INFOCOMP / DataSys 2017 International Expert Panel:

Challenges on Web Semantic Mapping and Information Processing

June 28, 2017, Venice, Italy

The Seventh International Conference on
Advanced Communications and Computation (INFOCOMP 2017)
The Seventh International Conference on
Advances in Information Mining and Management (IMMM 2017)
The Twelfth International Conference on
Internet and Web Applications and Services (ICIW 2017)

INFOCOMP/IMMM/ICIW (DataSys)
June 25–29, 2017 - Venice, Italy

INFOCOMP Expert Panel: Web Semantic Mapping & Information Proc.

Panelists

- *Claus-Peter Rückemann* (Moderator),
  Westfälische Wilhelms-Universität Münster (WWU) /
  Leibniz Universität Hannover /
  North-German Supercomputing Alliance (HLRN), Germany
- *Marc Jansen,*
  University of Applied Sciences Ruhr West, Deutschland
- *Fahad Muhammad,*
  CSTB, Sophia Antipolis, France
- *Kiyoshi Nagata,*
  Daito Bunka University, Japan
- *Claus-Peter Rückemann,*
  WWU Münster / Leibniz Universität Hannover / HLRN, Germany

INFOCOMP 2017: `http://www.iaria.org/conferences2017/INFOCOMP17.html`
Program: `http://www.iaria.org/conferences2017/ProgramINFOCOMP17.html`

INFOCOMP Expert Panel: Web Semantic Mapping & Information Proc.

Panel Statements:

- **Practical Experiences:** Long-term multi-disciplinary data, High End Computing & storage, supercomputing, Big Data types / handling (Volume, Variability, Velocity, Vitality, Veracity), reusable, portable, reasonable, commonly available standards, and methods.
- **Methodologies:** Advanced methodologies, e.g., handling uncertainties of increasing Big Data and natural language processing.
- **Best Practice:** Long-term essential content and context should preceed computational needs: Data and structure preceeds computation for long-term.
- **Scientific computing:** Appl. scenarios have different requirements.
- **High End:** Limits of bandwidth and latency regarding transfer and storage (much more than computing).
- **Knowledge resources:** Conceptual knowledge, classification, managing complexity, ...
- **Data-centric:** Data handling priority. View of disciplines.
- **Computing-centric:** Computing priority. Resources providers' view.

INFOCOMP Expert Panel: Web Semantic Mapping & Information Proc.

Pre-Discussion-Wrapup:

- **Focus:** What are the challenges and how to cope with them?
- **Aspects:** Examples for semantic mapping, Big and Huge Data, real-time processing . . .?
- **Recommendations:** Which general solutions and recommendations?
- **How-to** create sustainable information processing solutions?
- **How** can we handle uncertainties with Big Data?
- **Blockchain:** How can the blockchain be organised and add value to businesses?
- **Long-term:** Are there (already) long-term endeavors?
- **Context:** Are context/integration/modularity/. . . sufficiently considered?
- **Sustainability:** Scenarios beyond multi-disciplinary and long-term?
- **Flexibility:** What about multi-disciplinary, long-term, real-time?
- **Networking:** Discussion! Open Questions?
  Suggestions for next Expert Panel?

INFOCOMP Expert Panel: Post-Panel-Discussion Summary

Post-Panel-Discussion Summary (2017-06-29):

- Classical **understanding of knowledge** can be very beneficial for creating and developing approaches and solutions to key challenges.
- **Industry and economy understanding may be completely different** from background requirements and experiences of scientists and other practitioners. For example, blockchain "structures" are not an excellent medium for information processing. Industry/economy mostly acts for short-term economic interests. Esp., businesses regulary show different focus where need for long-term activities is, what the value of knowledge and data, and what means should be involved
- **Language** is one of the few things being **defined by itself** (unical/unikal).
- **Ontologies** are an **essential and valuable** tool supporting web semantics and information processing.
- **Uncertainties** in data, e.g., in big data, can be handled with **fuzzy sets**.
- For sustainable success the **integration** of many **advanced methodologies** is required, e.g., for a) factual, conceptual, procedural, ... documentation, classification, concordances, b) ontologies, c) authentication / long-term signatures, d) uncertainties (e.g., natural language processing) ...
- **Keep knowledge** and related means like **data structures, ontologies, and classification editions a central and long-term effort** and be **aware of the value of the work** of science and society.

INFOCOMP Expert Panel: Table of Presentations, Attached

Panelist Presentations: (presentation sort order, following pages)

- **Do We Know the Essential Components for Creating Insight by Information Processing?** (*Rückemann*)
- **Real-world blockchain scenarios - from theory to application** (*Jansen*)
- **Semantic Mapping and Merging** (*Muhammad*)
- **Handling the Big Data with Uncertainties** (*Nagata*)

INFOCOMP / DataSys 2017 International Expert Panel:
Challenges on Web Semantic Mapping and Information Processing

Do We Know the Essential Components for Creating Insight by Information Processing?

The Seventh International Conference on Advanced Communications and Computation
The Seventh International Conference on Advances in Information Mining and Management
The Twelfth International Conference on Internet and Web Applications and Services

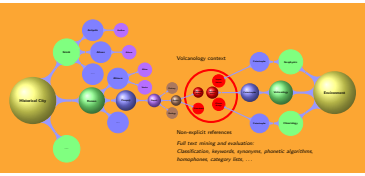
(INFOCOMP 2017 & AICT 2017 & ICIW 2017)

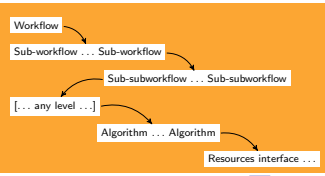
June 28, 2017, Venice, Italy

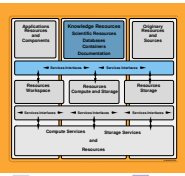
Dr. rer. nat. Claus-Peter Rückemann[1,2,3]

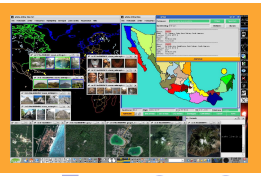
[1] Westfälische Wilhelms-Universität Münster (WWU), Münster, Germany
[2] Leibniz Universität Hannover, Hannover, Germany
[3] North-German Supercomputing Alliance (HLRN), Germany

ruckema(at)uni-muenster.de









Semantic Mapping, Insight, and Information Processing

- **Semantic mapping** is the transformation of data entities from one namespace into another namespace.
  Example tools: Semantic mapper, semantic broker, ... Semantic mapper is a tool (e.g., program or service) that supports the transformation (of data entities).
- **Mapping sets required:**
  Lists of data elements in source namespace, in destination namespace, of semantic equivalent statements between both.
- **Semantic mapping language examples and terms:**
  Extensible Stylesheet Language Transformations (XSLT). Extract, Transform, Load tools (ETL tools). Further: Semantic unification, ontology alignment, Semantic Web, background knowledge, ...
- **Status:** Semantic mapping cannot provide solutions on its own. Deficits with integrability/solutions/acceptance/...
- **Examples of expectations:** Search engines working with huge data but simple interface concepts and minimal results for decades now. Expert systems are still in relatively primitive stages. Only a very limited number of disciplines practice "knowledge".

Learning from omnipresent deficits:

- **Semantic mapping is not a (universal) Rosetta Stone**.
- Problems, which arise from **'semantic mapping'** are **comparable** with those **'data mapping'** for data integration (e.g., relations through semantic nets / dictionaries).
- **Mapping namespaces is too short (thought)**.
- Namespaces are **not able to represent knowledge** with sufficient complexity.
- **Elaboration** (NOT quality) **of data sources is much too weak**.
- **Too little human knowledge / expertise** involved.
- **Too little long-term contributions** regarding knowledge.
- **Too little understanding** of the classical meaning of knowledge.
- **No fostering of continuous knowledge** creation processes.
- **Believe in technology-centric solutions only is insufficient**.

Conclusions / Future

- **Knowledge:**
  Knowledge should be considered systematically and holistically:
  Factual, conceptual, procedural, metacognitive, . . . knowledge.
- **Information processing:**
  Information processing should recognise knowledge-driven approaches for structured and unstructured data: Improved data organisation, long-term data, structures, means. Mapping requires knowledge aware precise and fuzziness qualities. Language is one of the few things being defined by itself (unical/unikal).
- **Data-centric components required / Optimisation:**
  Optimisation should be done on "knowledge side": Content / context, **and** . . . technical side.
- **Energy / efficiency:**
  Efficiency should be considered on **holistic and long-term** base.
- **Quality:**
  Quality of "content/knowledge" should be given higher value.
- **Solutions (for semantic mapping), which can be integrated (with knowledge).**

HOCHSCHULE RUHR WEST
UNIVERSITY OF APPLIED SCIENCES

INSTITUT INFORMATIK

Real-world Blockchain Scenarios - From Theory to Application

Marc Jansen

University of Applied Sciences Ruhr West

Computer Science Institute


BITCOIN OWNERS
What my friends think I do
What my mom thinks I do
What society thinks I do
What Politicians think I do
What I think I do
What I really do
Littlevisuals.com - BTC design!

FORTUNE | The 21st Century Corporation

BOOK EXCERPT

Here's Why Blockchains Will Change the World

Don Tapscott, Alex Tapscott
May 08, 2016

A s early a
problem
matter h
because third parti
was insecure becau
transaction fees we
short paper entitle
be-all end-all techn
party in the middle
on the Internet req

McKinsey&Company
High Tech

Our Insights | How We Help Clients | Our People | Contact Us

Interview
May 2016

How blockchains could change the world

Satoshi Roundtable: Blockchain is bigger than the Internet

Details
Category: News

his interview, Don Tapscott explains
y underpinning the cryptocurrency,
ize the world economy.

Zurück zu

Is Blockchain the next world wide web?

Veröffentlicht: 6. März 2017

Charlie Gunningham | Folgen
CEO, Business News ~~ MBA, GAICD

74 6 7

7 years ago I visited a New York real estate technology conference, and one of the main themes was the emergence of the mobile economy, and how important smartphones were becoming. On returning, I wrote one of my first blog posts ('It's mobile, stoopid') on the Business2 website, the first comment of which still reads: "*I don't think so…*"

3 years earlier, Apple's iPhone had heralded the onset of the smartphone era, and business was never going to be the same again.

bank innovation

dlines | Innovation Strategy | New Technology | Watchlist | DataBank | Lists | JobBank

European Banks to Build Trade Finance Platform Using IBM, Hyperledger

Blockchain Wallets: 'Bigger Than the Internet'?

Diana Asatryan June 16, 2016 1

Subscribe to our mailing list

email address

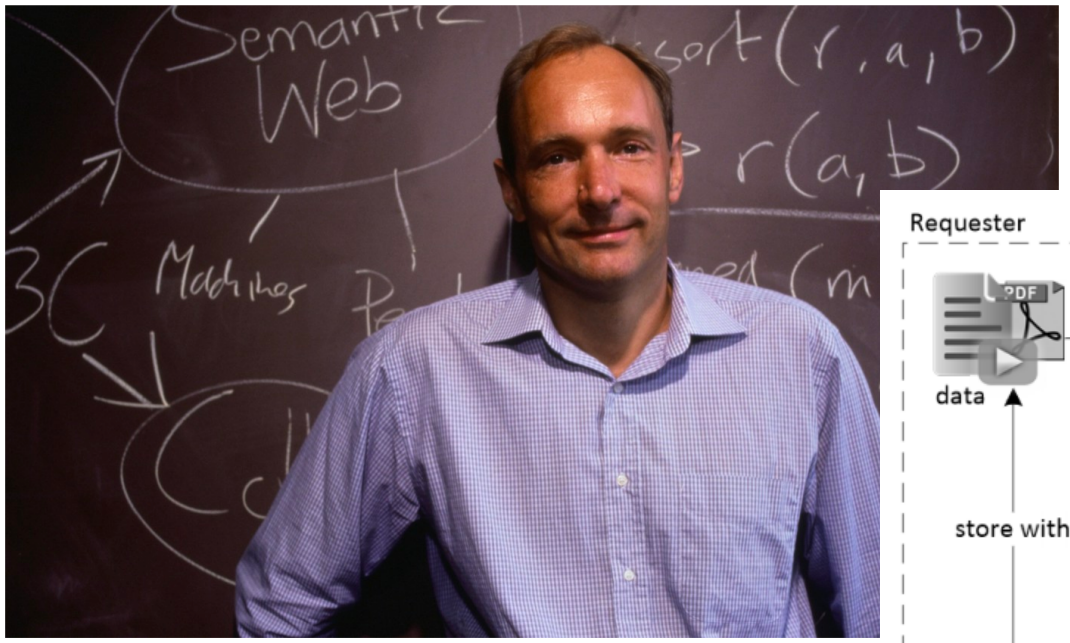
Real-world Blockchain Scenarios - From Theory to Application

World Wide Web Creator Tim Berners-Lee Wants to Decentralise the Internet with P2P and Blockchain Technologies

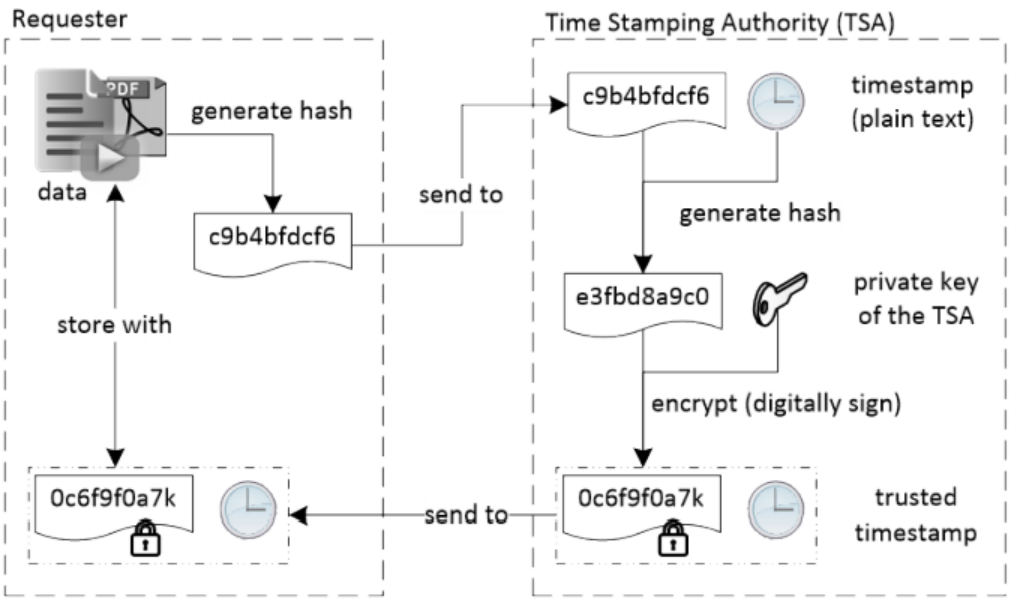
By **Richard Kastelein** - June 12, 2016

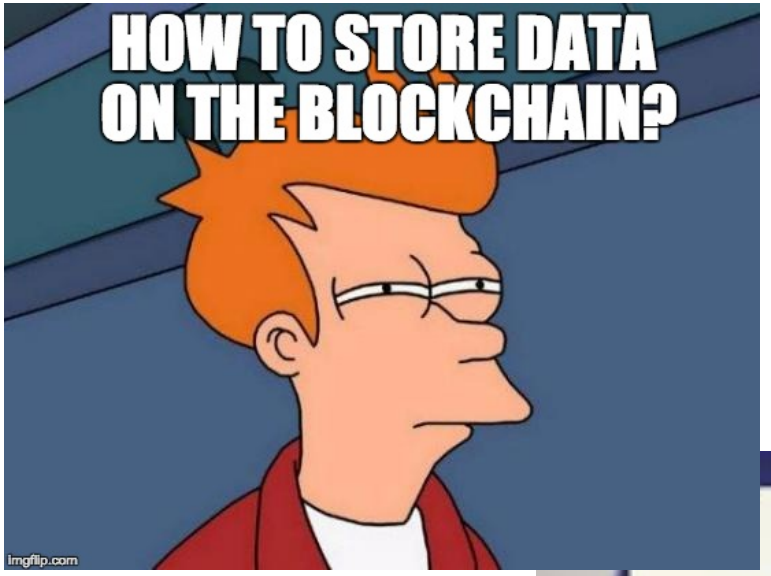
2721

Gefällt mir 34 Tweet

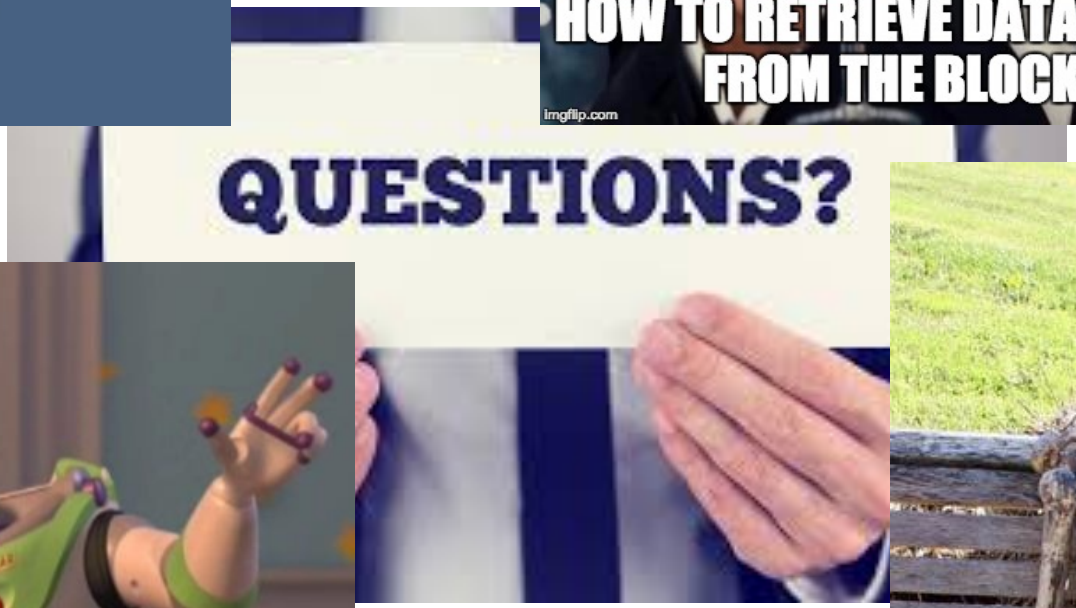


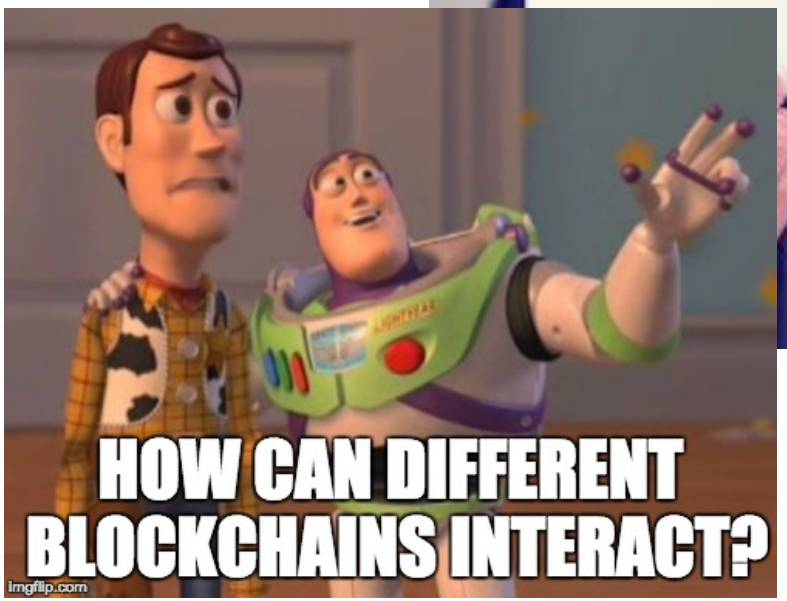
ca. 1999 --- Tim Berners-Lee, inventor of the World Wide Web, stands at a chalkboard where he has wr development. --- Image by © Andrew Brusso/Corbis




HOW TO STORE DATA
ON THE BLOCKCHAIN?
imgflip.com


HOW TO RETRIEVE DATA (EFFICIENTLY)
FROM THE BLOCKCHAIN?
imgflip.com


QUESTIONS?


HOW CAN DIFFERENT
BLOCKCHAINS INTERACT?
imgflip.com


IS ALL THIS
SECURE?
imgflip.com

Panel on

INFOCOMP/IMMM/ICIW

Topic: Challenges on Web Semantic Mapping and Information Processing

Panelist

Fahad Muhammad

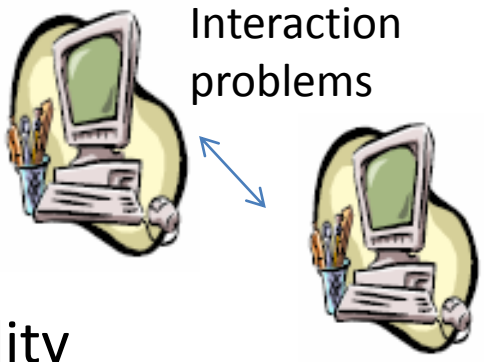
CSTB Sophia-Antipolis, FRANCE

CSTB
le futur en construction

Panel on

INFOCOMP/IMMM/ICIW

Challenges on Web Semantic Mapping and Information Processing



- WWW - Physical and Local connectivity
- The Semantic Web
  - Goal: Automatic and Intelligent Interoperability
  - "...The Semantic Web is an extension of the current web in which **information is given well-defined meaning**, better enabling computers and people to work in co-operation." T. Berners-Lee (May, 2001)
  - Ontologies
    - Unleash a revolution of new abilities
    - Complex to build and understand, and require huge cost

Panel on

INFOCOMP/IMMM/ICIW

Ontology Evaluation

Inconsistency

- Circulatory Error
  - Circle in class/property hierarchy
- Partition Errors
  - Common class/instance in disjoint decomposition of classes
  - Common property in disjoint decomposition of properties
  - External instance in exhaustive decomposition and partition
- Semantic Error
  - More Generalized concept by subclass
  - Domain violation by subclass
  - Disjoint domain by subclass

Redundancy

- Redundancy of subclass/instance of relations
- Redundancy of subproperty of relations
- Redundancy of disjoint of relations among classes
- Redundancy of disjoint of relations among properties
- Grammatical
  - Identical formal definition of classes/instances
  - Identical formal definition of properties

Incompleteness

- Partition Errors
  - Disjoint Knowledge Omission among classes
  - Disjoint Knowledge Omission among properties
  - Exhaustive Knowledge Omission
  - Sufficient Knowledge Omission
- Incomplete concept classification

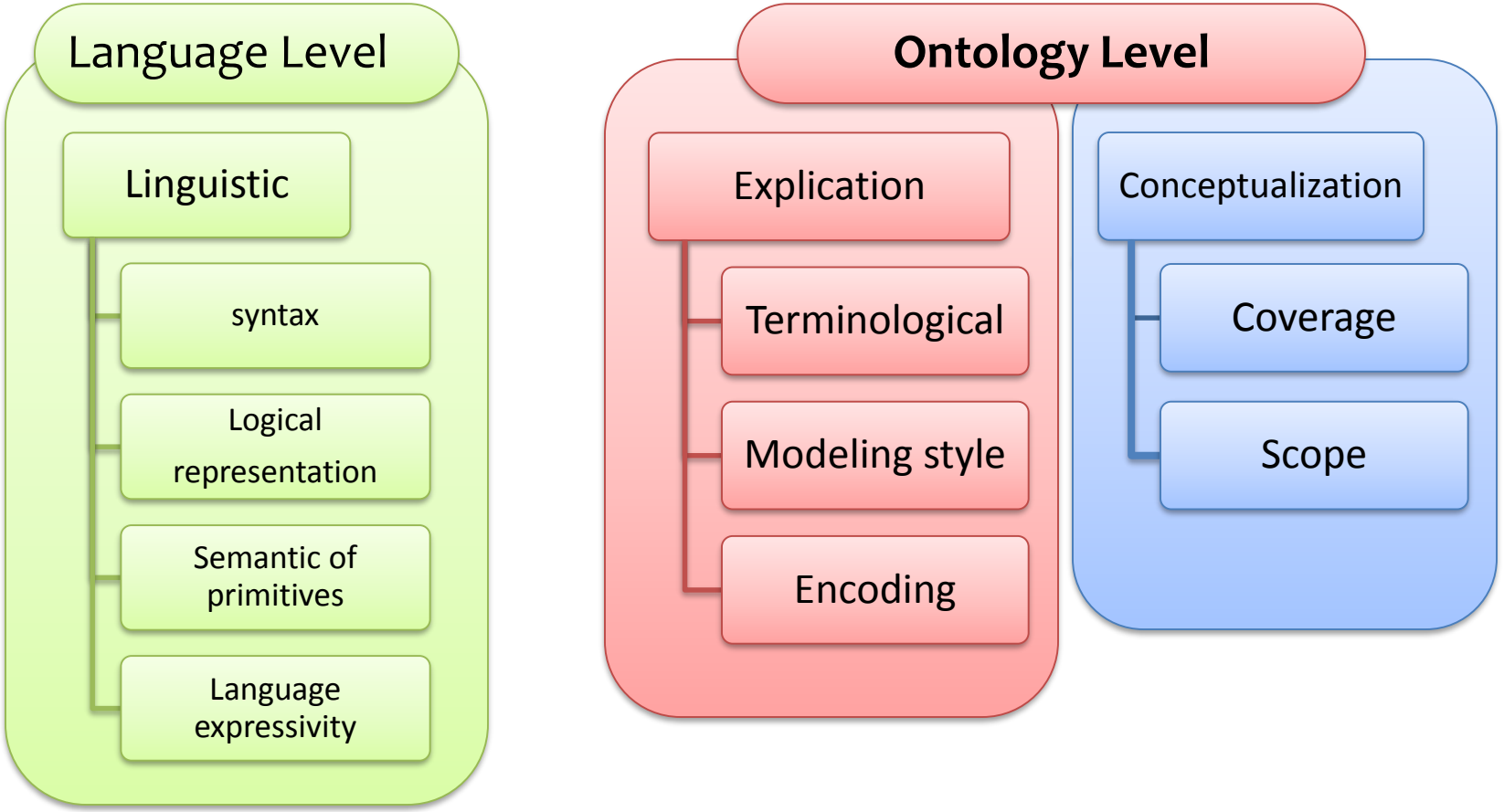
Design Anomalies

- Chain of Inheritance
- Property Clumps
- Lazy concepts
- Lonely Disjoints

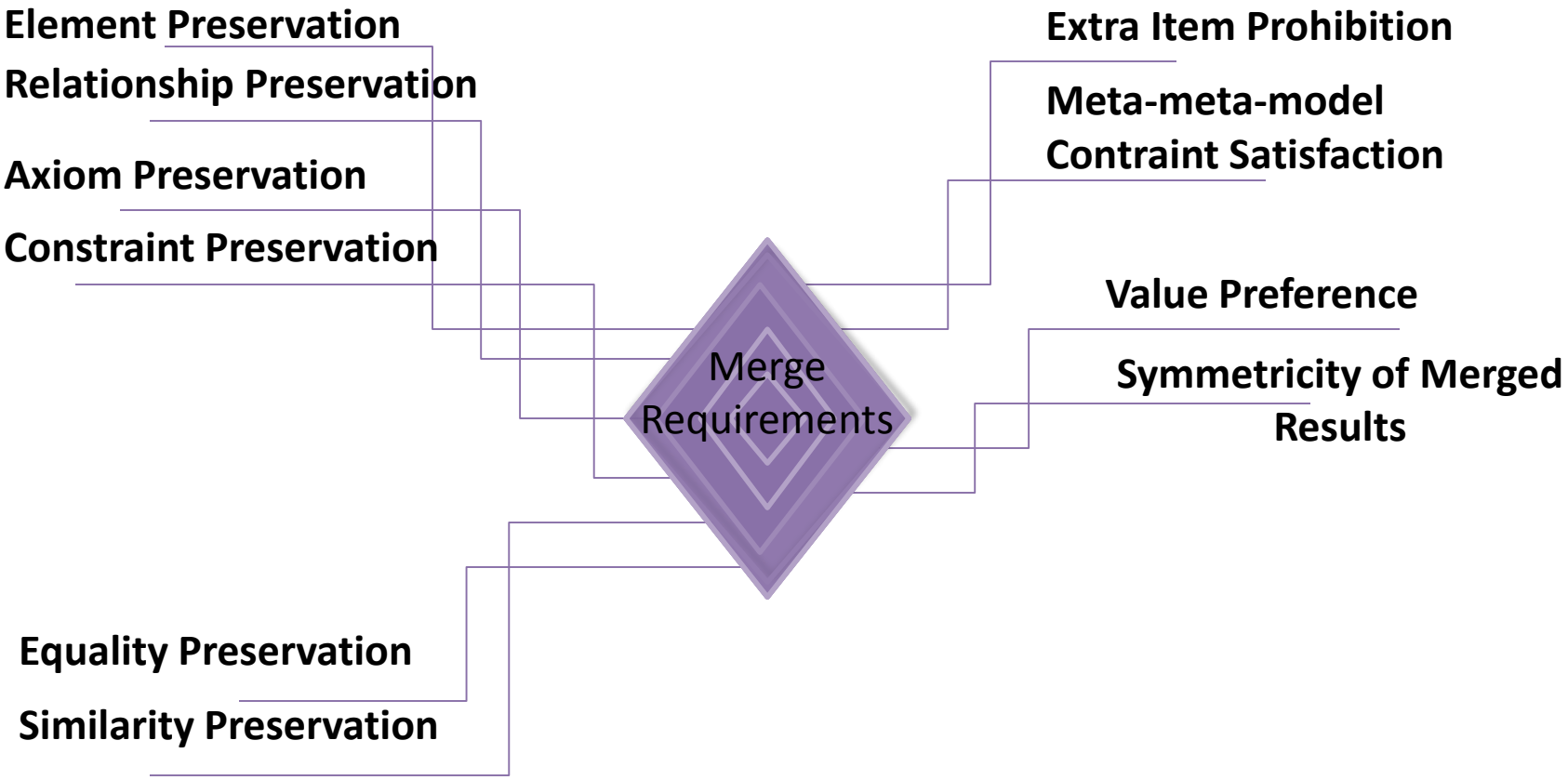
Panel on

INFOCOMP/IMMM/ICIW

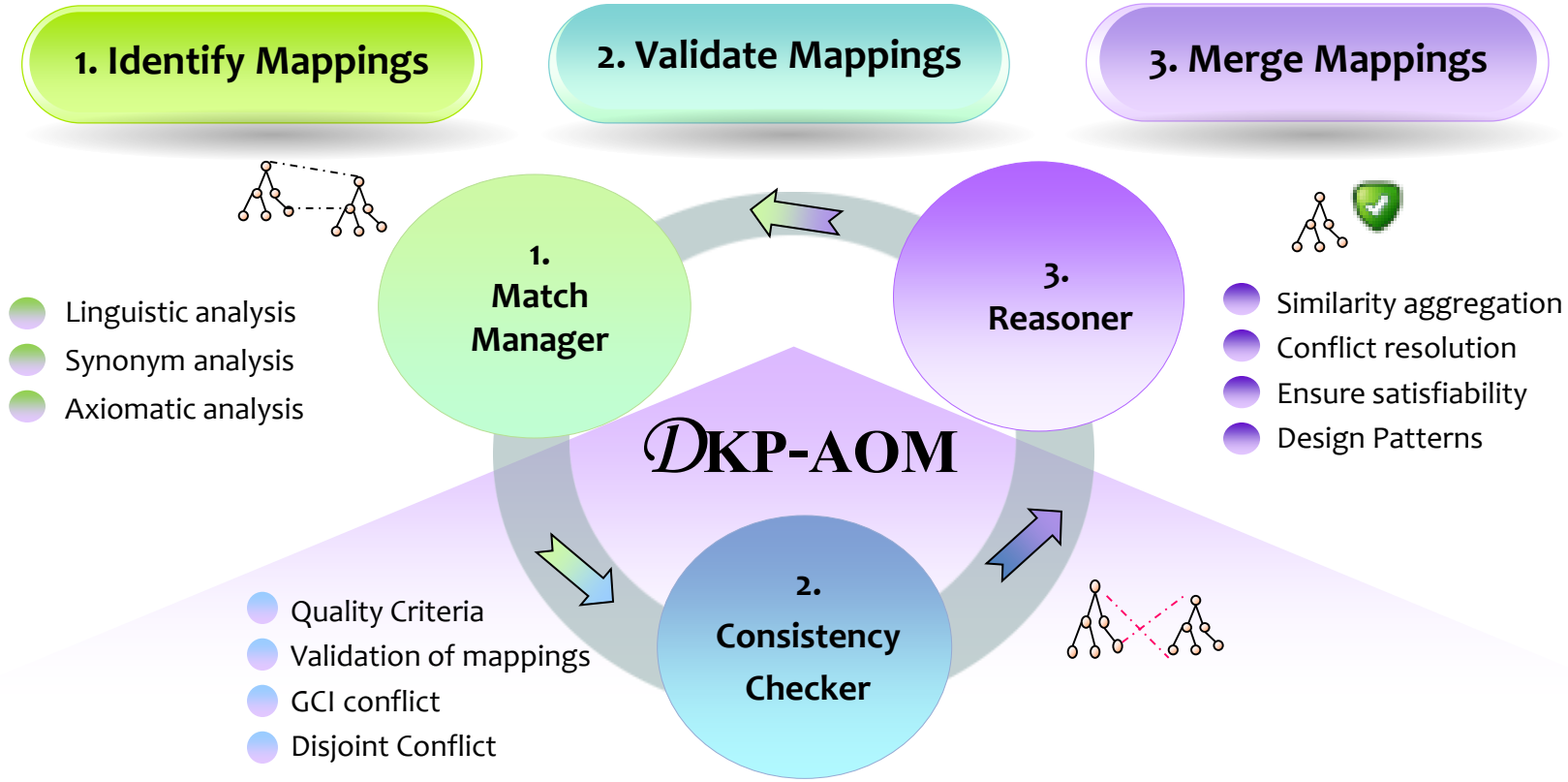
Semantic Heterogenities



Ontology Merge Requirements



Ontology Merging



http://oaei.ontologymatching.org/2015/oa4qa/results.html

Thank you for your attention.

Panel Discussion "Handling the Big Data with Uncertainties"

Kiyoshi Nagata

Faculty of Business Administration,
Daito Bunka University, Tokyo, Japan

*IMMM*2017 in *Venézia*, *Italy*,
2017/06/28

Big Data with Uncertainty

- Properties of Big Data
  - Large amount of data
  - High complexity (including many types of data)

Big Data with Uncertainty

- Properties of Big Data
  - Large amount of data
  - High complexity (including many types of data)
- Where are They?
  - Internet
  - Cloud providers' storage
  - Social infrastructure related companies
  - Financial institutions, Banks
  - etc.

Big Data with Uncertainty

- Properties of Big Data
  - Large amount of data
  - High complexity (including many types of data)
- Where are They?
  - Internet
  - Cloud providers' storage
  - Social infrastructure related companies
  - Financial institutions, Banks
  - etc.
- What types of Data?
  - Numerical or Linguistic
  - Precise or ambiguous
  - Human related or not
  - Valuable or worthless (?)
  - etc.

Use of Big Data

- Prediction Model
  - Customer behavior analysis
  - Financial technology
  - Artificial Intelligence
  - Decision support
  - Risk analysis

Use of Big Data

- Prediction Model
  - Customer behavior analysis
  - Financial technology
  - Artificial Intelligence
  - Decision support
  - Risk analysis
- Enhancement of Data Reliability
  - Medical data
  - Consciousness survey

Handling Uncertainty with Fuzzy Set

- Advantage
  - Well established Theory or method for handling uncertainty
  - Applied in various fields
  - Some application softwares are available
  - etc.

Handling Uncertainty with Fuzzy Set

- Advantage
  - Well established Theory or method for handling uncertainty
  - Applied in various fields
  - Some application softwares are available
  - etc.
- Disadvantage
  - Final judgment depends on the decision maker
  - Increasing of uncertainty
  - Uninterpretable output
  - Problem for the reflection of individual characteristic in questionnaire survey
  - etc.

Grazie per la vostra attenzione!