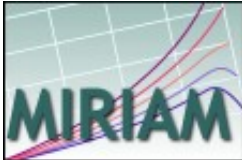
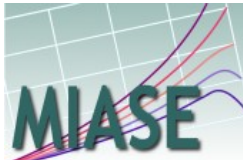








COMBINE – a vision

Is the mosaic of standards complete?

	Models	Simulation	Results
Minimal requirements			
Data-models	 		SBRML
Ontologies			

Disentangling the model life-cycle

PMML



SED ML

SBRML

model generation

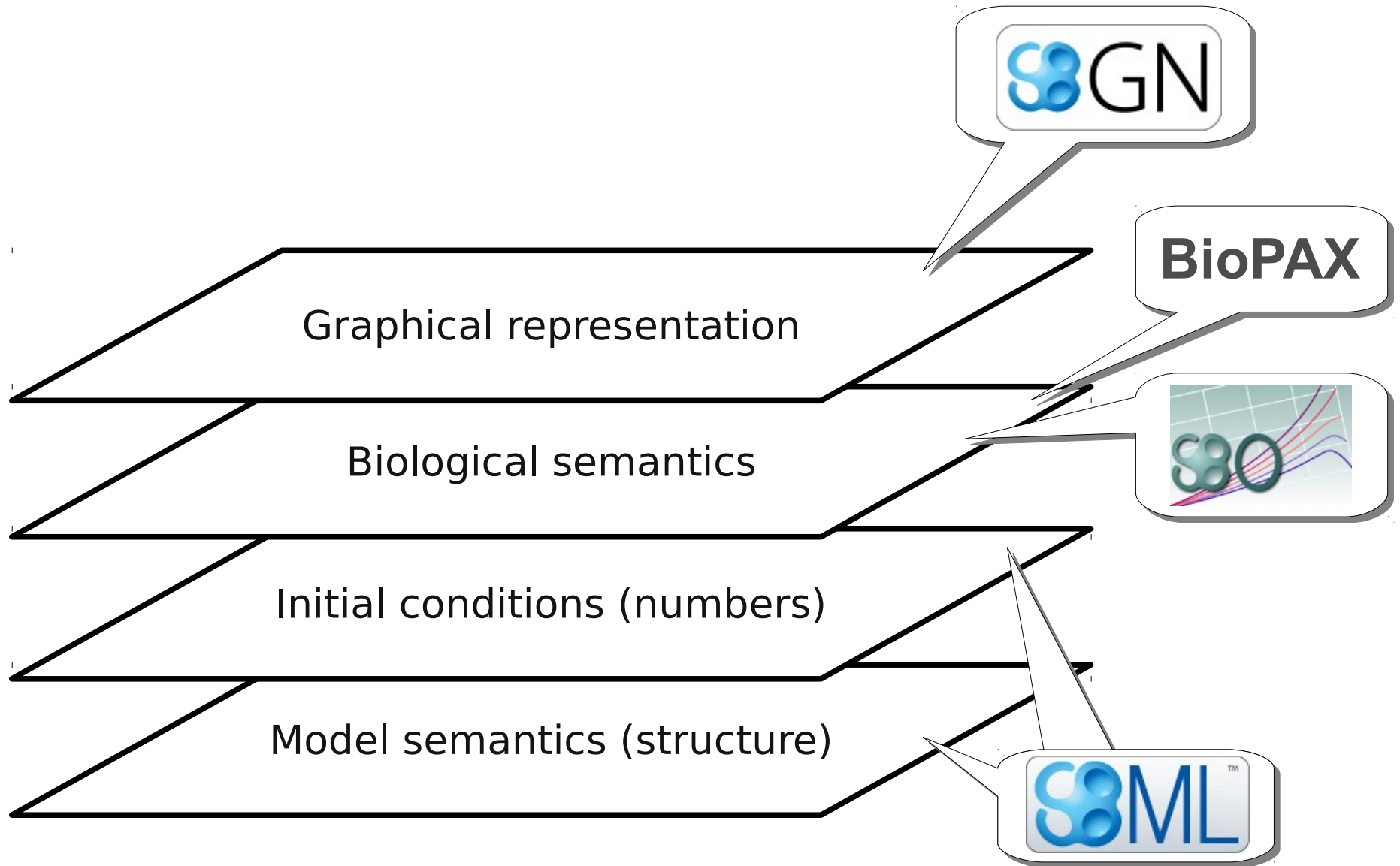
model description

parametrisation

simulation and analysis

numerical results

Disentangling the level of discourse



Parallel and redundant efforts

Drug Disease Model Resources
ddmore

drug discovery

ecology **SimileXML**

neurobiology

Physiology

incf International Neuroinformatics
Coordinating Facility

biochemistry



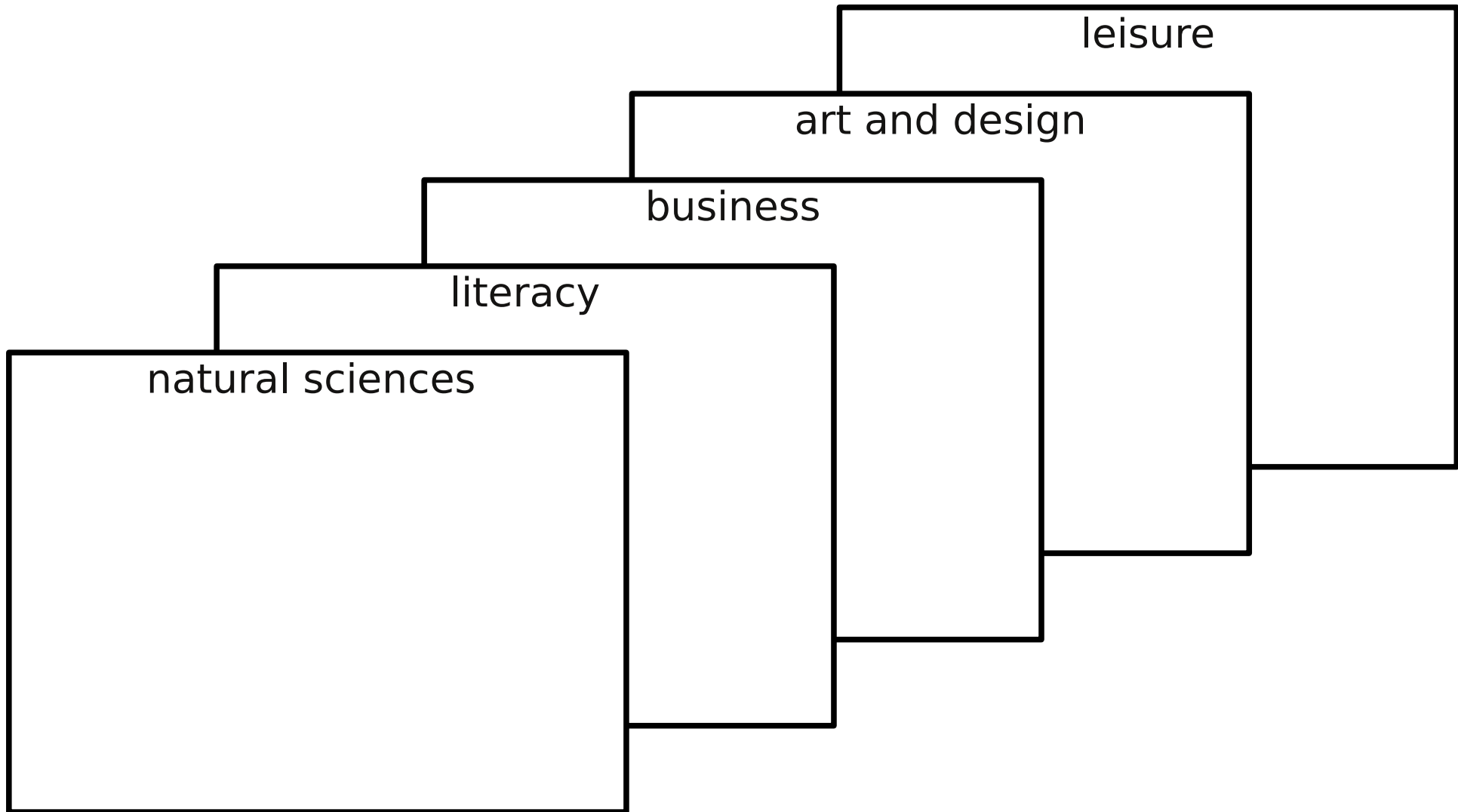
BioPAX



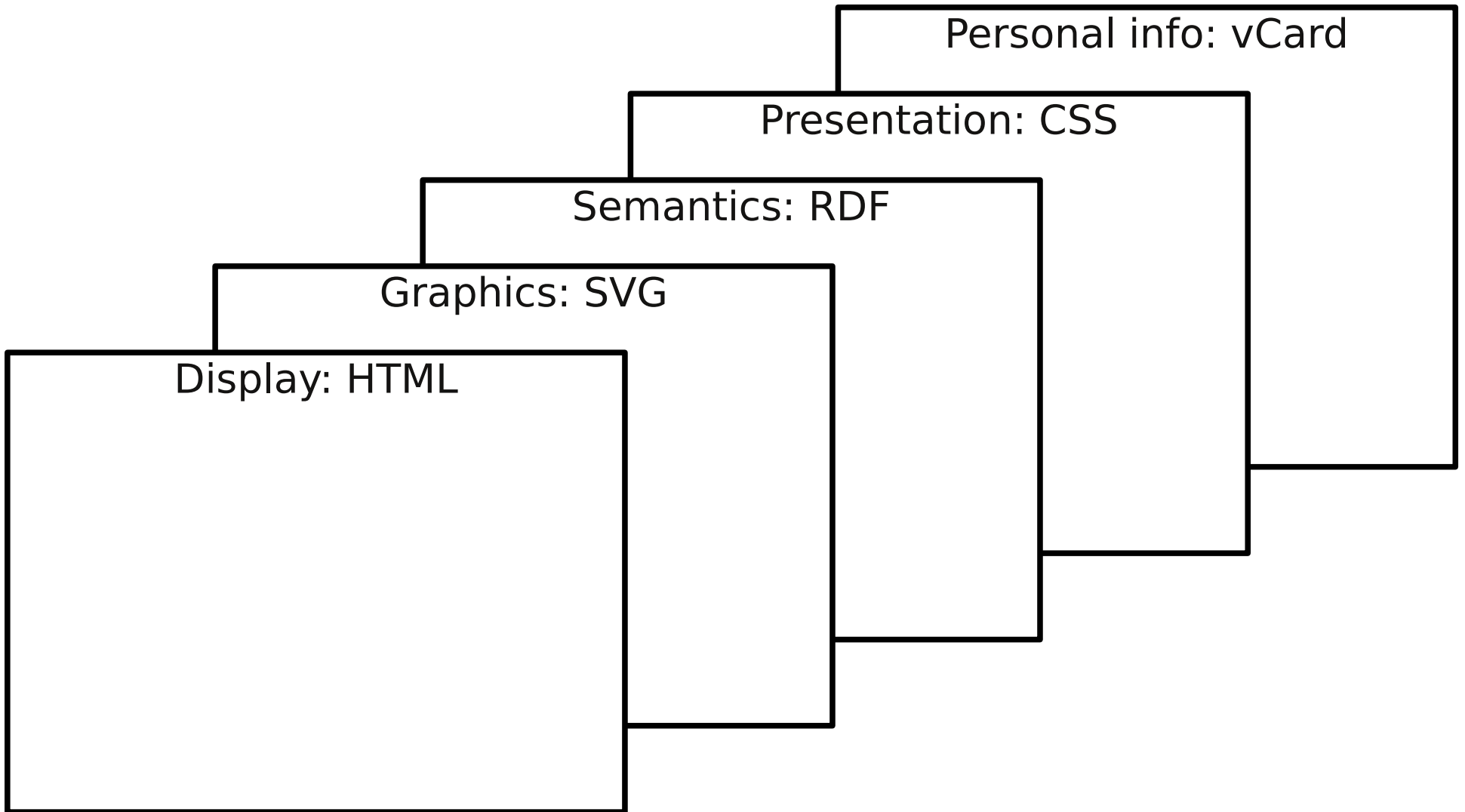
FieldML



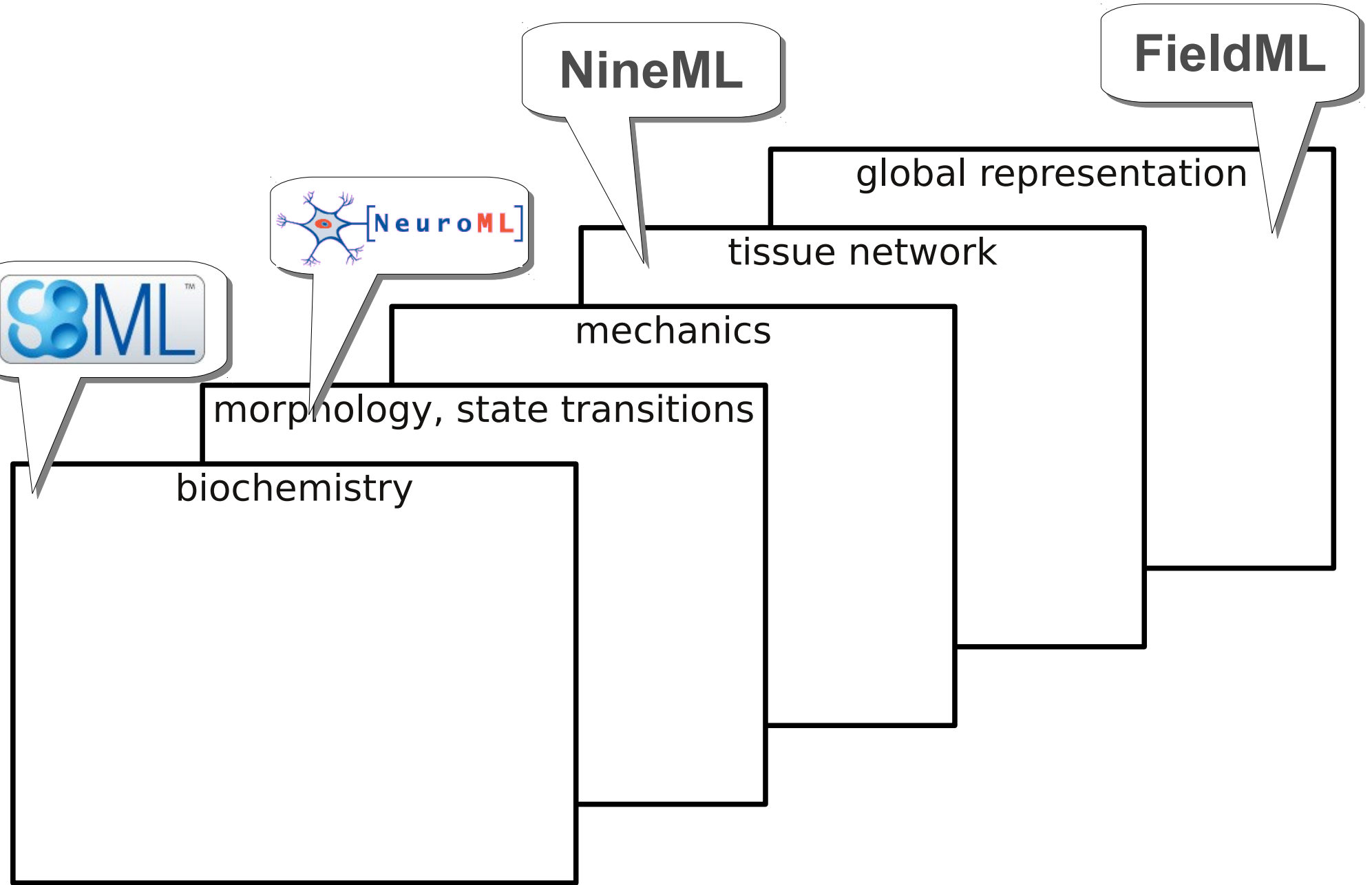
What if the world-wide web was built like this?



The correct way to do it

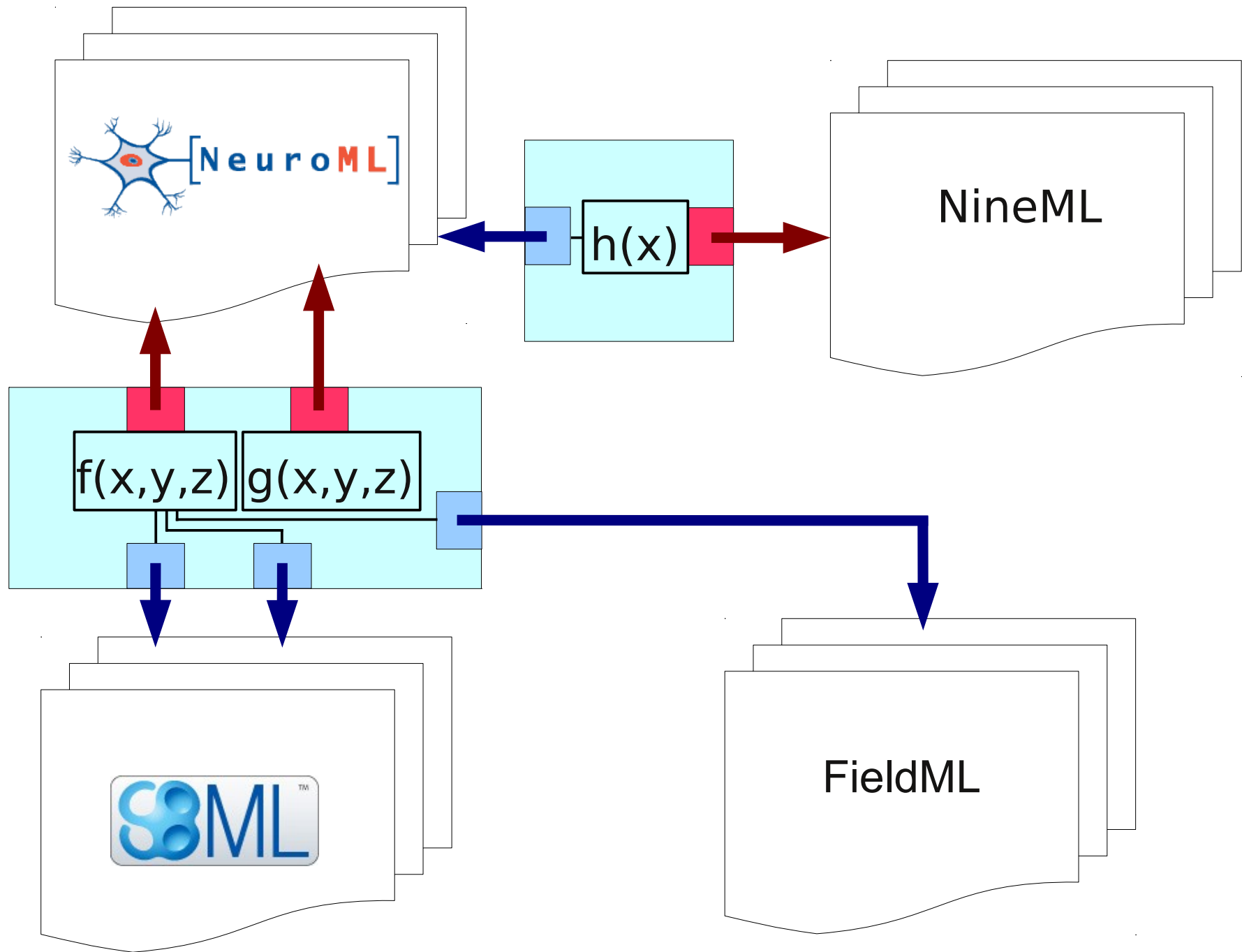


Non-overlapping languages to cover all models



Multi-scale/approach representation using adapters

(my opinion, not part of the vision ...)



Standards interoperability along the 3 dimensions

- SBML to BioPAX: conversion using metadata (MIRIAM annotations and SBO terms), e.g.
 - mapping between Species and PhysicalEntity
 - mapping between Reactions and PhysicalInteraction
- Conversion of SBML or BioPAX descriptions to SBGN map
- Usage of SBML descriptions (or CellML or VCML) in SED-ML: Identification of variables using XPath
- Descriptions using SBML and NeuroML: Interface based on XPath

Threats to the whole enterprise

- Current efforts are very dependent on key people coordinating maintenance and development. Their disengagement would mean stalling or even discontinuation.
- Current funding structure is fragile. Many different grants, sometimes only supporting meetings (SBGN), none of them infrastructure rolling funding, often tied to individuals.
- Current efforts are not immune against intellectual property claims that would hinder the use of the standards
- Existing standards are developed with very different approaches, quality checks, and are based on completely different assumptions
- APIs needs industry-grade support, incompatible with standard academic usages and possibilities

Requirements for a overarching standardisation structure

- What?
 - Set of interoperable description languages
 - Cover all aspects of modelling and simulation, all types of descriptions / views of the real
 - Role of community-maintained ontologies.
- How?
 - Independence towards Institutions, funders and individuals
 - Role of European Research Infrastructures? (ELIXIR, ISBE)
- Who?
 - Communities developing their standards: Systems Biology, Physiology (VPH), Neuroscience (INCF), Drug discovery (DDMoRe), Clinical data (CDISC) ...
 - Other players in knowledge-representation: W3C ...
 - Academic and corporate users: Modeling platforms (MatWorks ...), Pharma (Pistoia alliance) ...

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**COmputational Modeling in Biology NEtwork
(COMBINE)** forthcoming: <http://co.mbine.org>



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W3C Mission

▶ Principles, vision, ...



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