DIVERSITY AS A FEATURE

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Diversity as *local maximum*

Thanks to Claudia!

Diversity as *pervasive local maximum*

... in the *world descriptions*

… as well as

… *in the world*

Diversity pervasive in the *world descriptions*

In language

- How many names do you have for snow? *(the role of weather)*
- "Bug as disease" ***vs.***"bug as food" *(the role of domains)*

In data

- "Transportation is on foot" ***vs.***"transportation is by plane" *(the role of time)*
- "The President is Obama" ***vs.*** "the President is Berlusconi" *(the role of space)*

In knowledge

- "There are 2 types of music: traditional and modern" ***vs***. "there are 50 types of music further refined in 100 types (pop, pop-country, …) *(the role of goals/ needs/ competence)*

In opinions

- "Bugs are great food" ***vs.***"how can you eat bugs?" *(the role of culture)*
- "Climate ***is/ is not*** an important issue" *(the role of schools of thought)*

… world descriptions which best fit the *world pervasive diversity!*

Cats?

The main cause of the ***semantic gap*** between our ***globalized conceptualizations*** of the world, expressed using *language*, and our ***local experience*** of the world, whose most direct representations are ***media***,

Handling Diversity

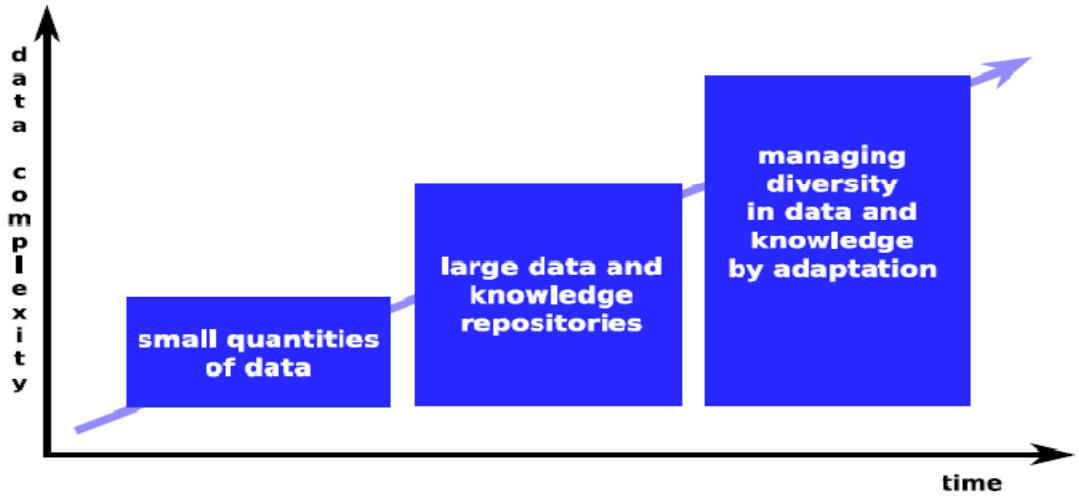


FIGURE 2. Increasing Complexity of Data over Time

Diversity as a bug *(up to the early Web).* ***The current implementation*** *of the web is an* ***"implementational mistake":*** we can pretend it is like querying a centrally designed data base

Diversity as a must *(the Semantic Web).* ***Diversity is unavoidable,*** *it is the* ***reason for diverging viewpoints and conflicts****:* we need semantics in order to "***absorbe***" diversity and reduce it to the centrally designed data base approach

Diversity as a feature. ***Diversity is a local maximum:*** we should make it ***traceable, understandable, and use it*** to develop better technology, e.g., diversity aware classification, navigation and search in large scale, long living (eternal), heterogeneous multimedia datasets (e.g., the Web of to day)

The LIVING WEB

Handling diversity: the vision

The world, our experience about the world, our data and knowledge about the world are strongly influenced by ***diversity*** in, e.g., geographical contexts, weather and time of the day, cultural backgrounds, schools of thought, ... and many others.

Time and ***evolution*** add a further dimension making diversity an even further intrinsic and unavoidable property of the world, and our data and knowledge of the world.

Diversity is a local optimum!

We envisage a future where ***data and knowledge management tools*** (implementing, e.g., ***search, navigation, reasoning, ...)*** will trace, understand, exploit diversity in ***very large multimedia datasets*** (in particular, the Web itself) and, therefore, will produce more insightful, better organized, easier-to-understand output.

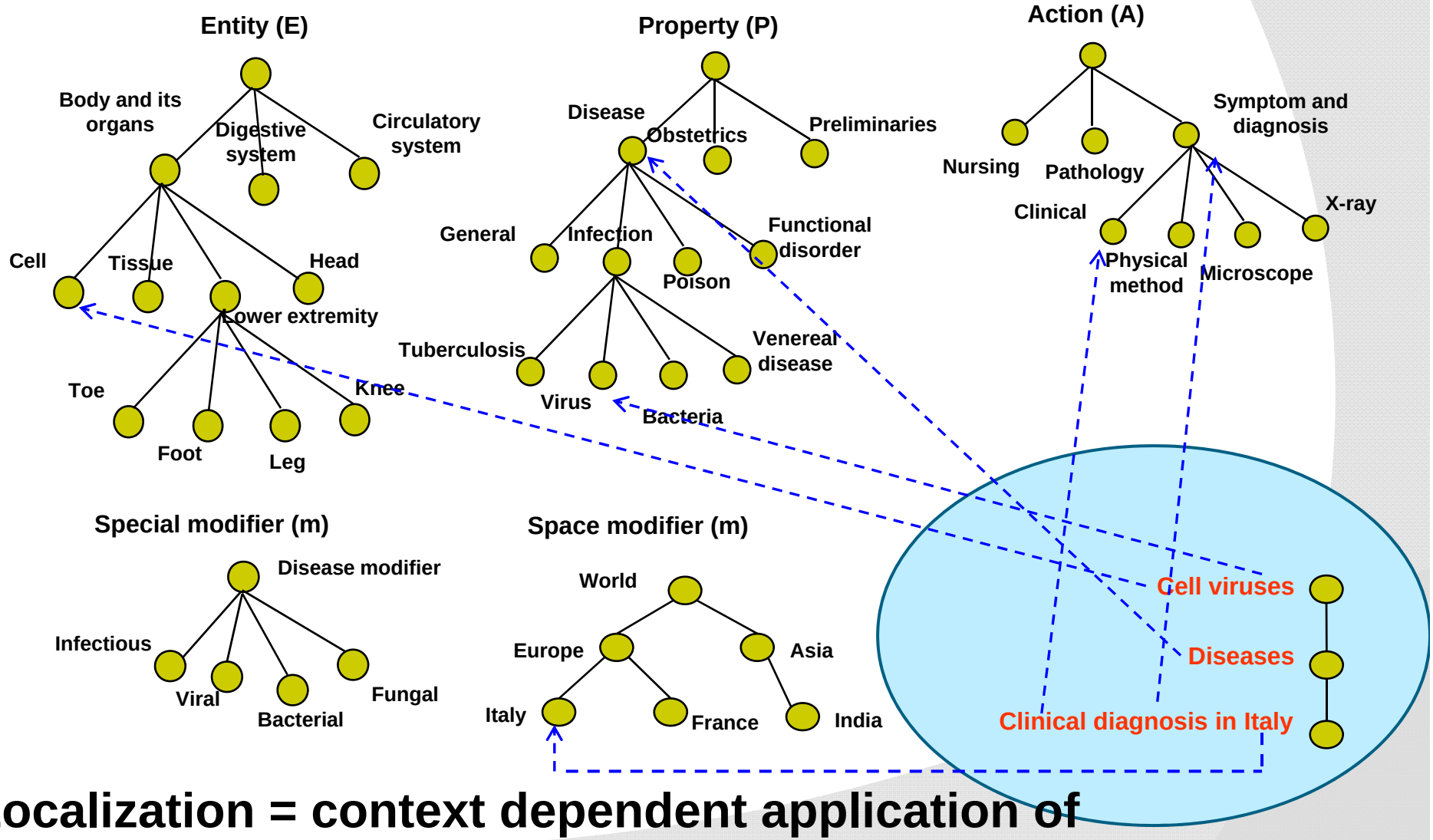
… How to implement the vision?

From decomposable, localizable global language and knowledge …

… to the local experience (data and media) of the local world (data being expressed in the global language)

… and back!

Handling diversity in language: Background knowledge, domains, facets



Localization = context dependent application of the mechano property on global domains and facets

Handling diversity in data, knowledge and opinions: Context

Global Knowledge = combination of multiple ***diverse local theories*** (***contexts***) of the world, also of the same world phenomena

A ***context*** is a 4- tuple:

< URL, Cxt, M, IA >

- **Cxt:** Context – it codifies, in a local language the *local knowledge* of the world
- **M:** a set of mappings – they codify the *semantic relations* existing between (elements of) contexts.
- **IA:** a finite but unbound set of assertions, which allow for the representation of *implicit assumptions*

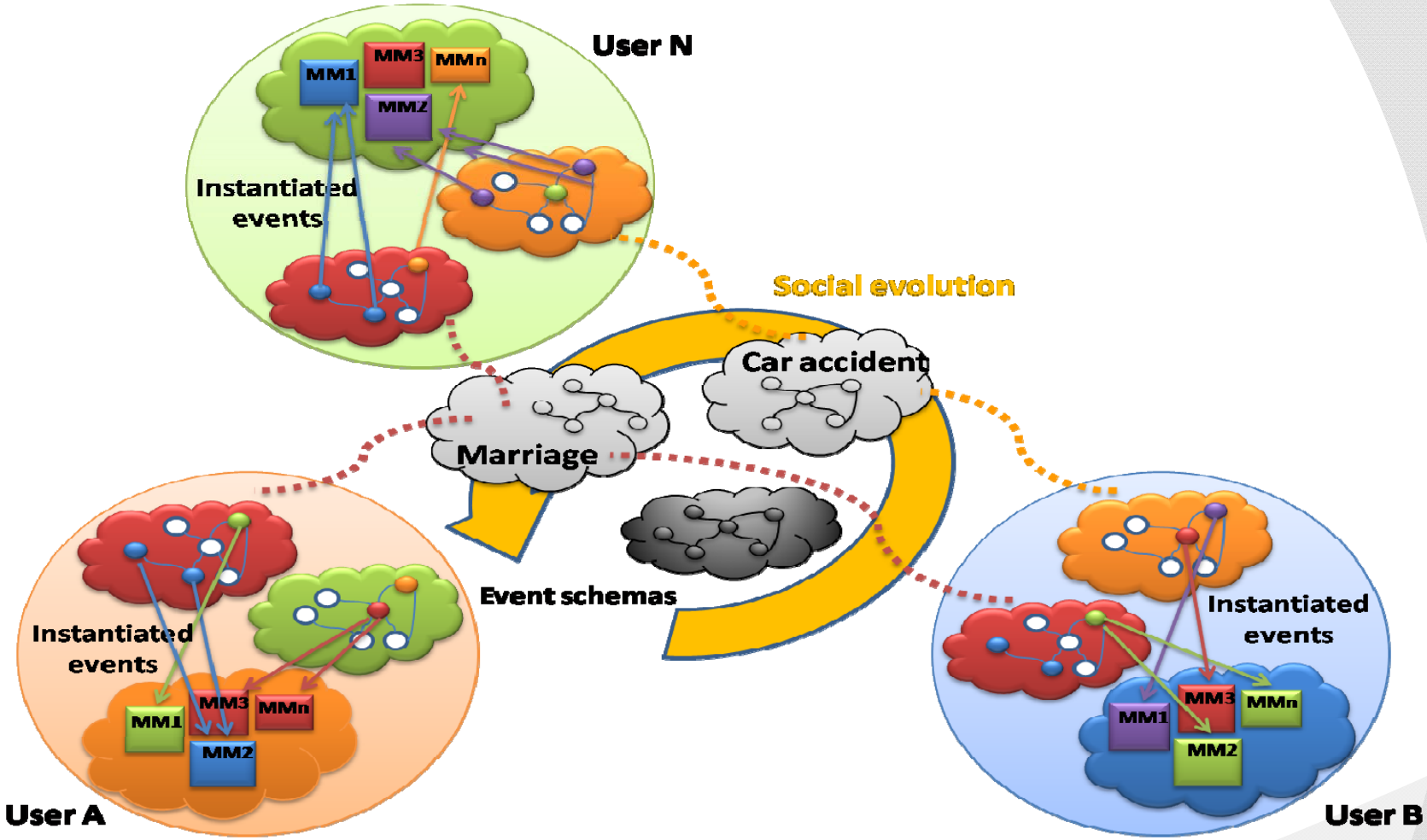
A real world example: Partial agreement between catalogs

- Top
  - Industrial Manufacturing and Processing Machinery and Accessories
    - Lapidary machinery and equipment
    - Leatherworking repairing machinery and equipment
    - Industrial process machinery and equipment and supplies
      - Separation machinery and equipment
      - Cutting tools
        - Drills
        - Reamer cutting tool
        - Form tools or toolbits
        - Taps or dies
        - Broach cutting tool
        - Gear cutting tools
        - Rotary burrs
        - Regrind or reclaim or coating services for cutting tools
        - Countesink tool or counterbore tool
        - Machinery cutting knives or knife assemblies
      - Assembly machines
      - Paint systems
    - Foundry machines and equipment and supplies
    - Workshop machinery and equipment and supplies

- Top
  - Machine, apparatus
    - Heat exchanger
    - Boiler, furnace
    - Sterilizer
    - Cleaning installation
    - Sound damper, pulsation damper
    - Cutting machine
      - Plasma cutting machine
      - Cutting machine (other)
        - shears (manufacturing of glass)
        - melt machine (manufacturing of glass)
      - Cutting machine (parts)
      - Cutting mach. (maint., serv.)
      - Cutting mach. (repair)
    - Textile machine
    - Pressure machine

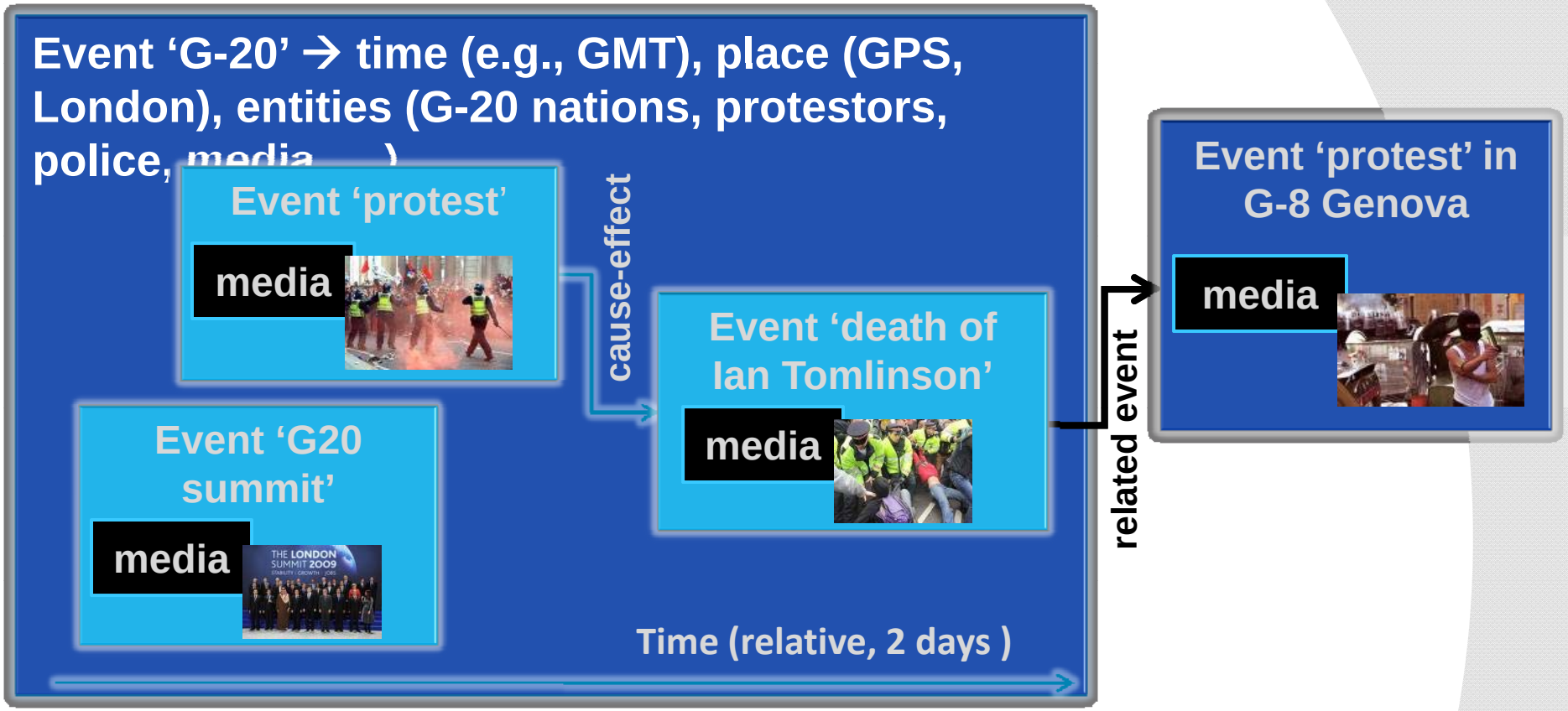
Ex.: <Id, Drills, Cutting machine (other), subsumes>

Handling diversity in media: Events



Events: from global concepts to local diversity in media

An example: G-20 Summit London (April 2, 2009)

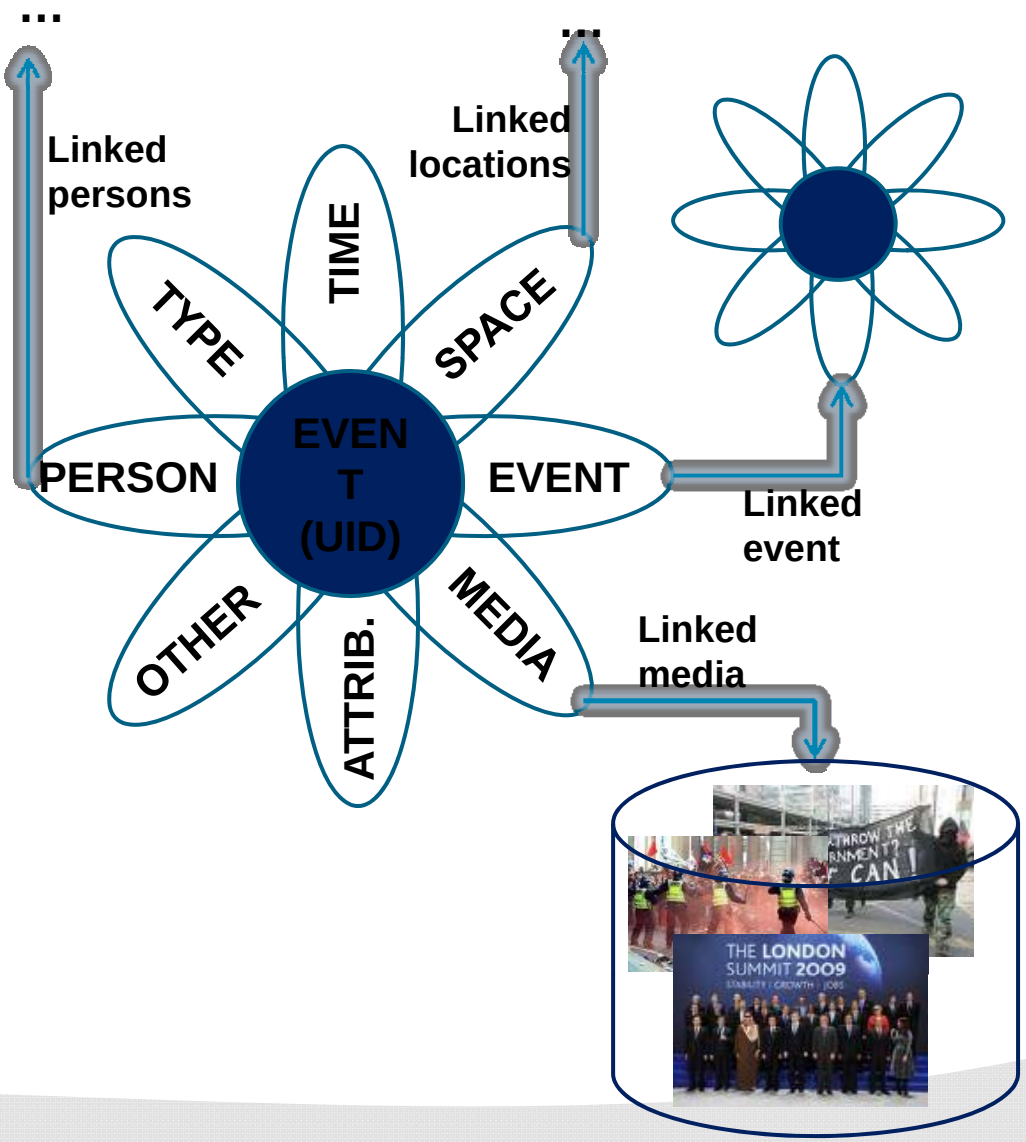


Event driven media creation (global → local): retrieve event structure and instantiate it with media *(experience enrichment)* and entities / metadata (attributes) about entities *(knowledge enrichment)*

Media global dynamics (Wisdom of the crowds: local → global → local): publication, e.g., in a blog, of a (partially) instantiated event structure and media, enrichment (add media, entities, entity attributes) by others who participated to the same event *(collective event)* or did not (add entity tag to photo), link to related events and concepts

Media local dynamics (Event and media life cycle: local → local): Same enrichment as above, in time, "*me on my data*" *(user in the loop)*

Events as the primary means for organizing and indexing media



Events are entities with attributes and relational attributes (links) to other entities (e.g., events, locations, people, *media*)

Related events (event network):

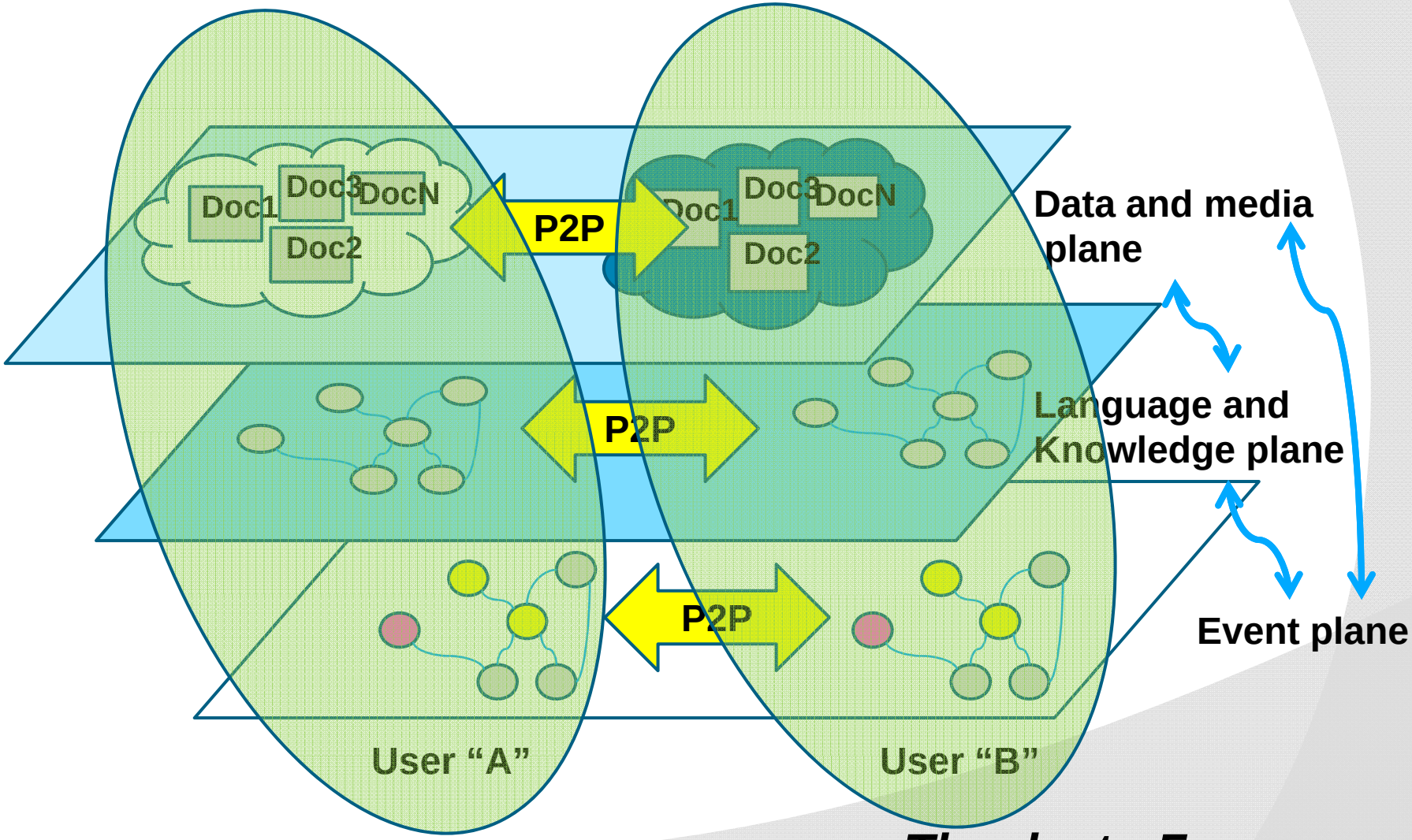
- Sub-event relationship (granularity)
- Cause-effect relationship (causality)
- Temporal relationship (continuity)
- ...

Media populate events:

- Events contextualize media (experiential dimension)
- Many-to-many relationship (viewpoints):
  - One media linked to many events
  - One event linked to many media

… The big picture

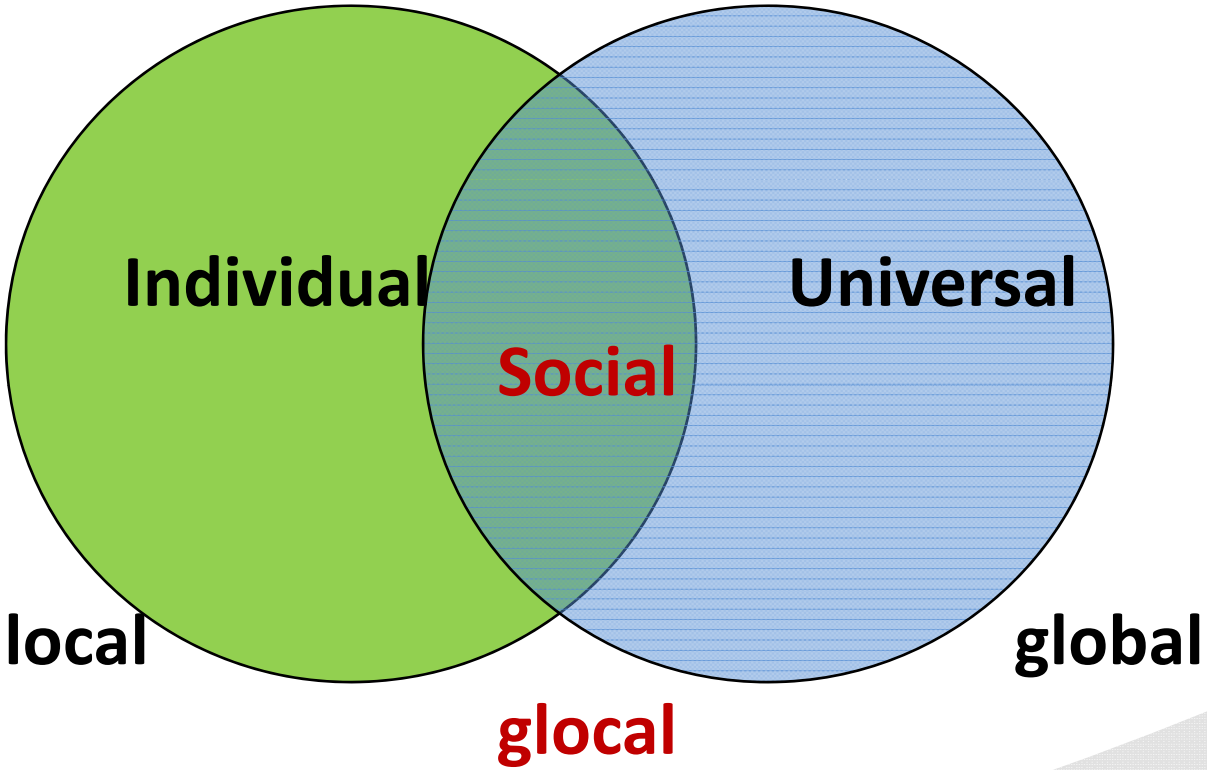
Managing diversity as *logical peer-to peer* knowledge management



Thanks to Francesco!

From *logical peer to peer* to *Social* Knowledge Management

Individual, from/to Social from/to Universal Knowledge



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