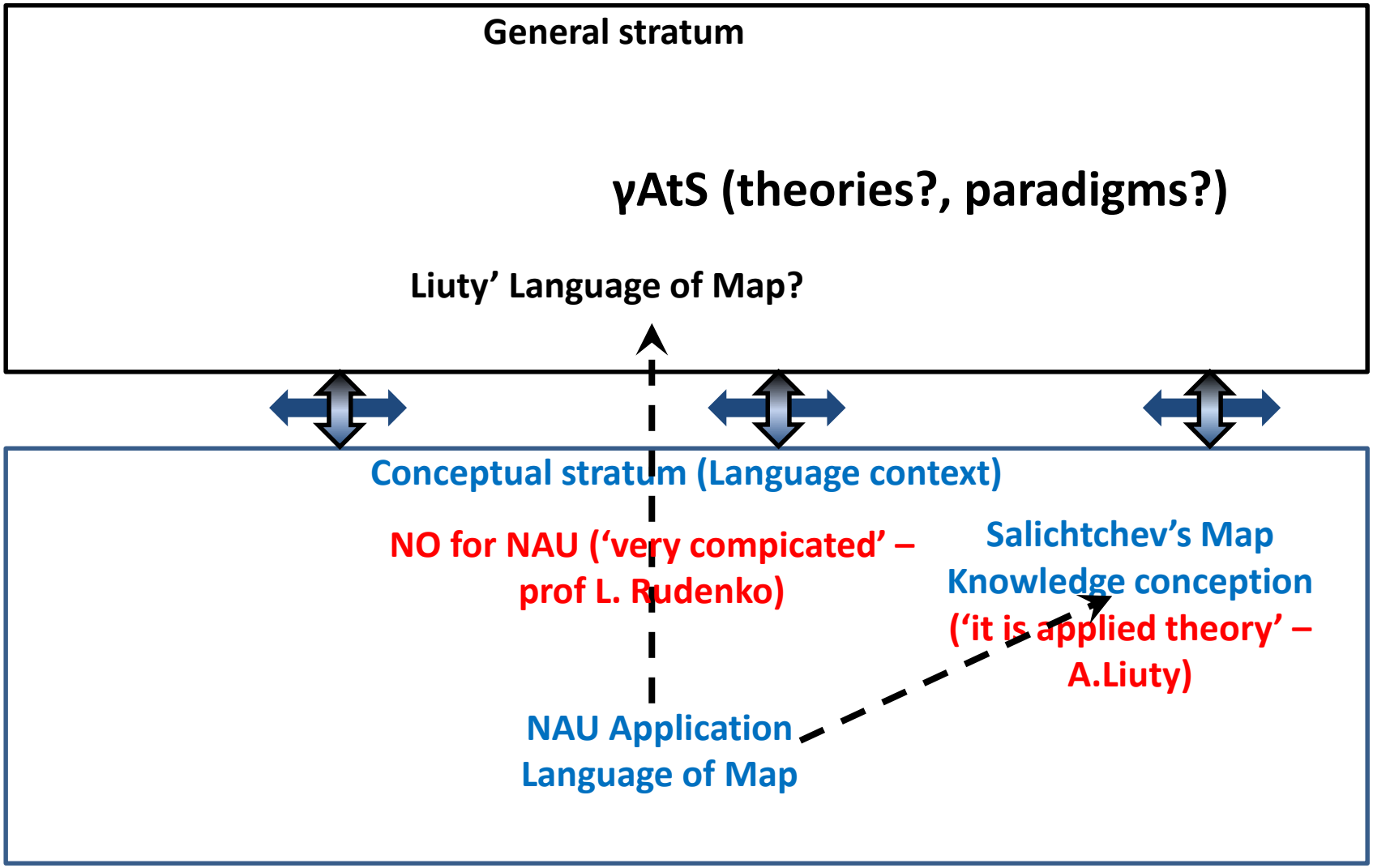
[MapInfo MapX component]

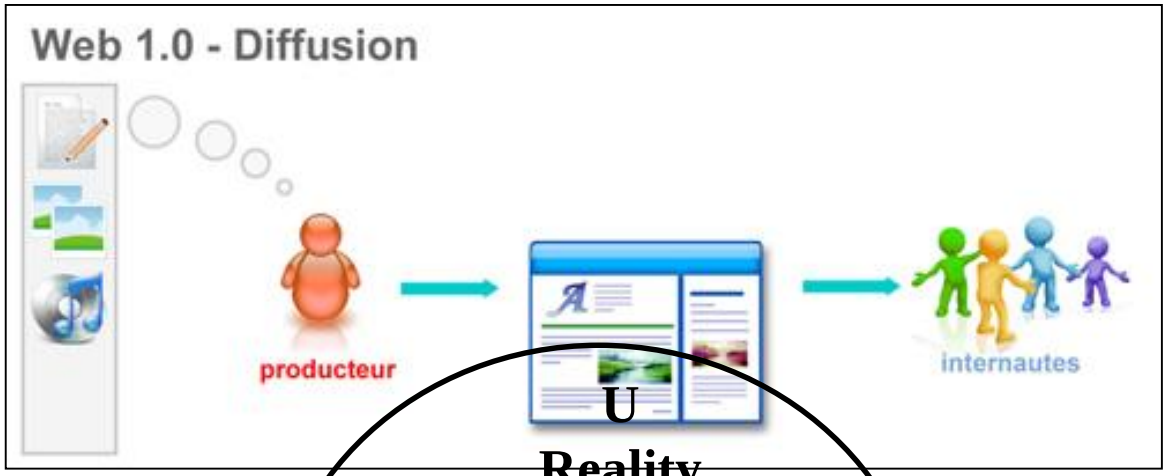
(Chabaniuk, Dyshlyk, 2014) Conceptual Framework of the Electronic Version of the National Atlas of Ukraine.- Ukrainian Geographical Journal, 2014, No. 2, pp. 58-68 (in Ukrainian)

In NAU were used Application and Operational Languages of Map

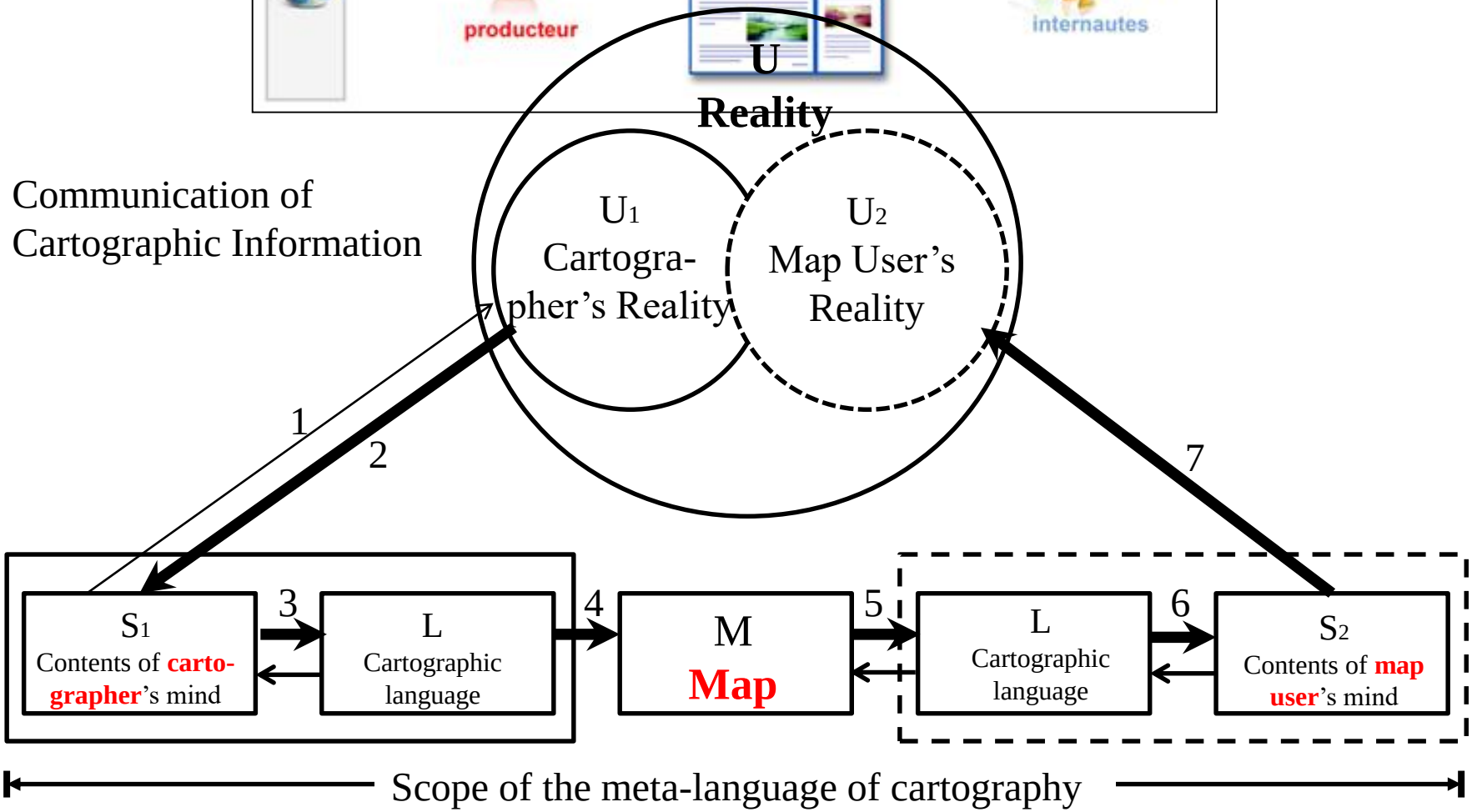


NAU was created in accordance with Salichtchev's Map Knowledge conception (see (Berlyant, 1996; Fig. 3), named 'applied theory' in (Liuty, 1988(2002)), using the specific Application Language of Map





Communication of Cartographic Information

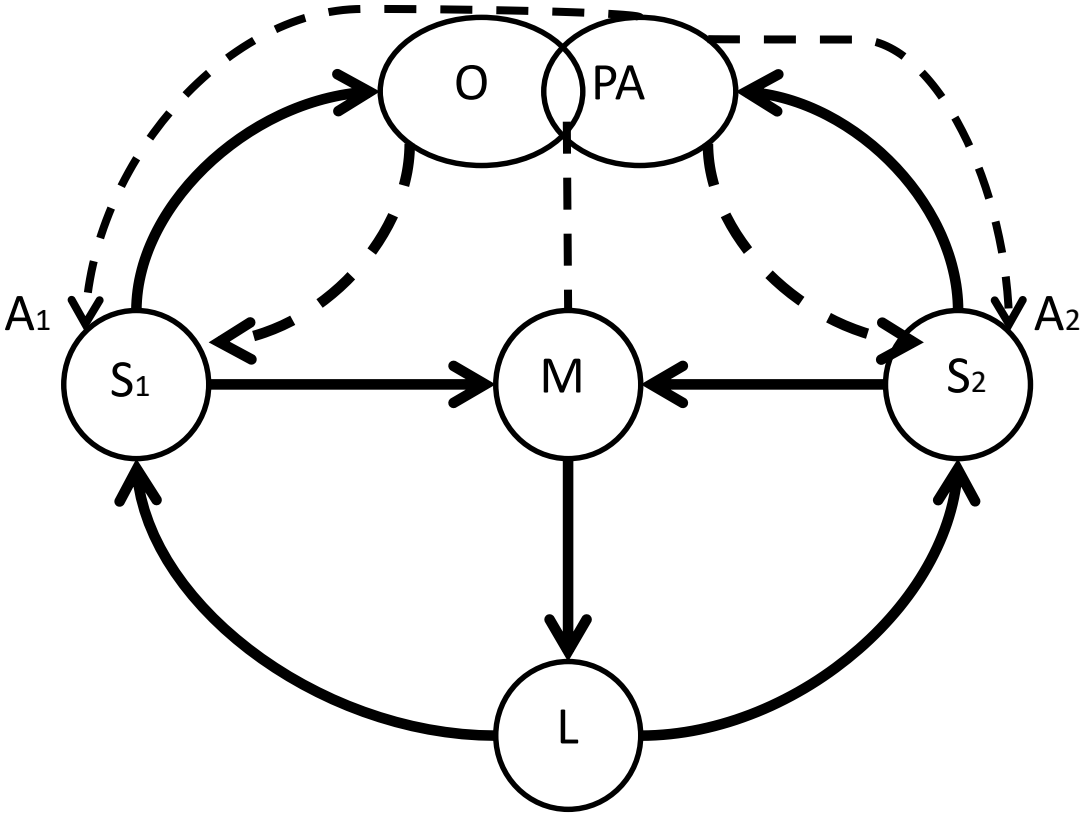


After (Kolachny, 1969) Cartographic Information – A Fundamental Concept and Term in Modern Cartography.- Cartogr. J., Vol. 6, Iss. 1, pp. 47-49

(Chabaniuk, Dyshlyk, 2016a) Atlas Basemaps in Web 2.0 Epoch.- The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLI-B4, 2016 XXIII ISPRS Congress, 12-19 July 2016, Prague, Czech Republic, pp. 611-618

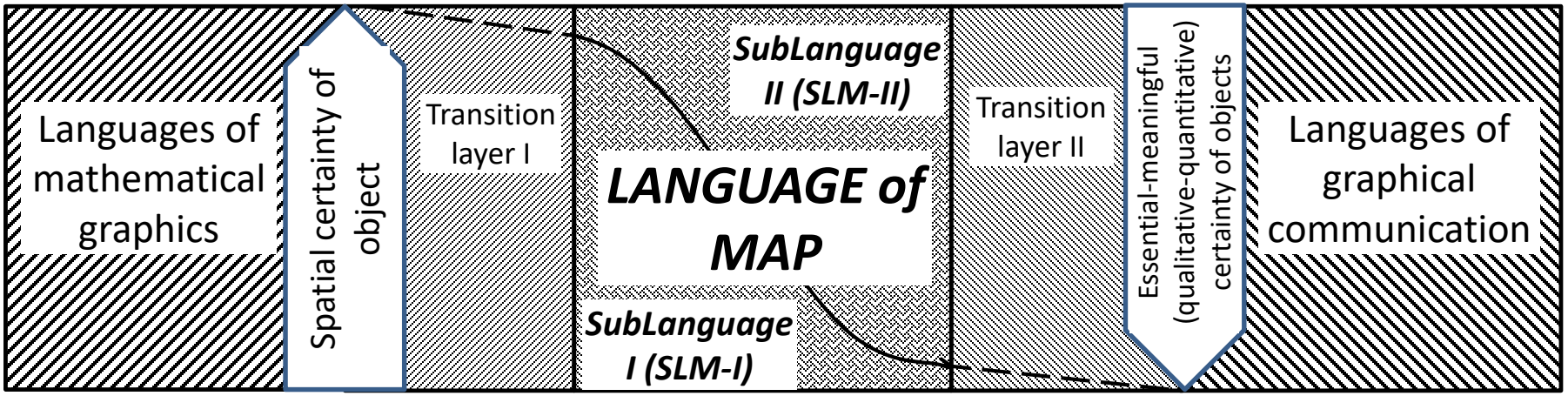
System model ‘making-using maps’ (Liuty, 2002(1988); Fig. 5)

O - object (reality),
PA – practical activity,
S_1 - subject-cartographer,
S_2 - subject-consumer (user) of map,
M - map (text of language),
L – language of map (system),
A_1, A_2 – activators (objective conditions of human practice, determining the appeal of subjects to language of map , to cartographic forms of communication, modeling and cognition)



(Liuty, 2002(1988)) Language of map: essence, system, functions.- M.: IG RAS, 2002.- 2nd Ed., corr.- 327 p. (in Russian)

Dual structure of the language of map and its 'position' among other language systems (Liuty, 2002 (1988); Fig. 9)



Types of images

Geometric drawings explaining the principles of deploying a ball (ellipsoid) to a plane

Image of map grids

Image of map grids with some elements of the earth's situation

Contour and address maps

Detailed general geographic and thematic maps

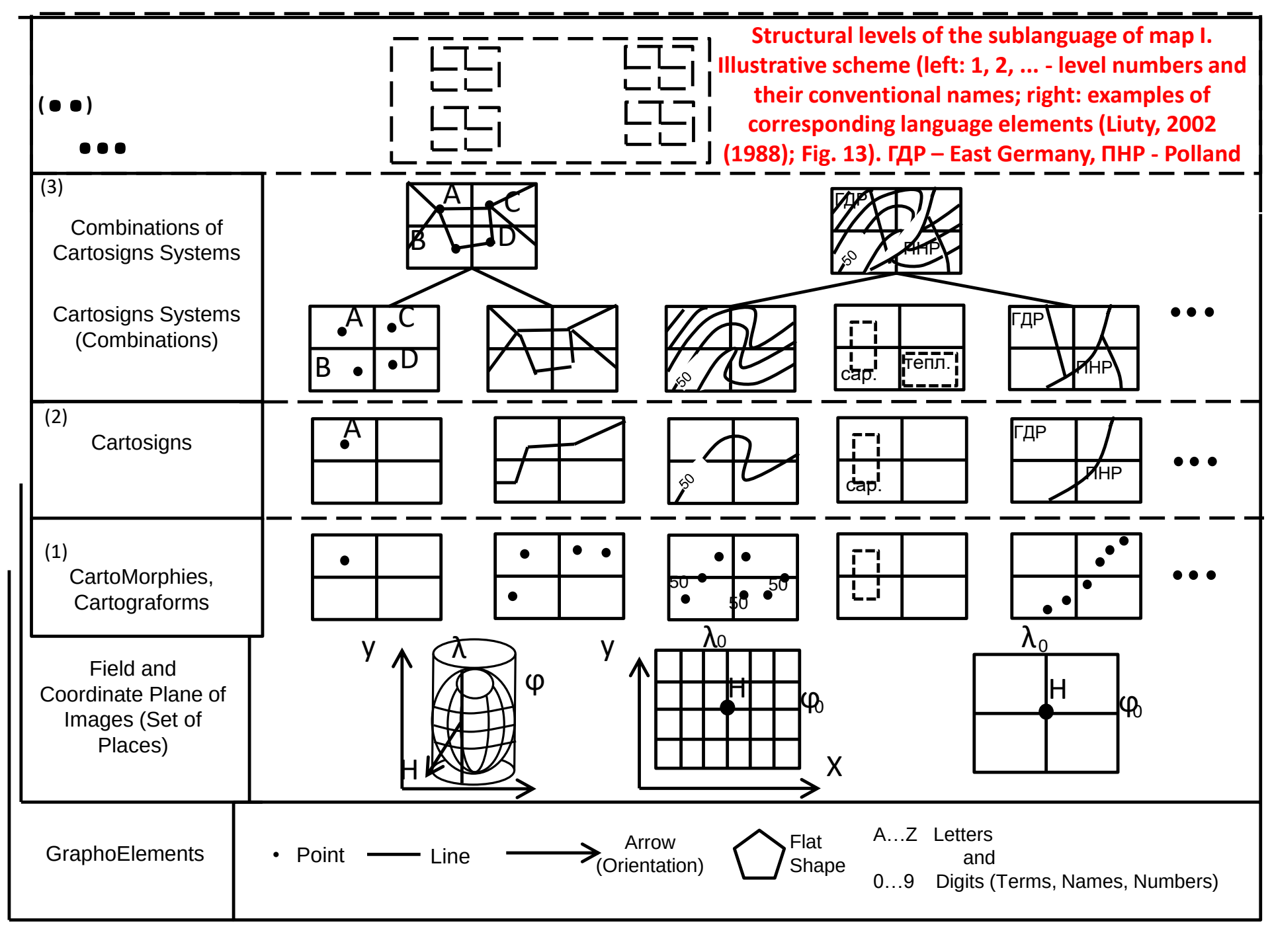
Cartograms and cartodiagrams for the enlarged networks of territorial division

Cartosimilar diagrams and other constructs

Diagrams and graphs indicating geographical coherence

Diagrams and graphs

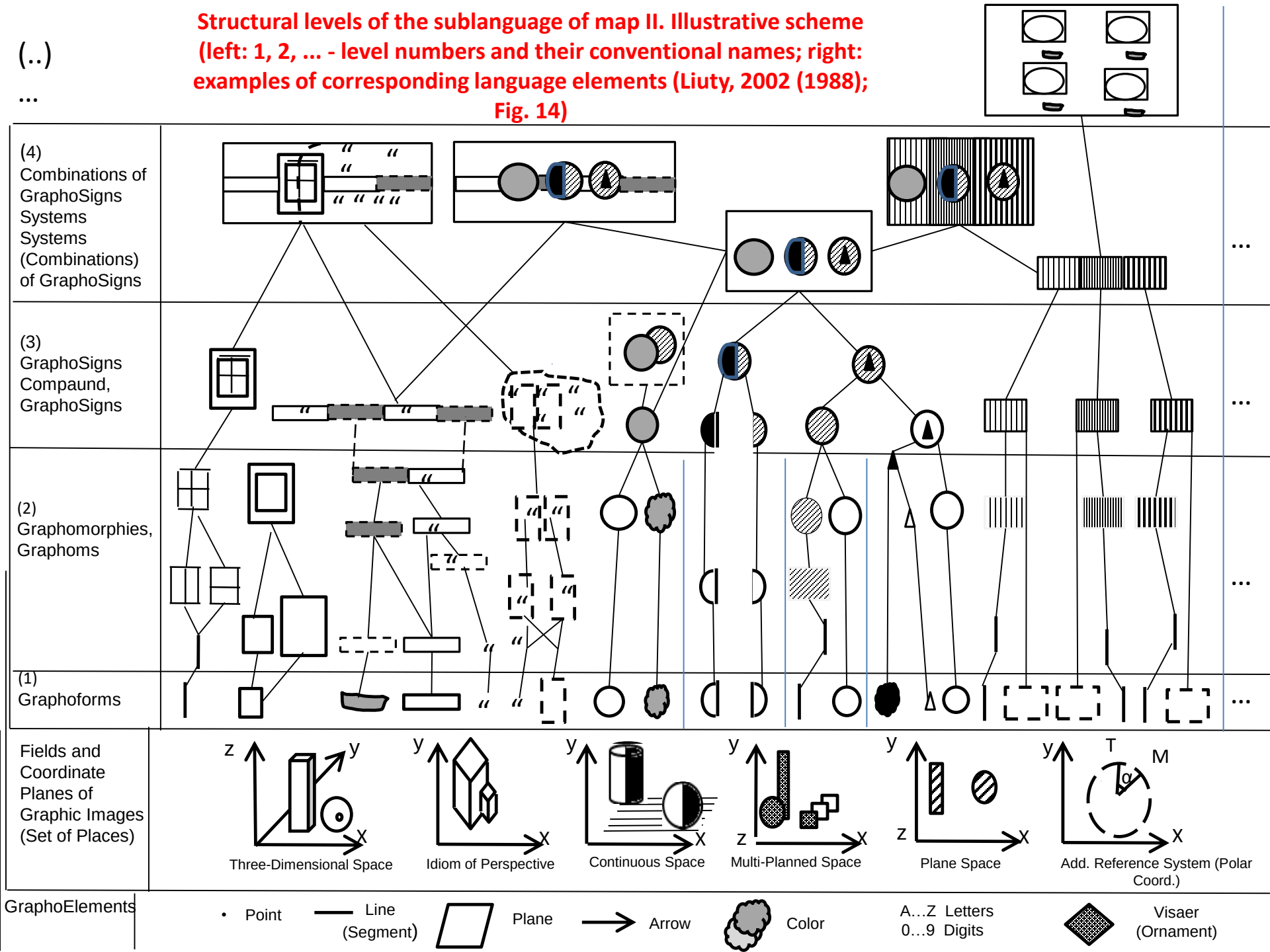
BaseMap(SLM-I)+ChoroLayer(SLM-II) - *ChaVi*


Structural levels of the sublanguage of map I. Illustrative scheme (left: 1, 2, ... - level numbers and their conventional names; right: examples of corresponding language elements (Liuty, 2002 (1988); Fig. 13). ГДР – East Germany, ПНР - Polland
(3)
Combinations of Cartosigns Systems
Cartosigns Systems (Combinations)
(2)
Cartosigns
(1)
CartoMorphies, Cartograforms
Field and Coordinate Plane of Images (Set of Places)
GraphoElements
A
B
C
D
ГДР
ПНР
50
сар.
тепл.
y
λ
φ
H
λ0
φ0
X
Point
Line
Arrow (Orientation)
Flat Shape
A…Z Letters and
0…9 Digits (Terms, Names, Numbers)

(..)

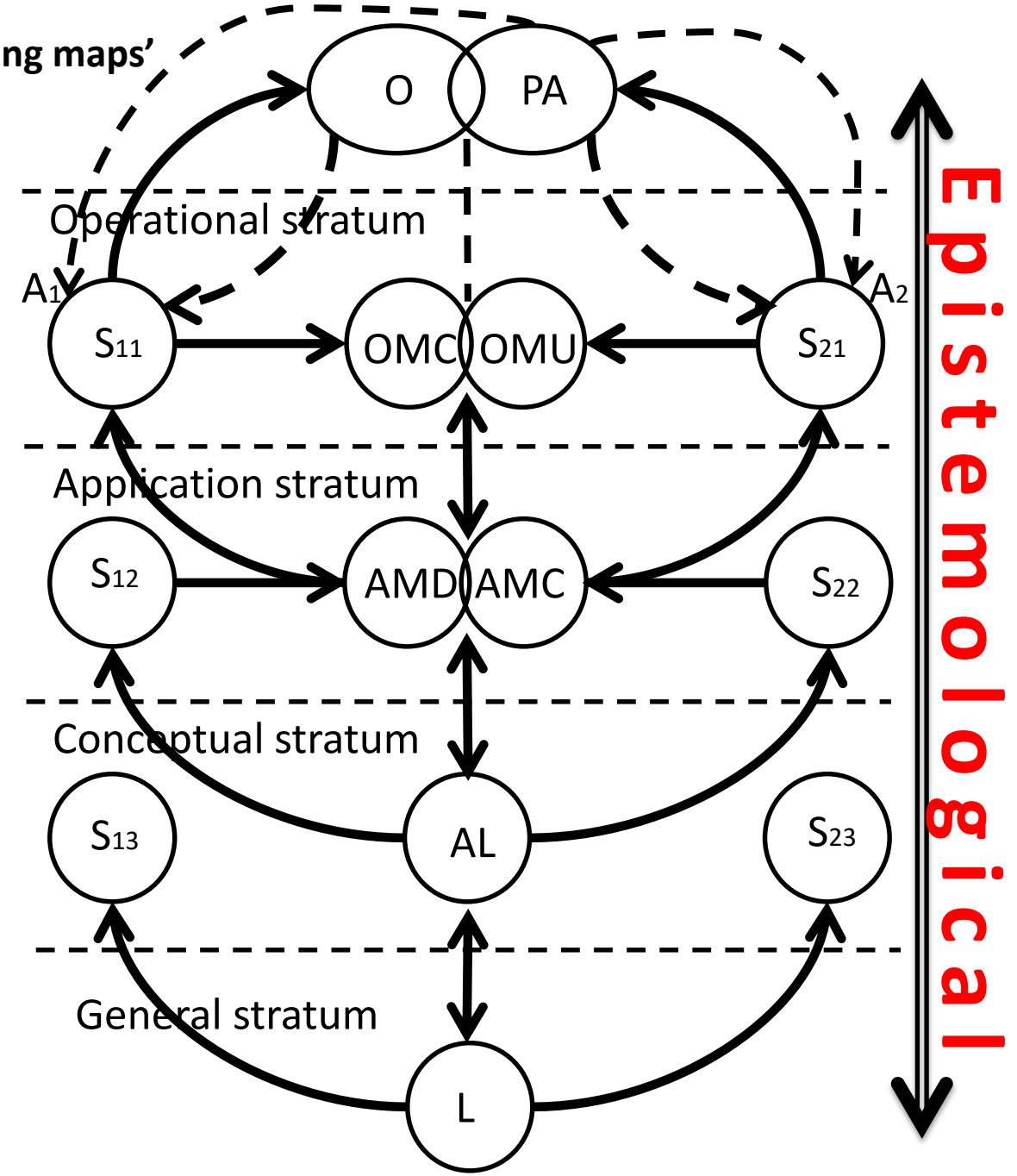
...

Structural levels of the sublanguage of map II. Illustrative scheme (left: 1, 2, ... - level numbers and their conventional names; right: examples of corresponding language elements (Liuty, 2002 (1988); Fig. 14)



Modern system model 'making-using maps'

AL – Application Language,
AMD – Application Map of Developer,
AMC – Application Map of Consumer (user-expert (author)),
OMC – Operational Map of Cartographer,
OMU – Operational Map of User,
S_{13} – computer and cartographic architects,
S_{12} – computer and cartographic designers,
S_{11} – programmers and cartographers,
S_{21} – user from (Liuty, 2002(1988)),
S_{22} – user-expert (author),
S_{23} – user-planner (coordinator),



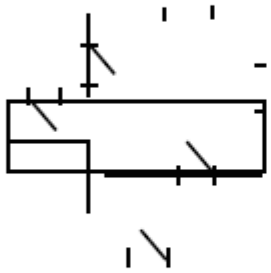
(Chabaniuk, Dyshlyk, 2016b) Towards relational cartography, pp. 114-123 // Collection of scientific papers of Western Geodetic Society of USGS, Issue II (32).- Lviv Polytechnic Press, 2016

Model and Meta-Model in Architecture

real object

house

model



architect's drawing (plan)

modeling language
(concrete syntax)

object types:

wall

door

window

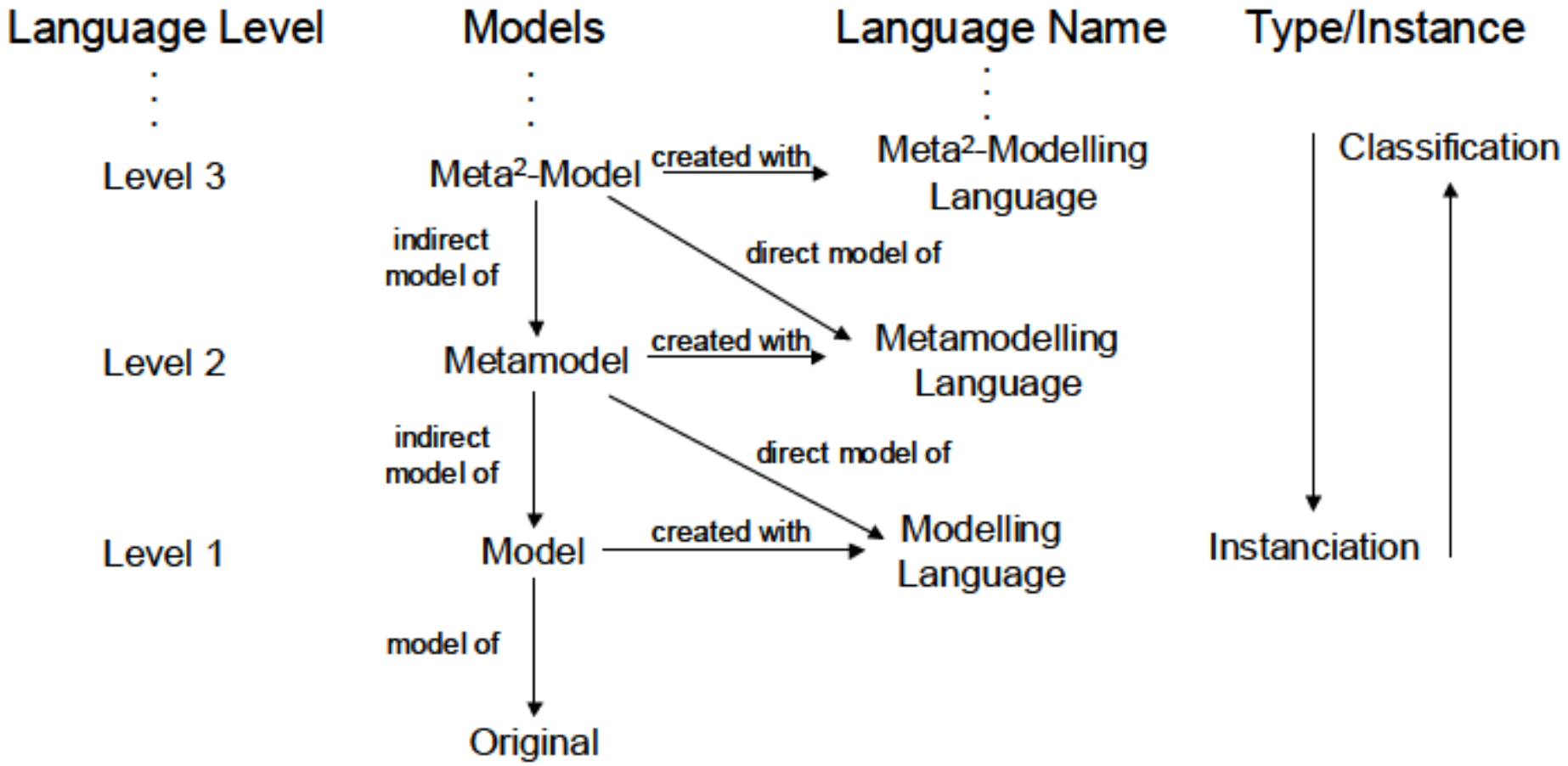
meta-model
(abstract syntax)

object types:
- wall
- door
- window

rules:
- a door is adjacent to a wall on both sides
- Windows are on outer walls.

(Hinkelmann K., 2016) Meta-Modeling And Modeling Languages, presentation.- Univ. of Applied Sciences and Northwestern Switzerland, School of Business, 33 p.

Metamodeling based on language stack (Karagiannis, Kühn, 2002; Fig. 3)



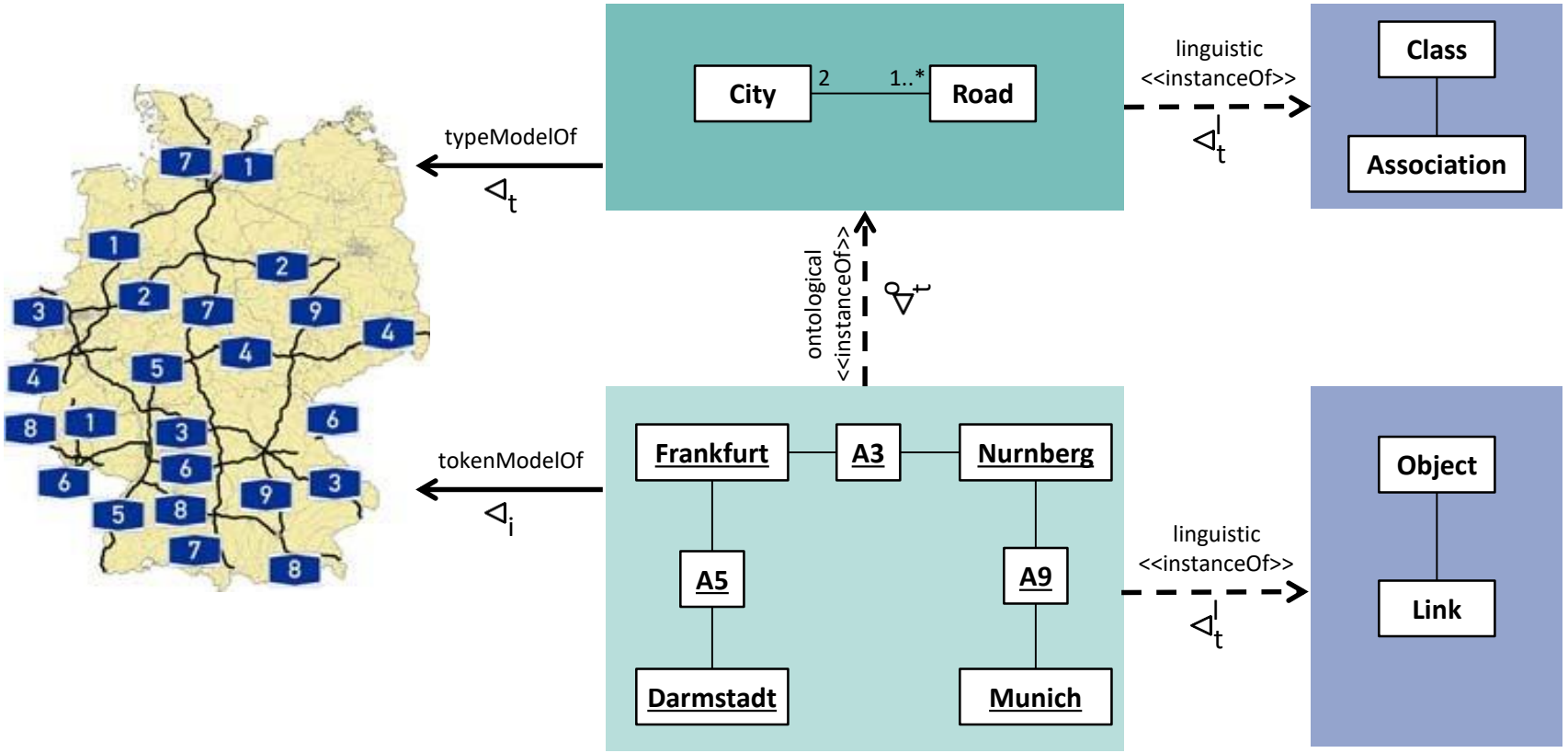
(Karagiannis, Kühn, 2002) Metamodeling Platforms, pp. 182-195.- In K. Bauknecht, A. Min Tjoa, & G. Quirchmayer (Eds). Proceedings of the Third International Conference EC-Web at Dexa 2002. Berlin: Springer-Verlag.

(Karagiannis, Kühn, 2002; from '5 Summary, Future Developments, and Research Directions')

Nevertheless, metamodeling is still a very challenging field for innovative future developments and essential research activities:

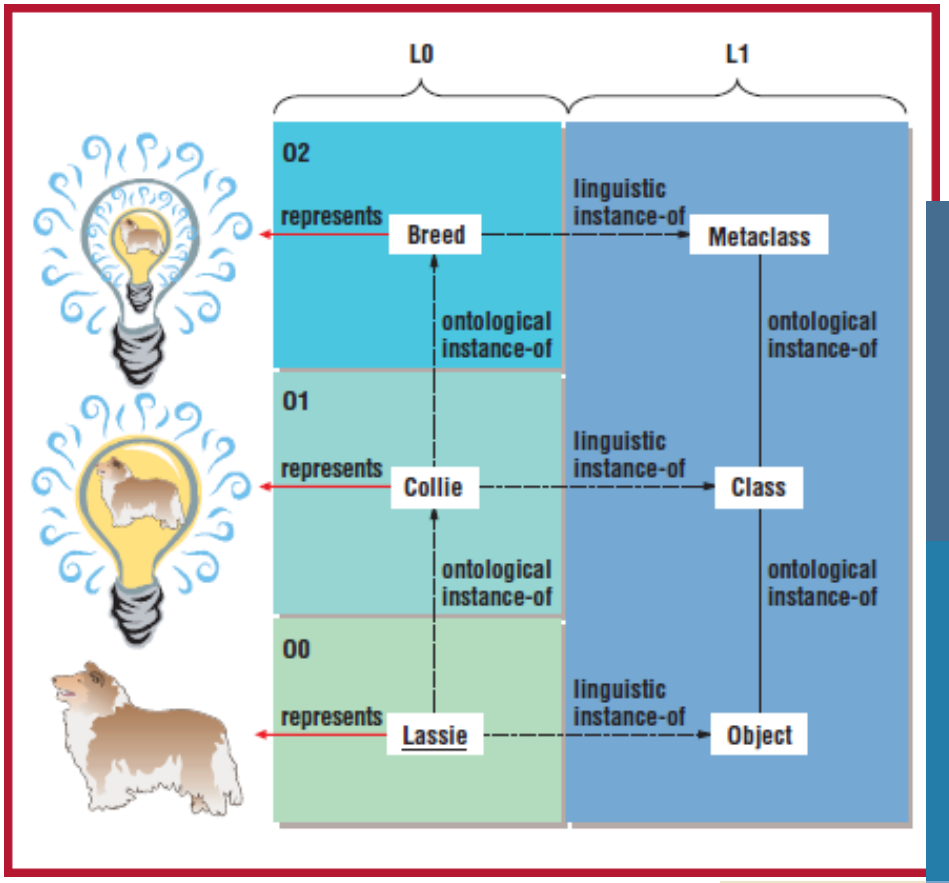
- *Integration and interoperability*
- *Semantic Web*
- *Model-driven Business Engineering*
- *Combination of modeling paradigms*
- *Language Engineering*: The definition of 'good' modeling language and their implementation in helpful software support still need a lot of experience and knowledge. To capture these experiences, patterns could be an appropriate formalism. E.g. current definition of semantics of modeling languages is either informal, and therefore often error phone and not directly understandable by machines, or formal, i.e. very time-consuming and expensive. In this area we are expecting improvements by interdisciplinary research.

(Karagiannis, Kühn, 2002) Metamodeling Platforms, pp. 182-195 // In K. Bauknecht, A. Min Tjoa, & G. Quirchmayer (Eds). Proceedings of the Third International Conference EC-Web at Dexa 2002.- Berlin: Springer-Verlag.



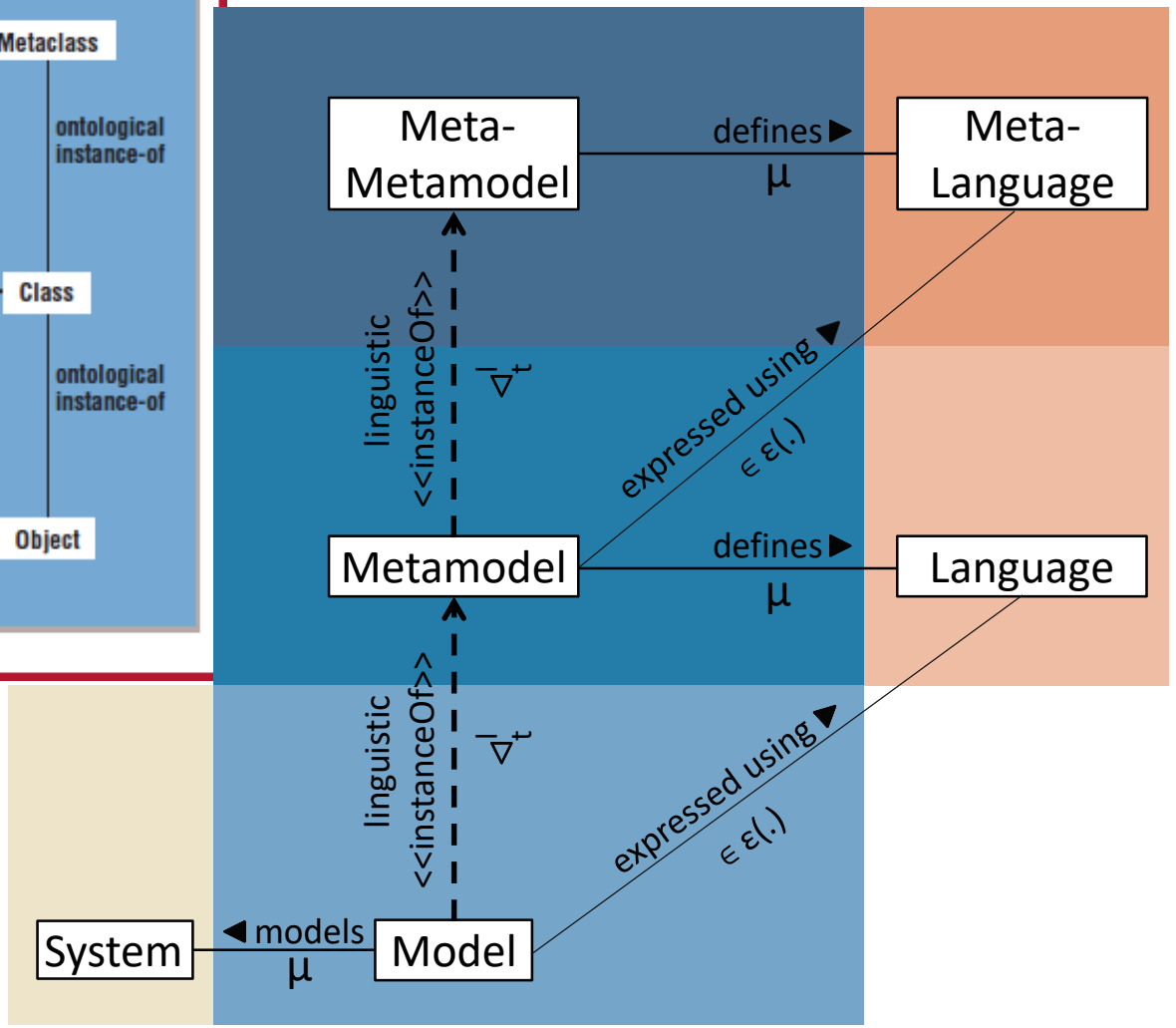
Kinds of model roles (Kühne, 2006; Fig. 2)

(Kühne, 2006) Matters of (meta-)modeling.- Softw. Syst. Modeling, 5, pp. 369–385



Ontological metamodeling view (Atkinson, Kühne, 2003; Fig. 3)

Language definition stack (Kühne, 2006; Fig. 9)



(Atkinson, Kühne, 2003) Model-Driven Development: A Metamodeling Foundation.- IEEE Software, Vol. 20, Iss. 5, pp. 36-41.

4. Deconstruction. Power

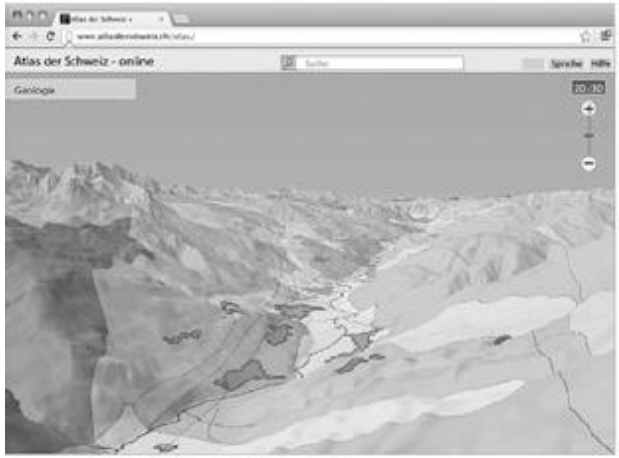
Questions:

- Has Google Maps (GoM) cartographic power?
- Is OpenStreetMap (OSM) powerful in cartographic community?
- If answer is “yes”, the next question is why?

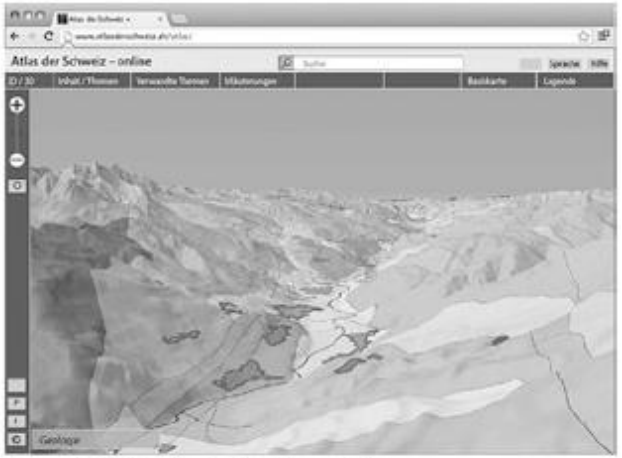
My answer:

GoM and OSM are powerful because they are typical solutions of typical problems of many users in cartographic context (patterns)

Few examples of ‘powerful’ patterns



Layout 1: Minimalistic style



Layout 2: Statistical Atlas style

Layout 3: Tablet style

Layout 4: Google Maps style

Layout 5: YouTube style

Schnürer R., Sieber R., Çöltekin A. (2014). The Next Generation of Atlas User Interfaces - A User Study with “Digital Natives”, pp. 23-36 // In Modern Trends in Cartography - Lecture Notes in Geoinformation and Cartography. Brus Jan, Vondrakova Alena, Vozenilek Vit (Eds. 2015).- Springer

Few examples of ‘powerful’ patterns

Table 1 Performance metrics (effectiveness and efficiency) for tested layouts

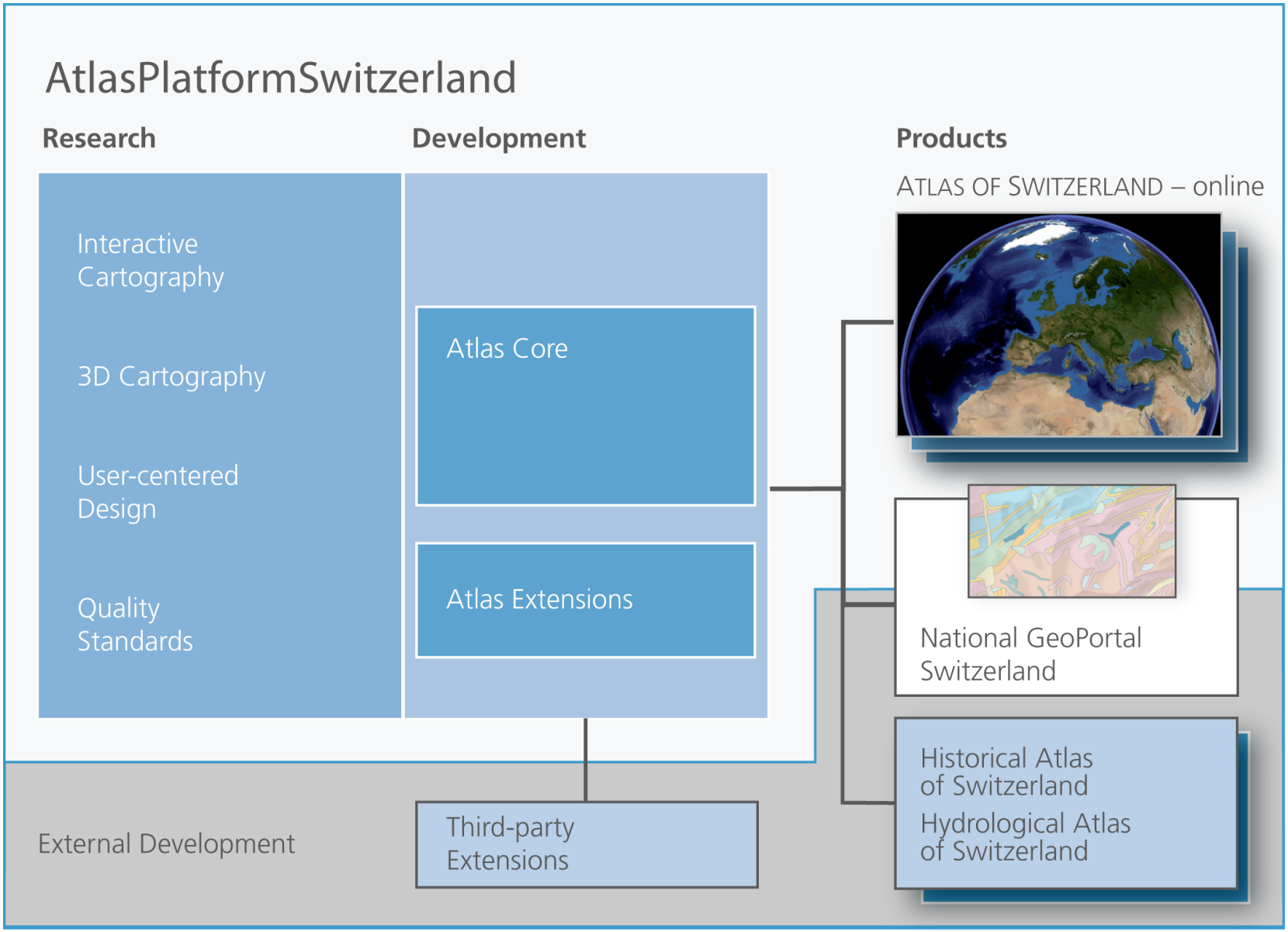
Stimuli	Successfully completed tasks	Time spent on a task on average (95 % confidence interval)	Normalized number of mouse clicks needed for a task on average (95 % confidence interval)
Layout 1	66 %	8.93 s (±0.68 s)	2.51 (±0.20)
Layout 2	72 %	9.21 s (±0.68 s)	3.31 (±0.24)
Layout 3	90 %	5.37 s (±0.51 s)	1.85 (±0.18)
Layout 4	93 %	4.52 s (±0.41 s)	1.87 (±0.21)
Layout 5	78 %	7.87 s (±0.47 s)	2.53 (±0.22)

Google Maps

Highlighted by ChaVi

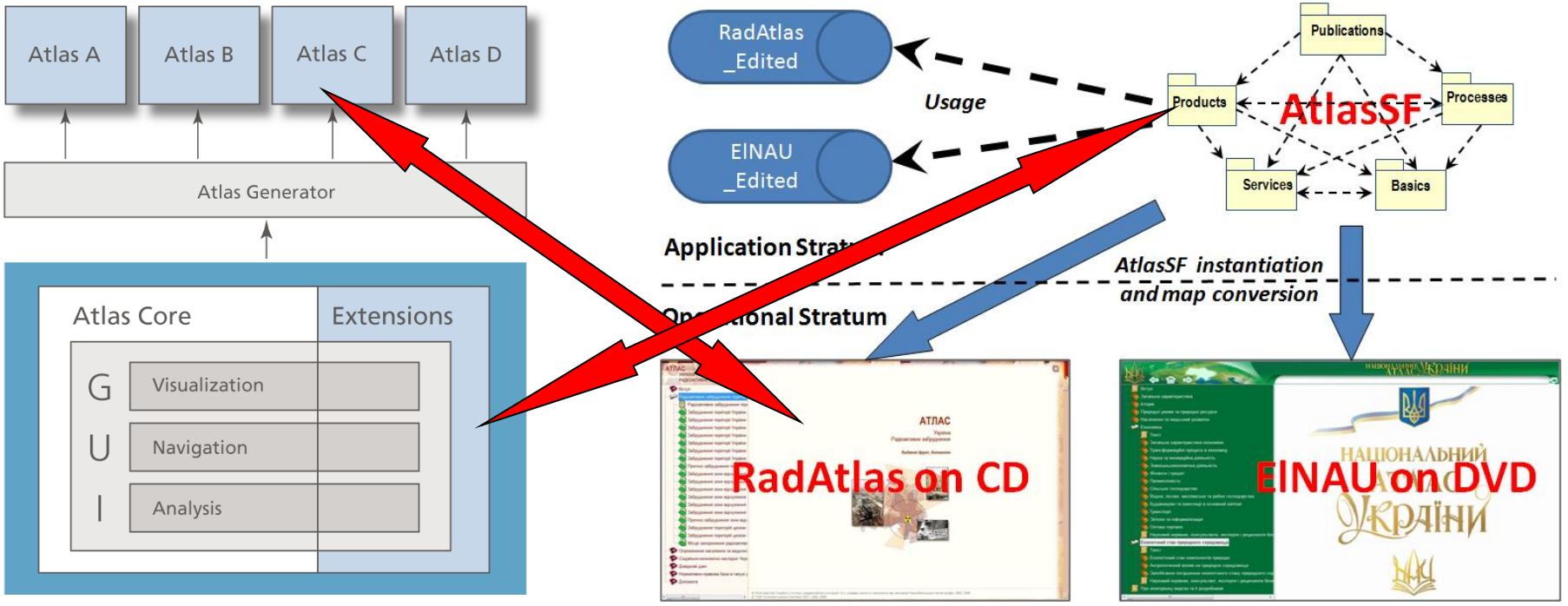
Schnürer R., Sieber R., Çöltekin A. (2014). The Next Generation of Atlas User Interfaces - A User Study with “Digital Natives”, pp. 23-36 // In Modern Trends in Cartography - Lecture Notes in Geoinformation and Cartography. Brus Jan, Vondrakova Alena, Vozenilek Vit (Eds. 2015).- Springer

Few examples of ‘powerful’ patterns



(Sieber R., et al., 2011) Sieber Rene, Hollenstein Livia, Odden Benedicte, Hurni Lorenz. From Classic Atlas Design to Collaborative Platforms – The SwissAtlasPlatform Project.- 25th International Cartographic Conference, Paris, 10 p.

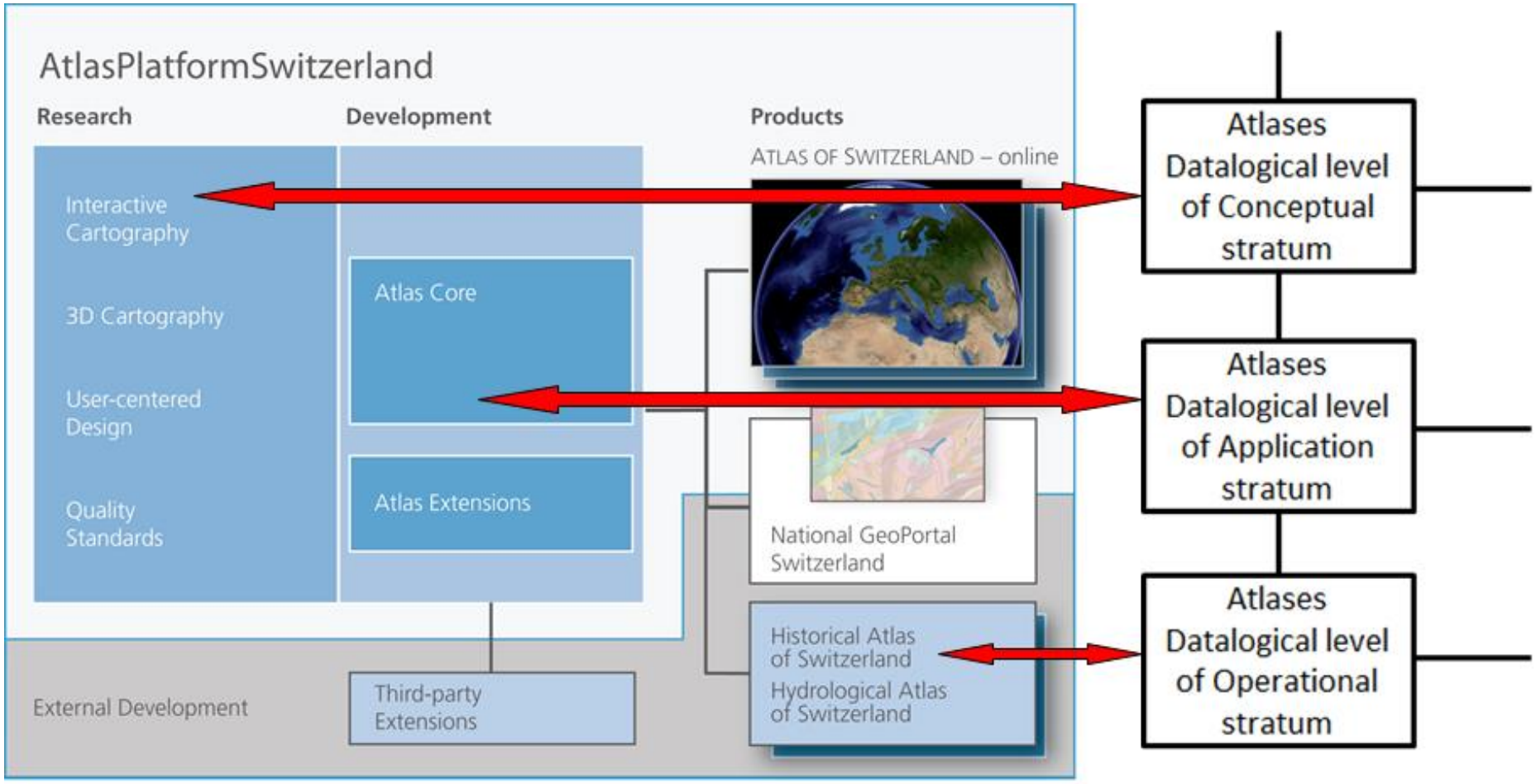
“a platform is a system that can be reprogrammed and therefore customized by outside developers - users - and in that way, adapted to countless needs and niches that the platform's original developers could not have possibly contemplated, much less had time to accommodate” (Andreessen, 2007)



(Andreessen, 2007) Analyzing the Facebook Platform, three weeks in (accessed 2016-apr-16).- http://web.archive.org/web/20071021003047/blog.pmarca.com/2007/06/analyzing_the_f.html

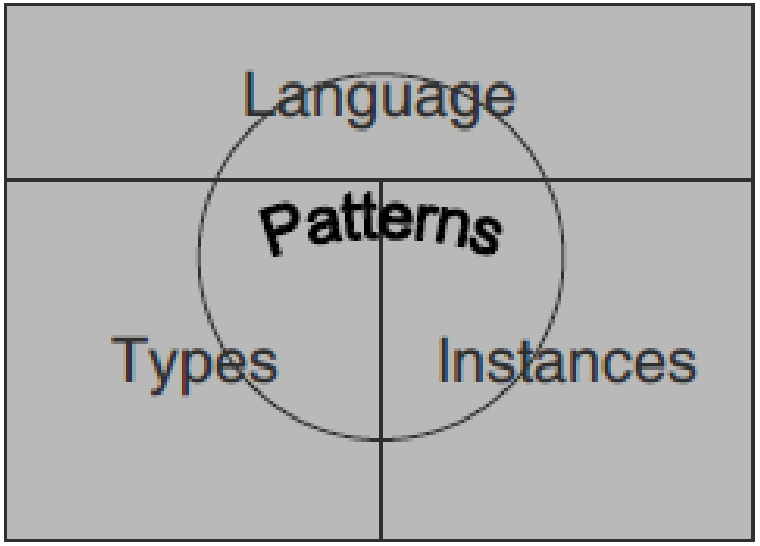
(Chabaniuk V., Dyshlyk O., 2015; Fig. 9) Do We Need Relational Cartography?- unPublished paper

Few examples of ‘powerful’ patterns



(Chabaniuk V., Dyshlyk O., 2015; Fig. 10) Do We Need Relational Cartography? - unPublished paper

Platform in Model-Based Engineering (Model-Driven Development)

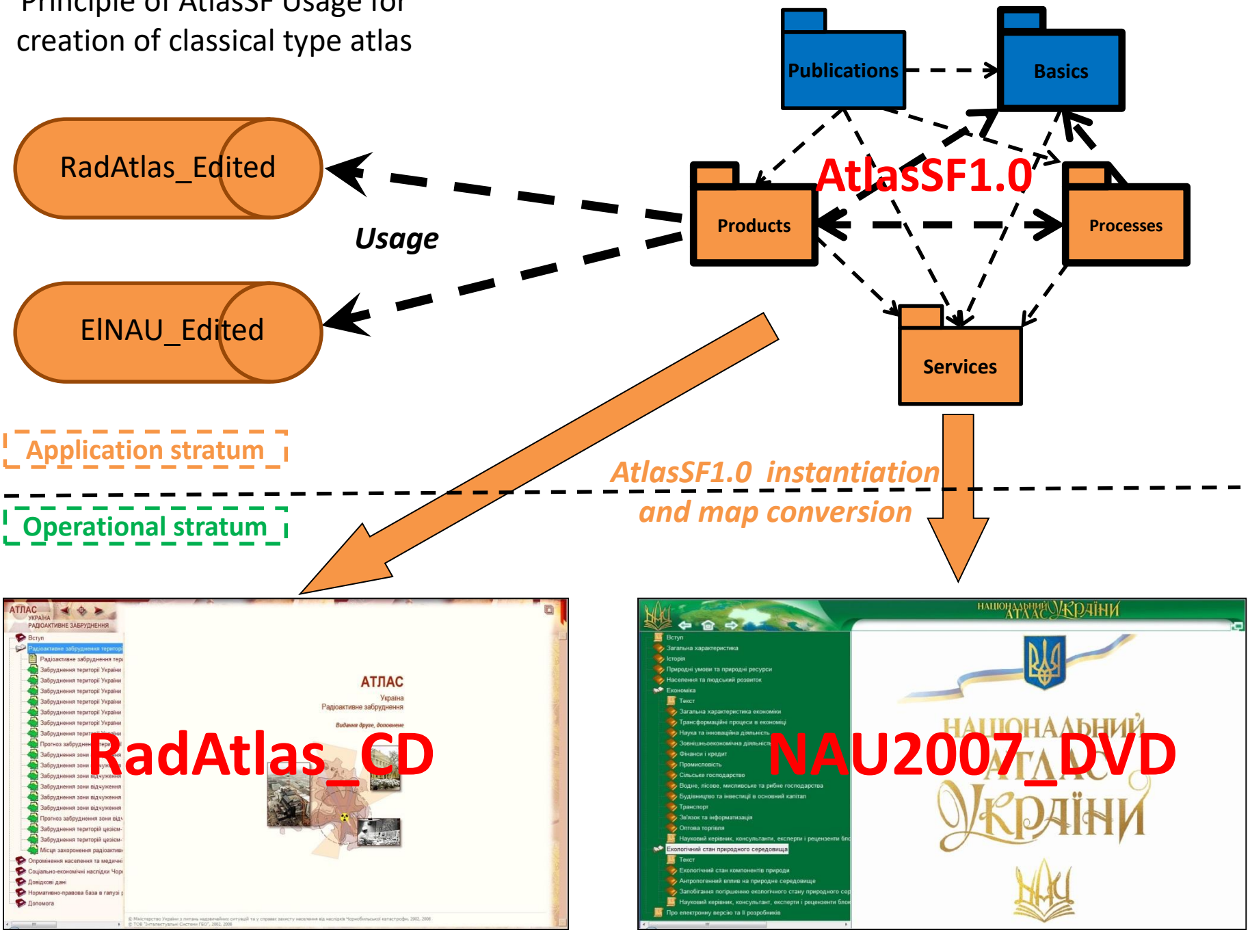


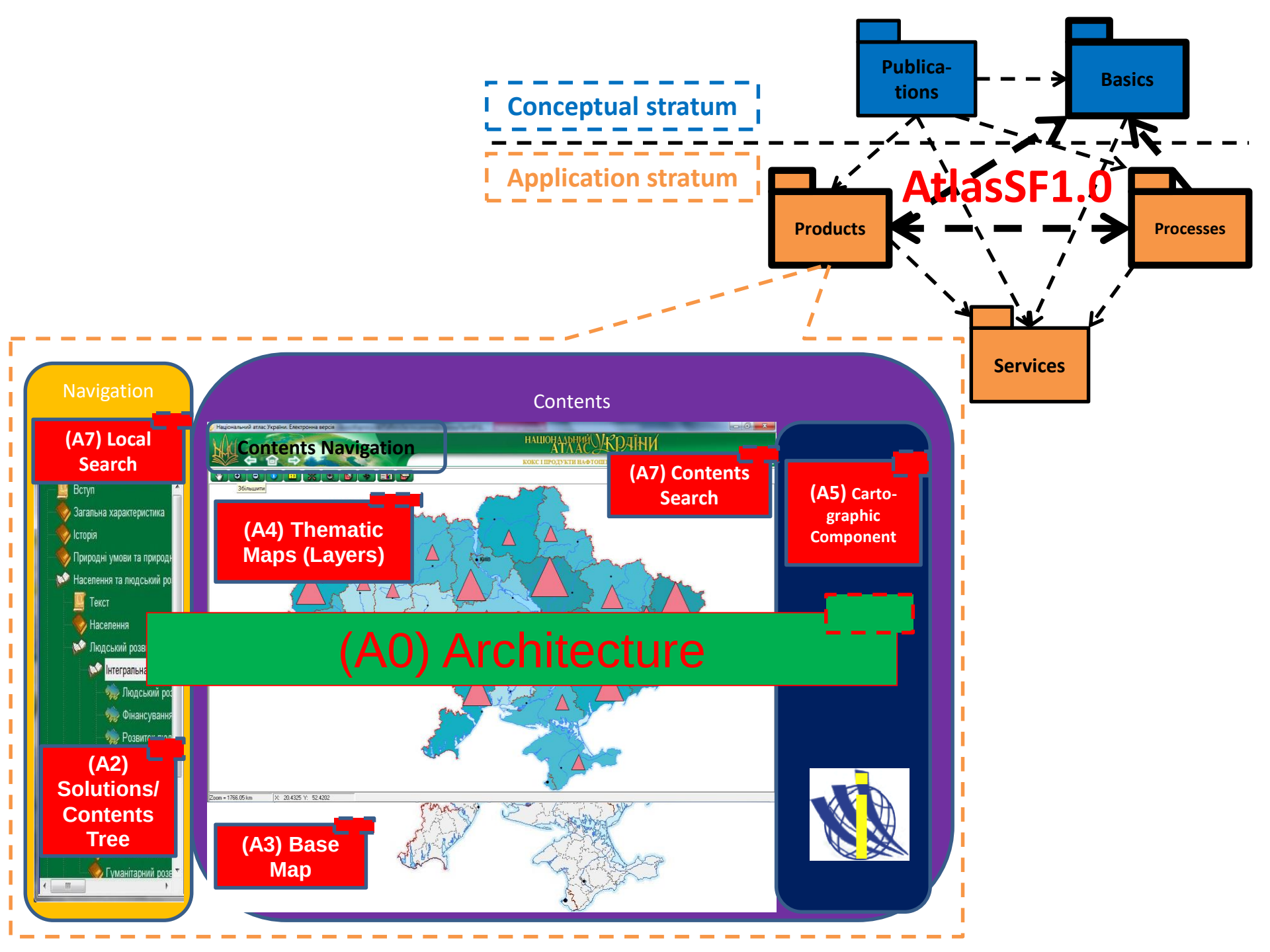
(Atkinson, Kühne, 2005; Fig. 3)

"In Fig. 3 we represent all the facets including their role by representing patterns as a circle covering the three other facets. The language facet sits above 'Types' and 'Instances', since it is the defining layer for both. Layer 'Language' corresponds to language *definition*, whereas 'Types' and 'Instances' correspond to language *usage*. We refer to this view of a platform as the General Platform Model (GPM). We only show two logical metalevels (types and instances) in this picture since most mainstream languages do not offer more than two levels of language use. In general, Fig. 3 may feature further facets below 'Language', such as 'Metatypes' etc."

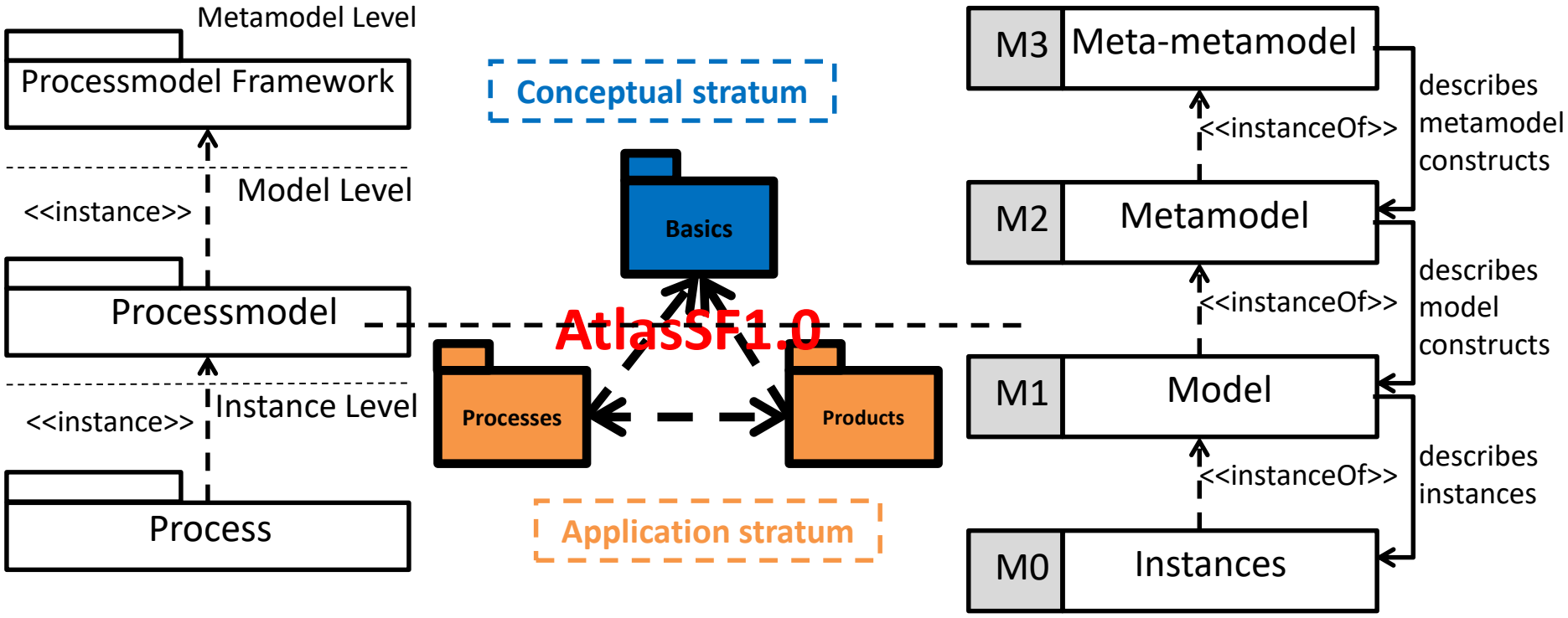
(Atkinson, Kühne, 2005) Atkinson Colin, Kühne Thomas. A Generalized Notion of Platforms for Model-Driven Development, pp. 119-136 // In Model-Driven Software Development, Beydeda Sami, Book Matthias, Gruhn Volker, Eds.- Springer, 2005.

Principle of AtlasSF Usage for creation of classical type atlas



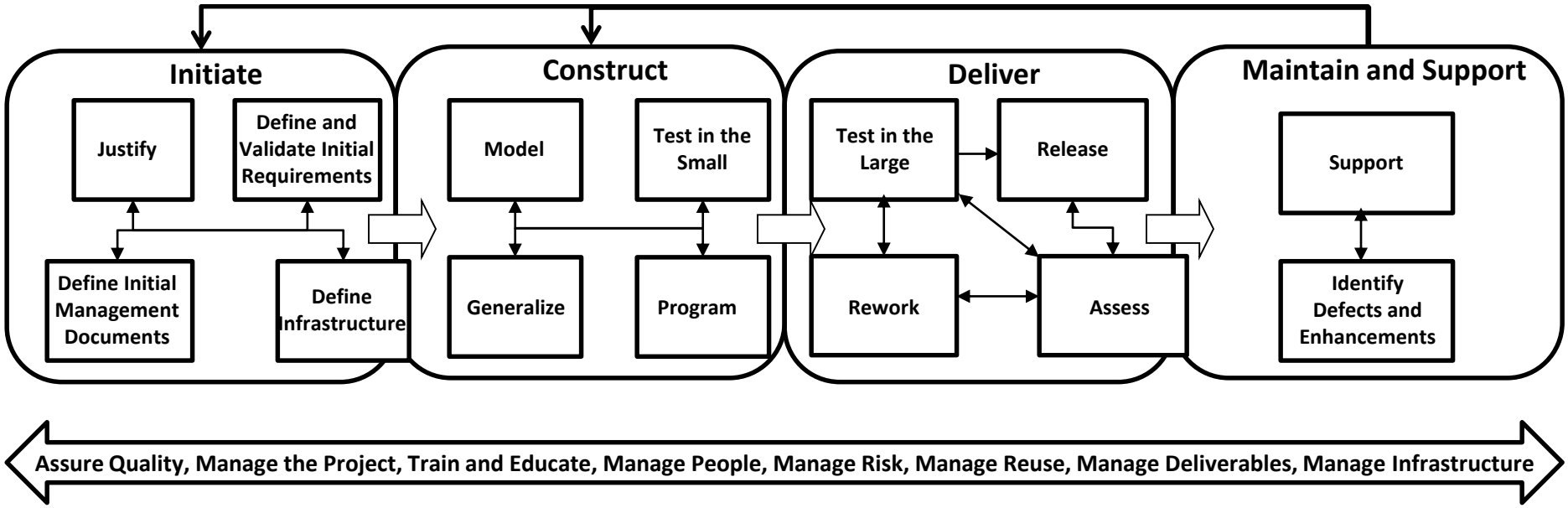

Conceptual stratum
Application stratum
Publica-tions
Basics
AtlasSF1.0
Products
Processes
Services
Navigation
(A7) Local Search
(A2) Solutions/ Contents Tree
Contents
Contents Navigation
(A7) Contents Search
(A4) Thematic Maps (Layers)
(A5) Carto-graphic Component
(A0) Architecture
(A3) Base Map

Main triad, defining relations Processes-Products-(Basics)

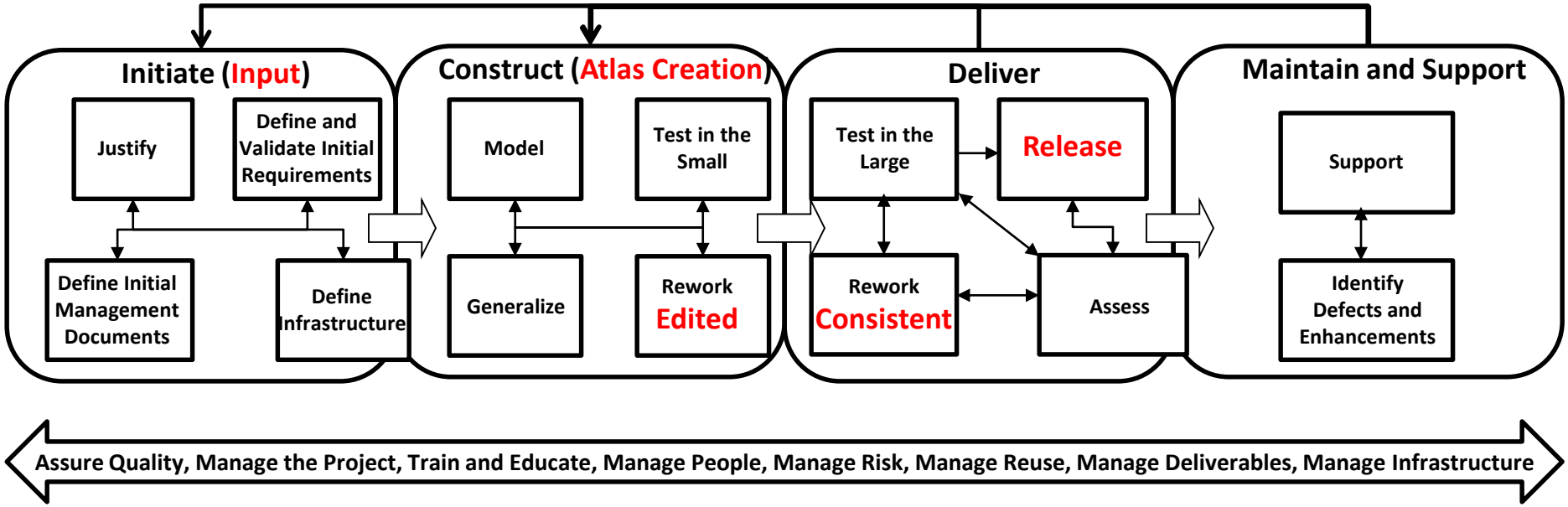


The Layers of an Overall Process Model (Gnatz, et al., 2001b; Fig. 1)

The four metalevels proposed in OMG's Meta-Object Facility (Daniel, Matera, 2014; 80, Fig. 4.4)

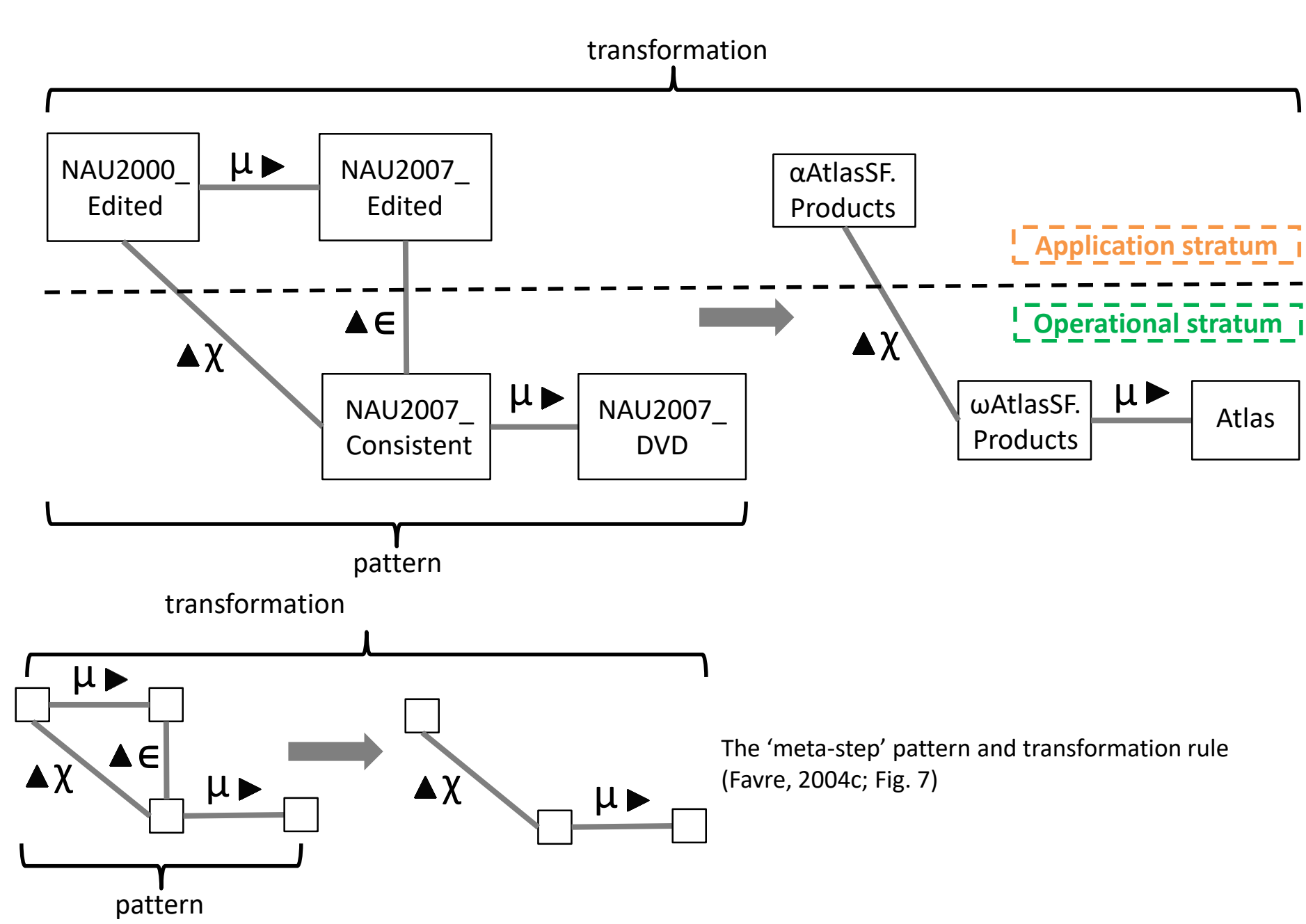


Conceptual process pattern: The Object-Oriented Software Process (OOSP) (Ambler, 1998; Fig. 4)



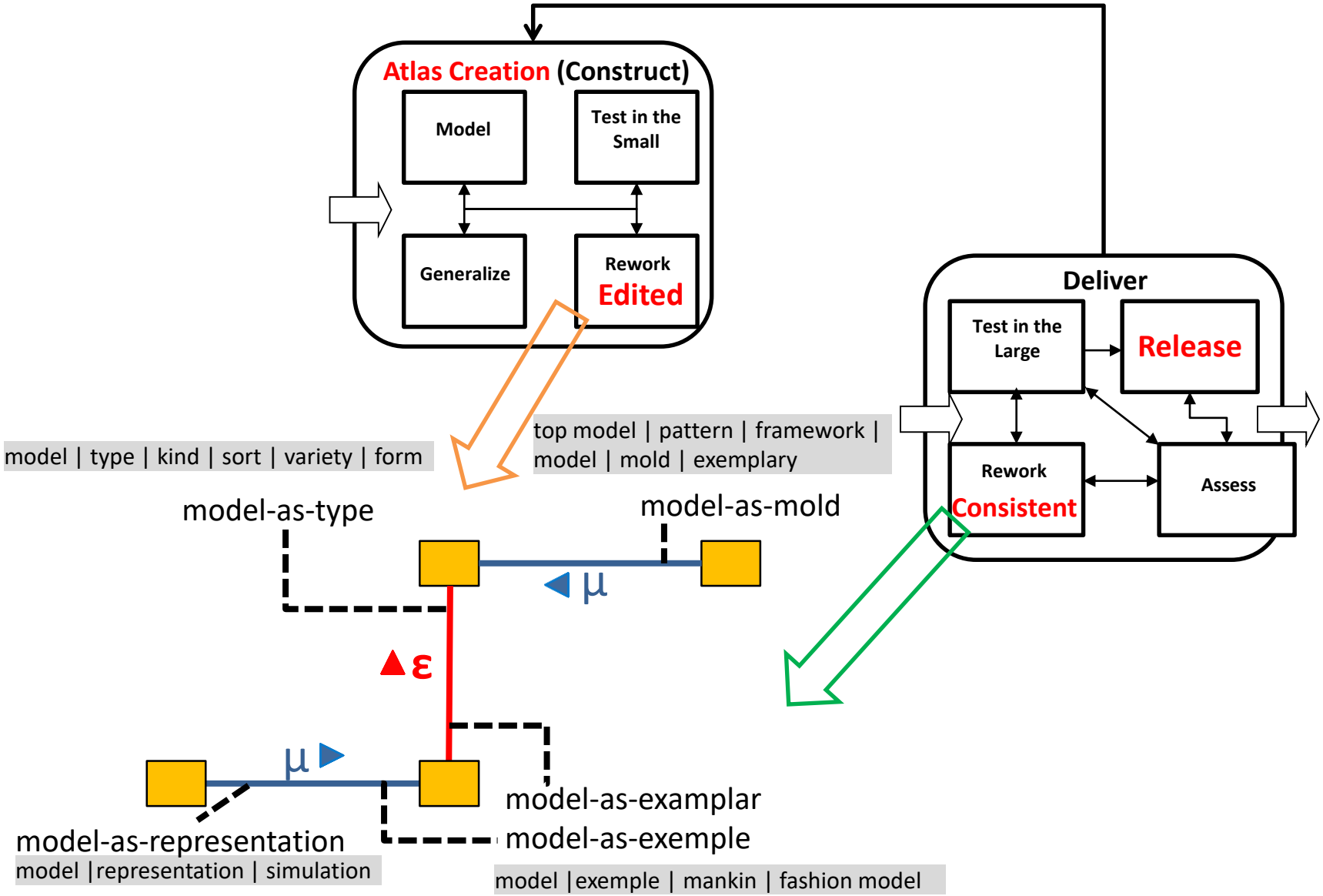
Application process pattern: Main phase work products of **AtlasSF1.0**

(Ambler, 1998) Ambler S. An Introduction to Process Patterns.- AmbySoft Inc. White Paper, 18 p.



The 'meta-step' pattern and transformation rule (Favre, 2004c; Fig. 7)

(Favre, 2004c) Favre Jean-Marie. Towards a Basic Theory to Model Model Driven Engineering.- Proc. of the 3rd UML Workshop in Software Model Engineering (WiSME'2004), 8 p.



(Favre, 2006) Favre Jean-Marie. Megamodelling and Etymology. A Story of Words: from MED to MDE via MODEL in Five Millenniums.- Dagstuhl Seminar Proceedings 05161, paper 427, 22 p.

a category of things distinguished by some common characteristic or quality

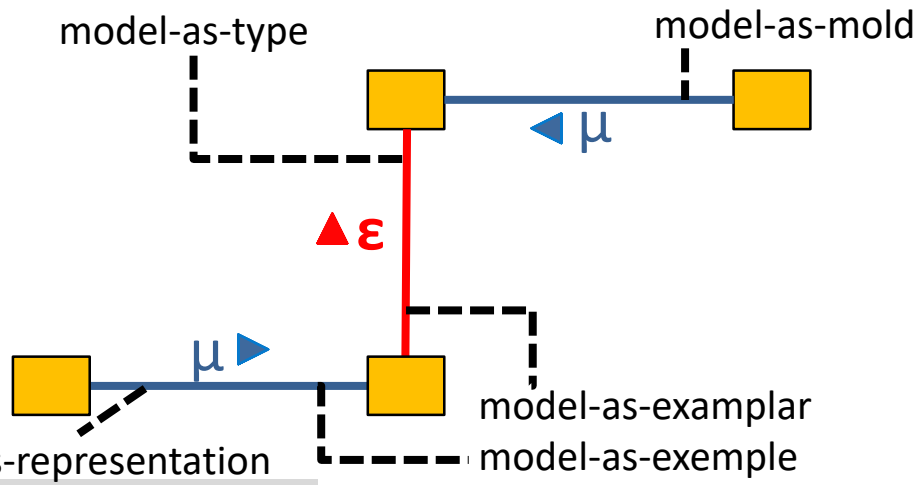
a type of product

model | type | kind | sort | variety | form

someone worthy of imitation

a representative form of pattern

top model | pattern | framework | model | mold | exemplary



model |representation | simulation

representation of something (sometimes on a smaller scale)

a simplified description of a complex entity or process

model |exemple | mankin | fashion model

someone worthy of imitation

something to be imitated

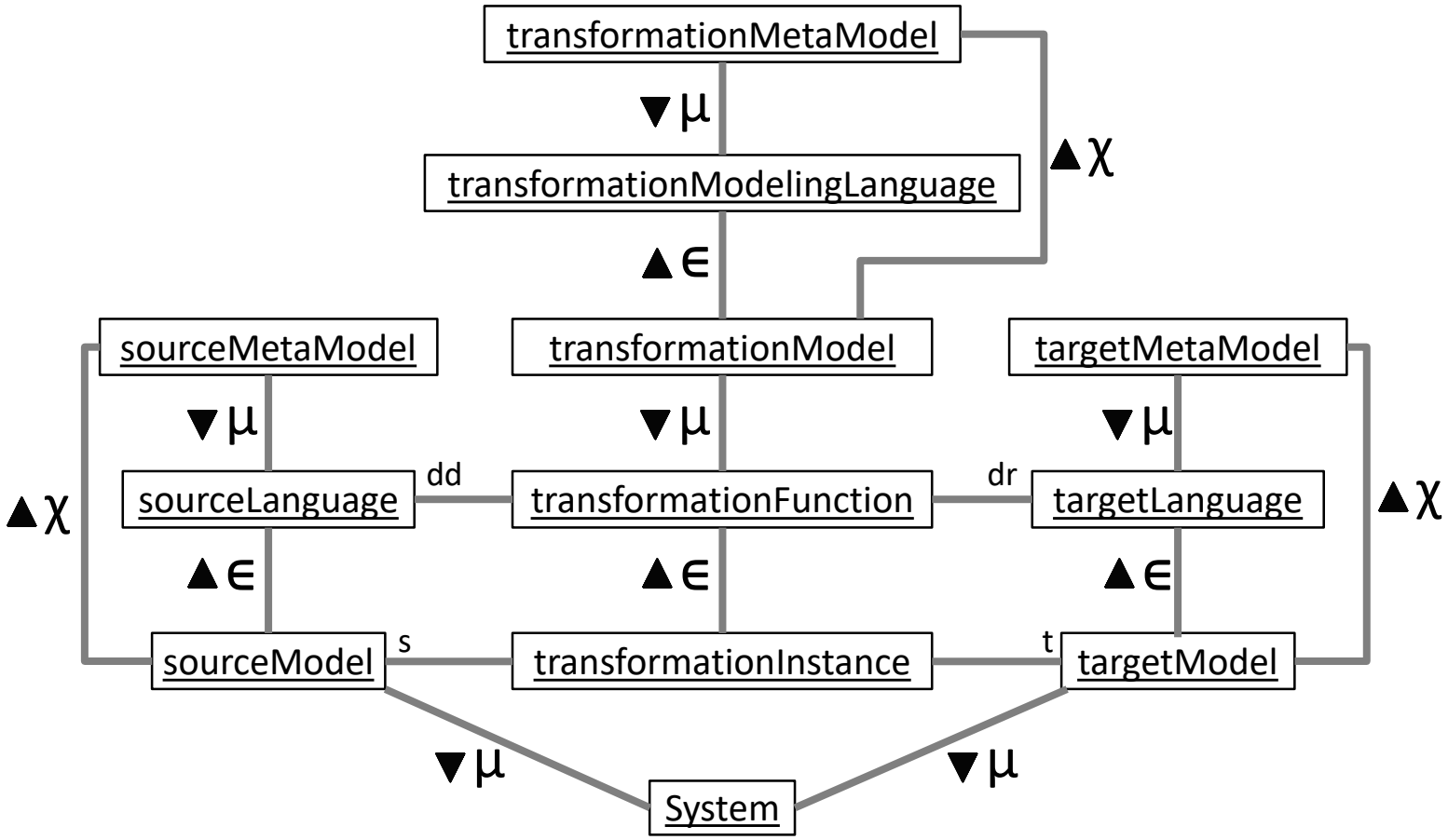
a person who poses a photographer or painter or sculptor

(Favre, 2006; Fig. 20)

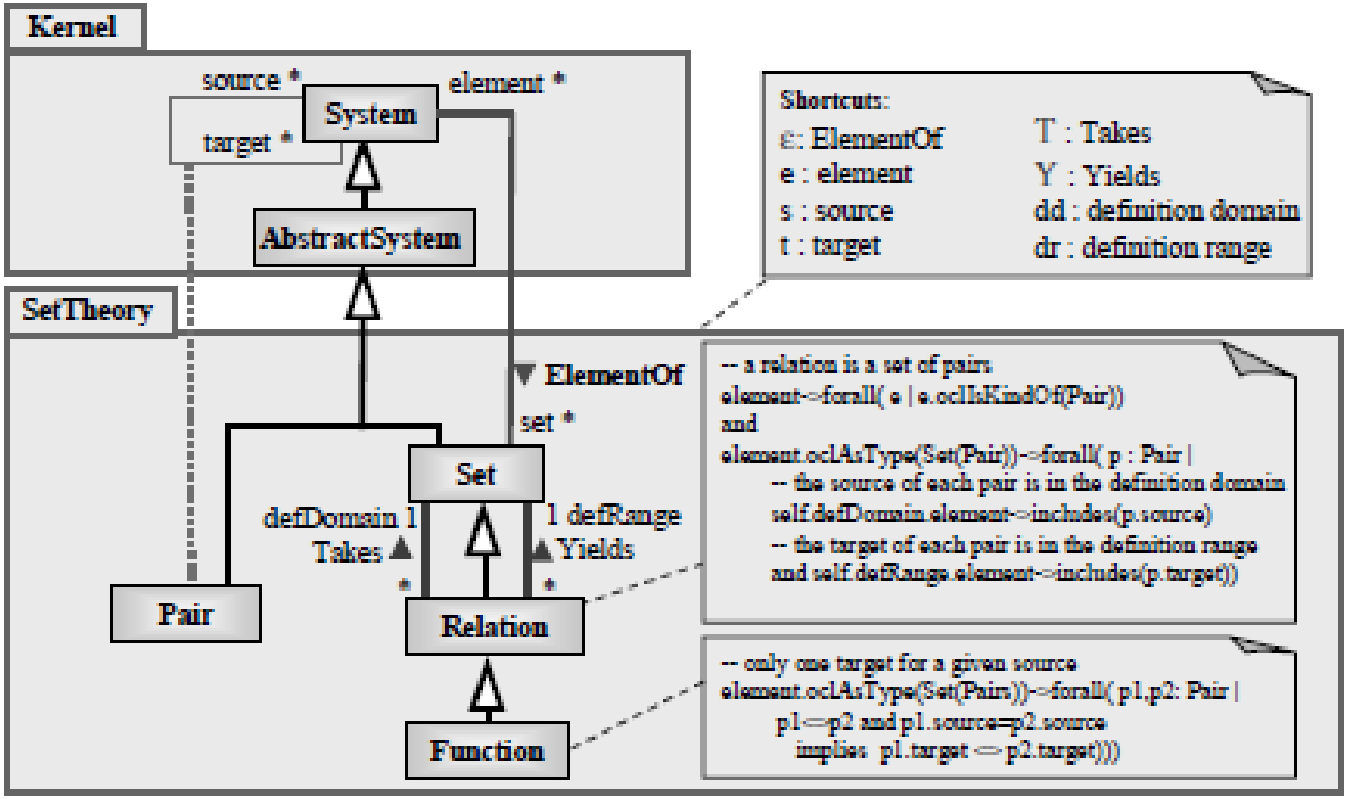
5. Collecting together (part),

See also some practical examples in ‘Atlas Extender as a Tool to Model Relational Spaces’ – Empirical study again, Olomouc2, 30-apr-18, 9.00-10.45

A typical pattern of model transformation (Favre, 2004c; Fig. 8)

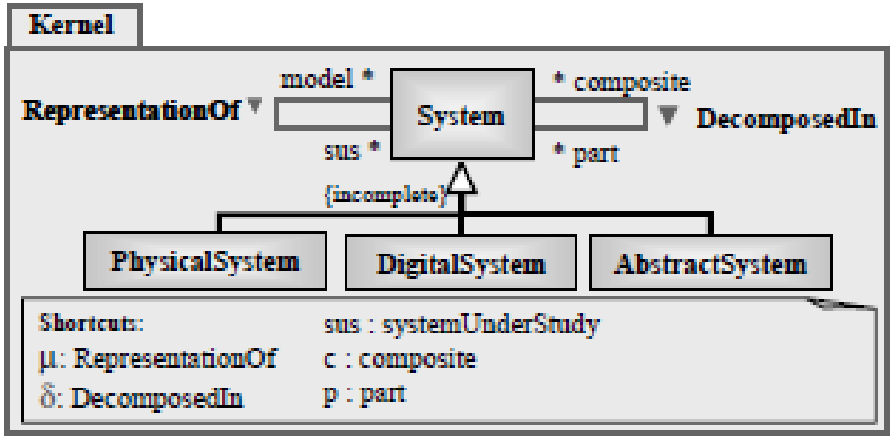


(Favre, 2004c) Favre Jean-Marie. Towards a Basic Theory to Model Model Driven Engineering.- Proc. of the 3rd UML Workshop in Software Model Engineering (WiSME'2004), 8 p.



SetTheory package (Favre, 2004c; Fig. 2)

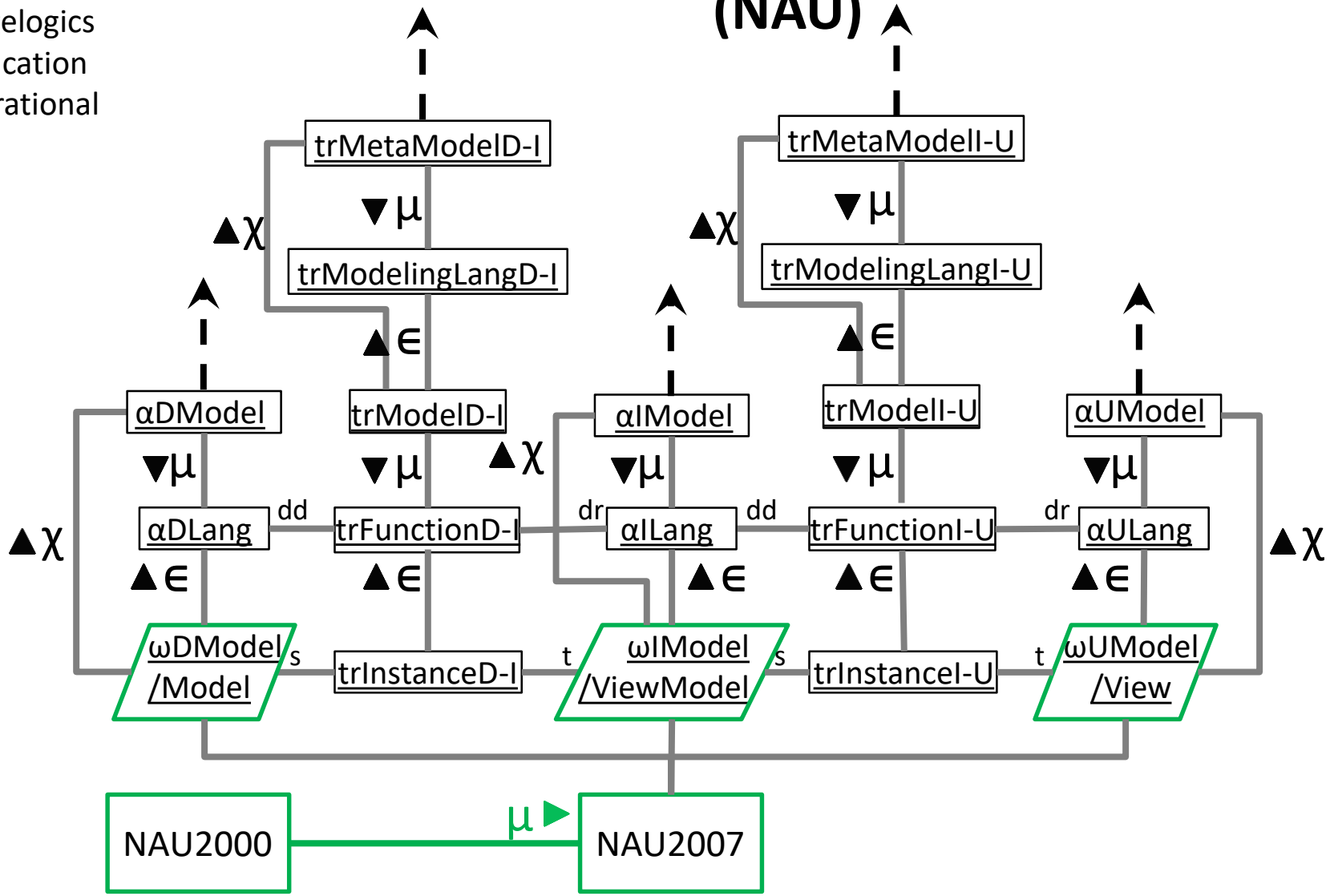
Excerpt of *Kernel* (Favre, 2004c; Fig. 5)



(Favre, 2004c) Favre Jean-Marie. Towards a Basic Theory to Model Model Driven Engineering.- Proc. of the 3rd UML Workshop in Software Model Engineering (WiSME'2004), 8 p.

ωDModel ϵ ChMap(D, Y, Z)
tr=transformation
Lang=language
D=Datalogics
I=Infologics
U=Usagelogics
α=Application
ω=Operational

Part of decostructed atlas choropleth map (NAU)



6. Conclusions

- It is shown that language of map is most principal element of deconstructed atlas choropleth map
- Deconstructed atlas choropleth map is system of interrelated models and languages, which can be described in terminology of Model-Based Engineering
- It is strongly recommended to search patterns for receiving ‘powerful’ atlas solutions
- Cartography should ‘return back’ language paradigm. 1st step here could be English translation of (still actual) monographs (Aslanikashvili, 1974) and (Liuty, 2002(1988))
- May be one or few Cartography Domain Specific Language (DSL) is appropriate solution
- Such deconstruction of atlas map hidden structure will be controlled step towards language, knowledge and power of maps in Web 2.0 epoch

Thanks for attention!