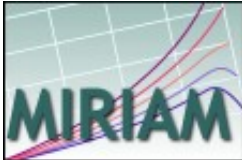
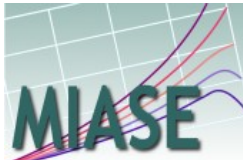





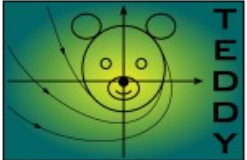


COMBINE – a vision

Is the mosaic of standards complete?

	Models	Simulation	Results
Minimal requirements			
Data-models	 		SBRML
Ontologies			

Disentangling the model life-cycle

PMML



SED ML

SBRML

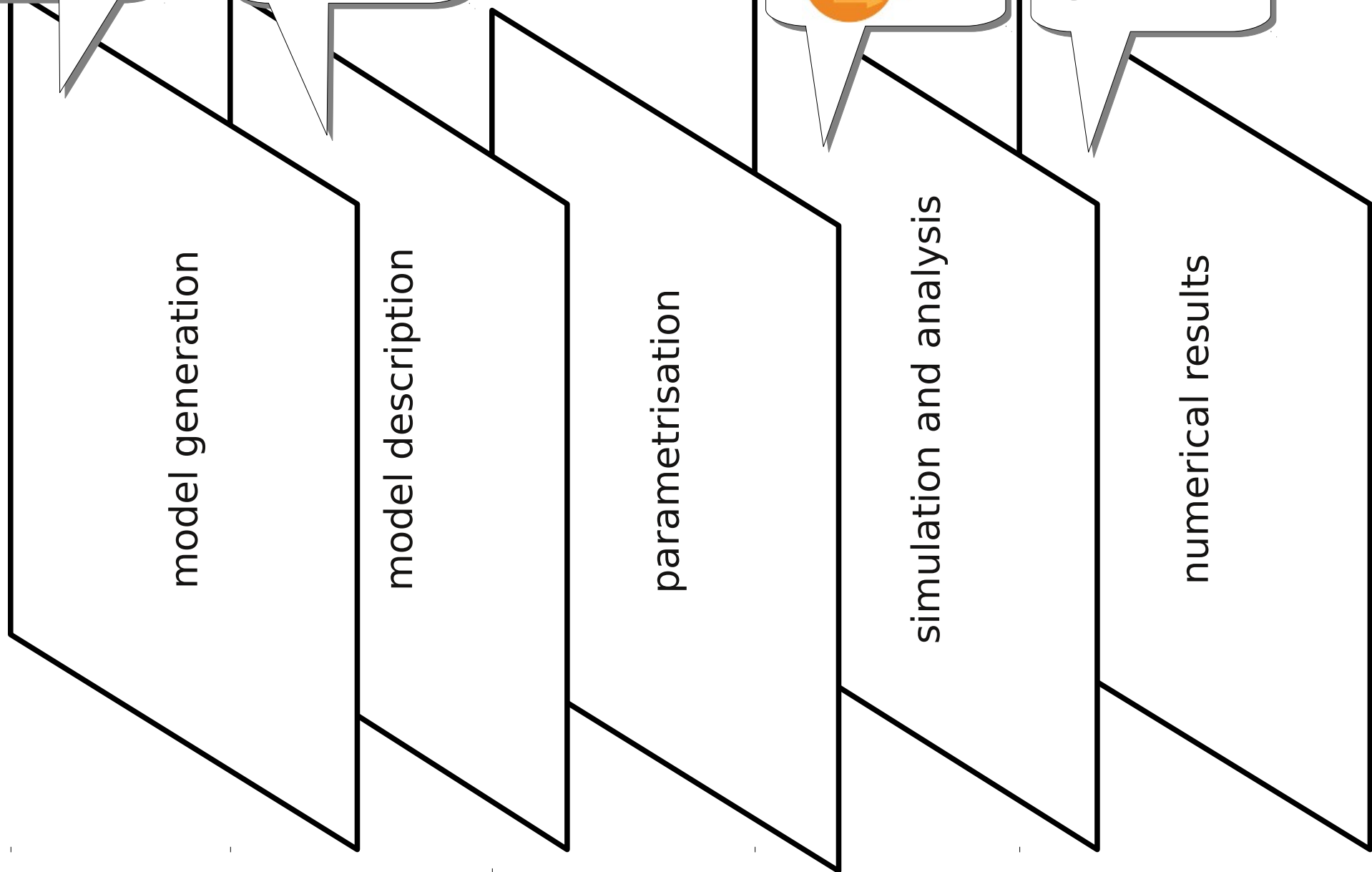
model generation

model description

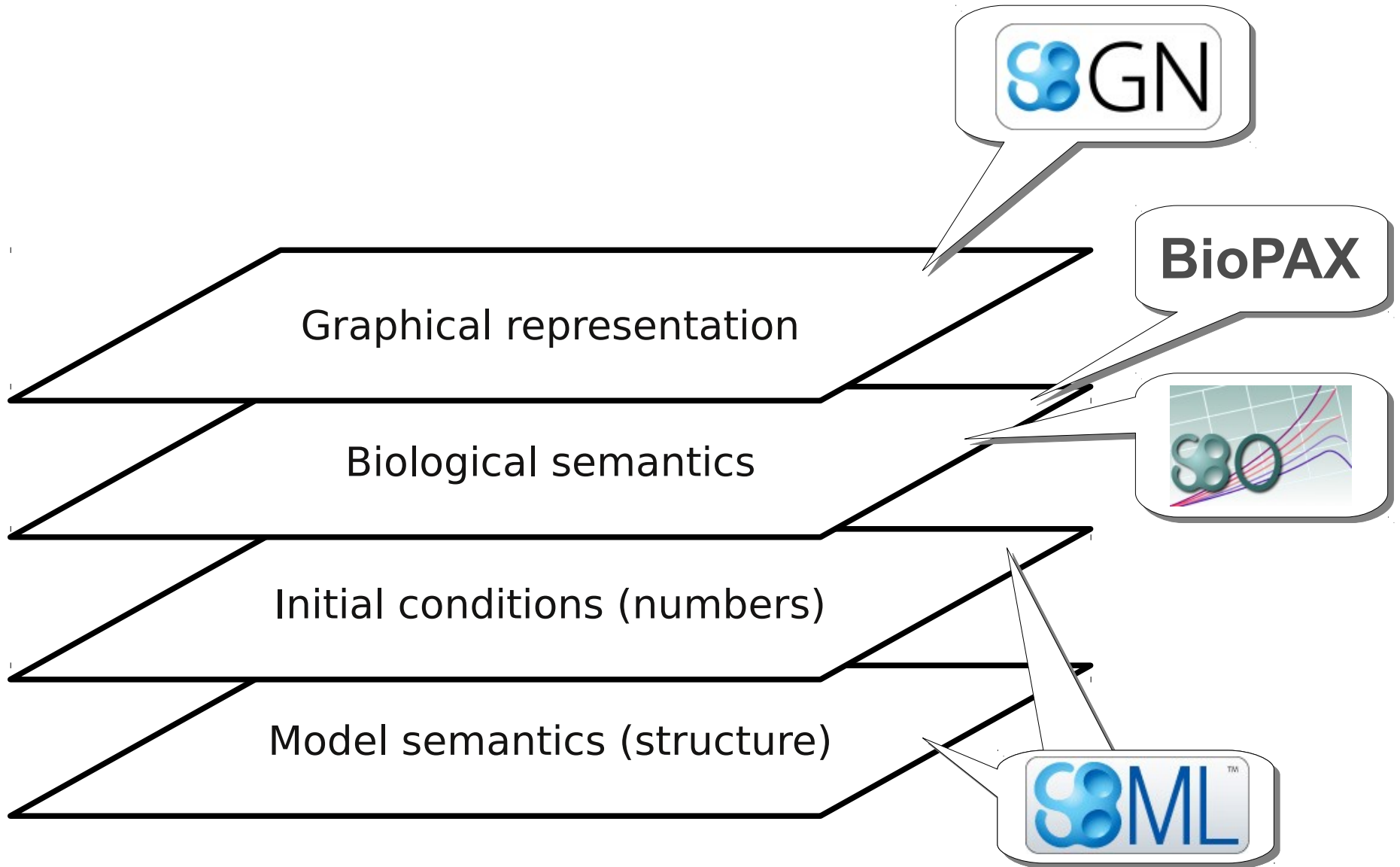
parametrisation

simulation and analysis

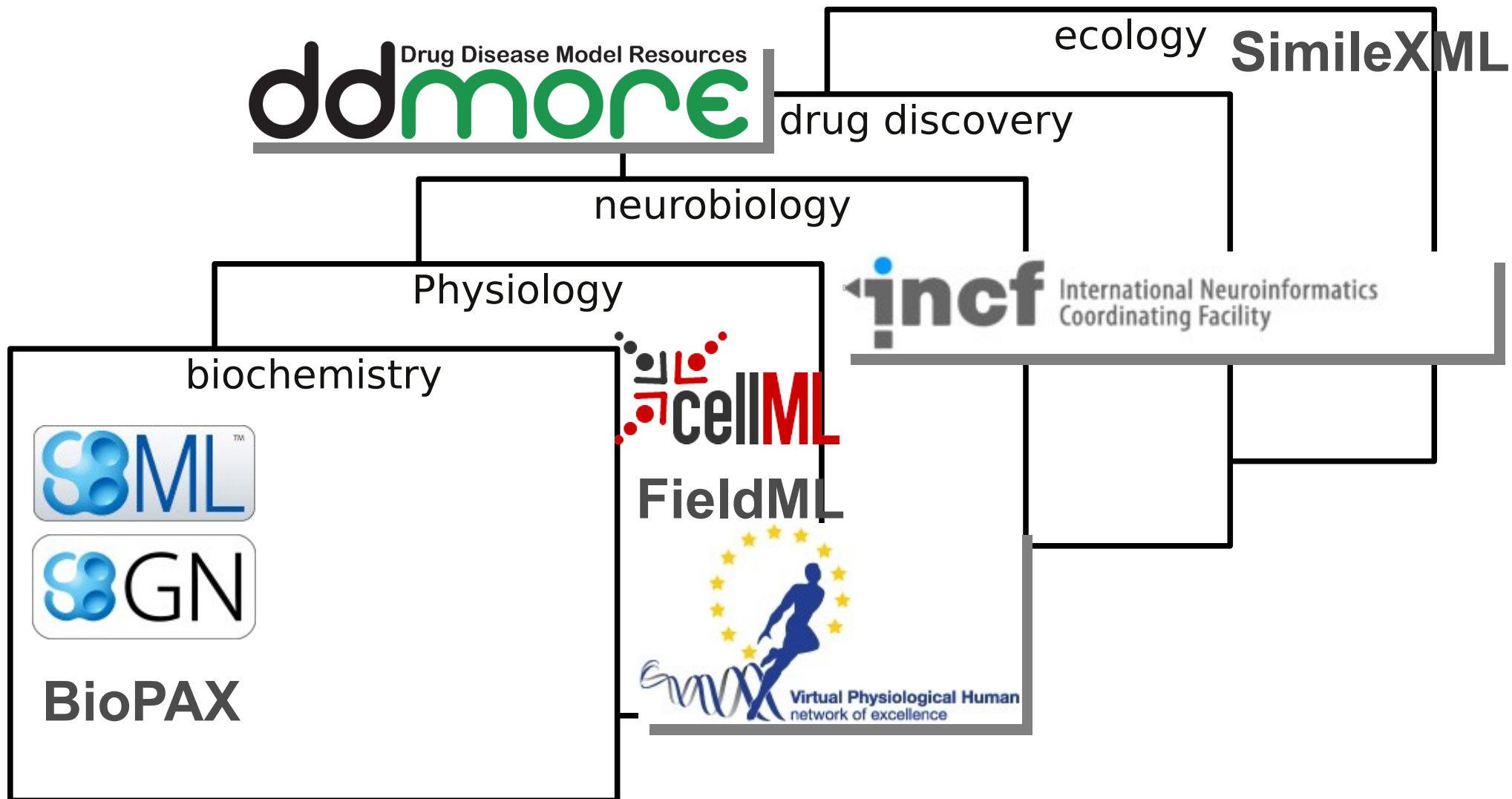
numerical results



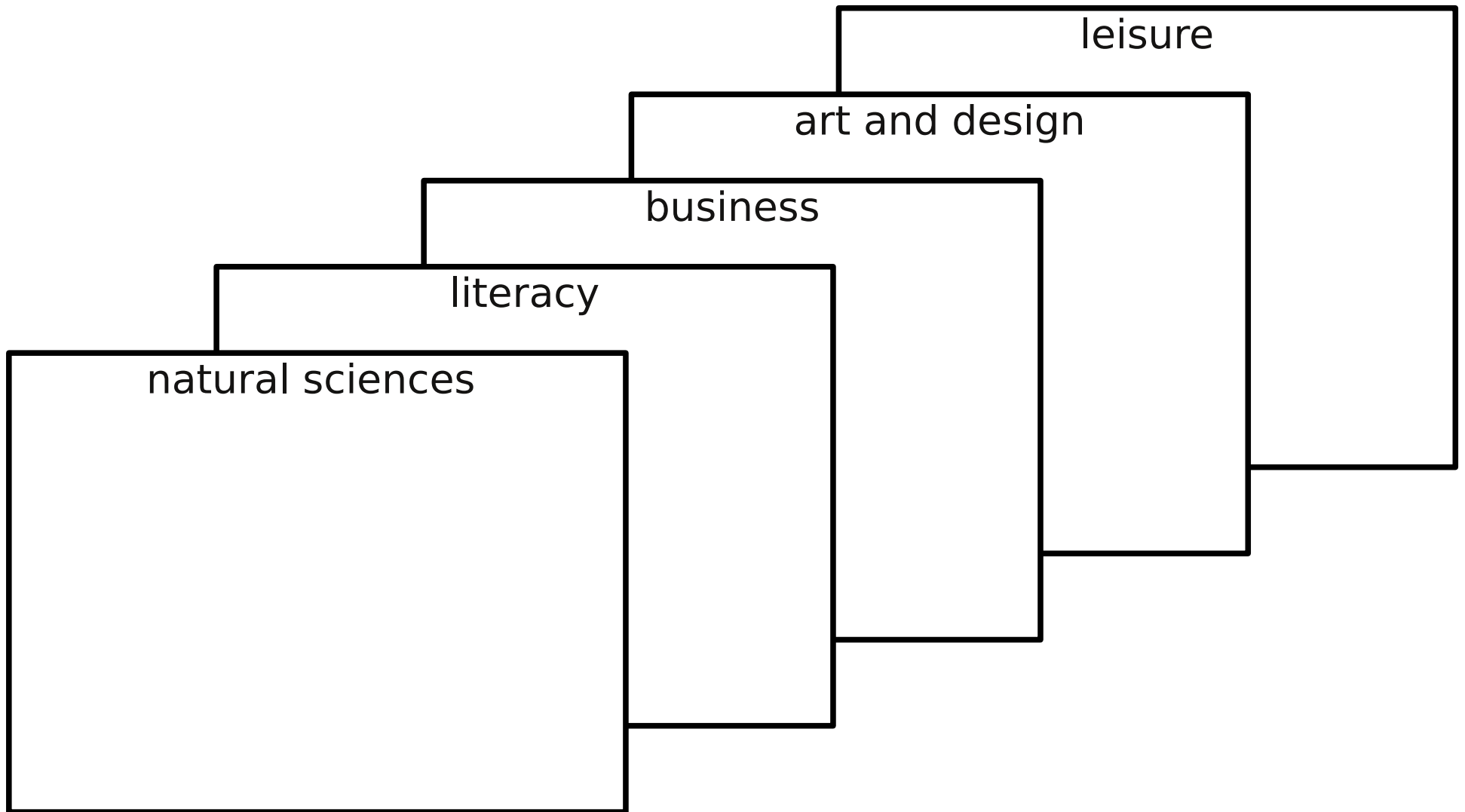
Disentangling the level of discourse



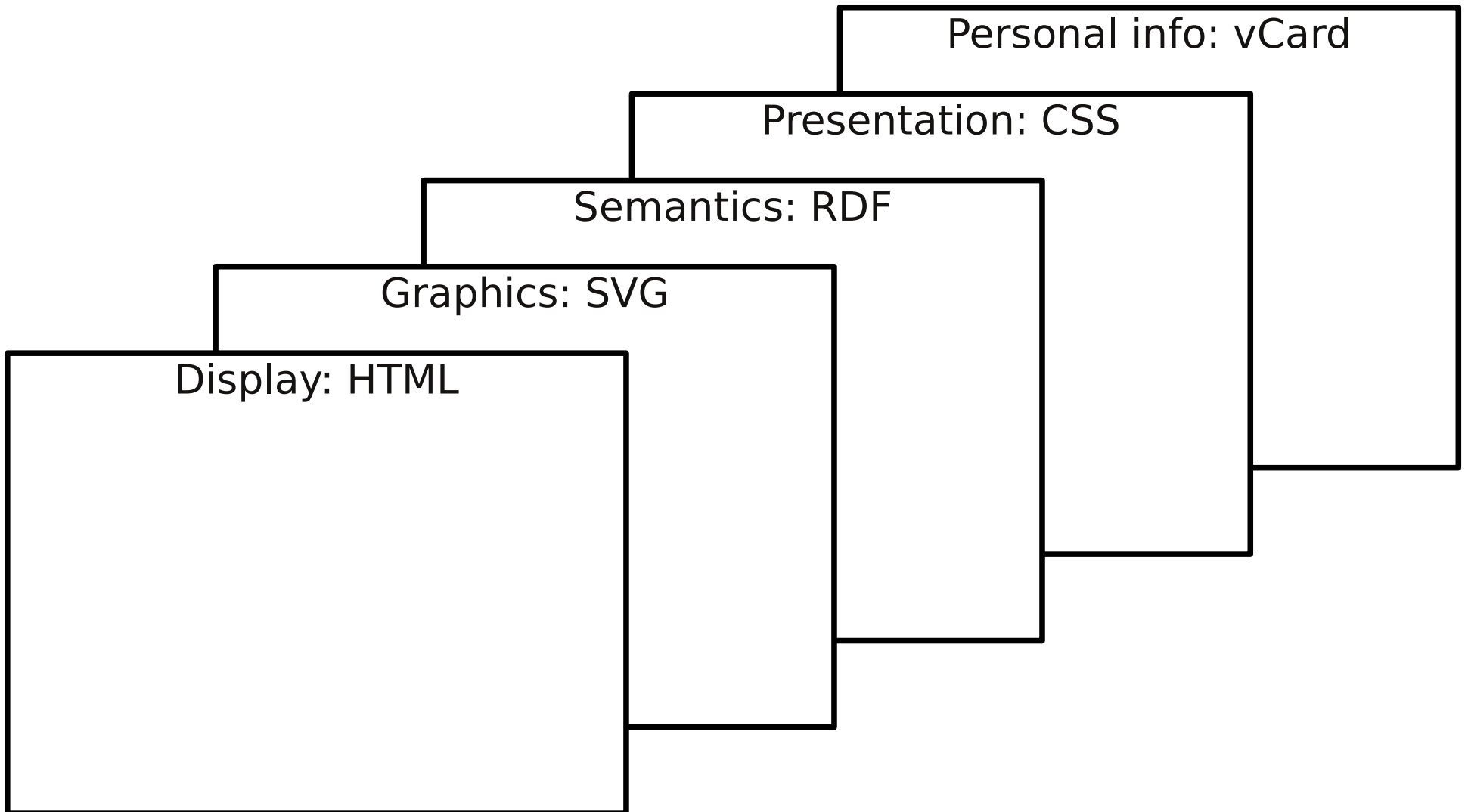
Parallel and redundant efforts



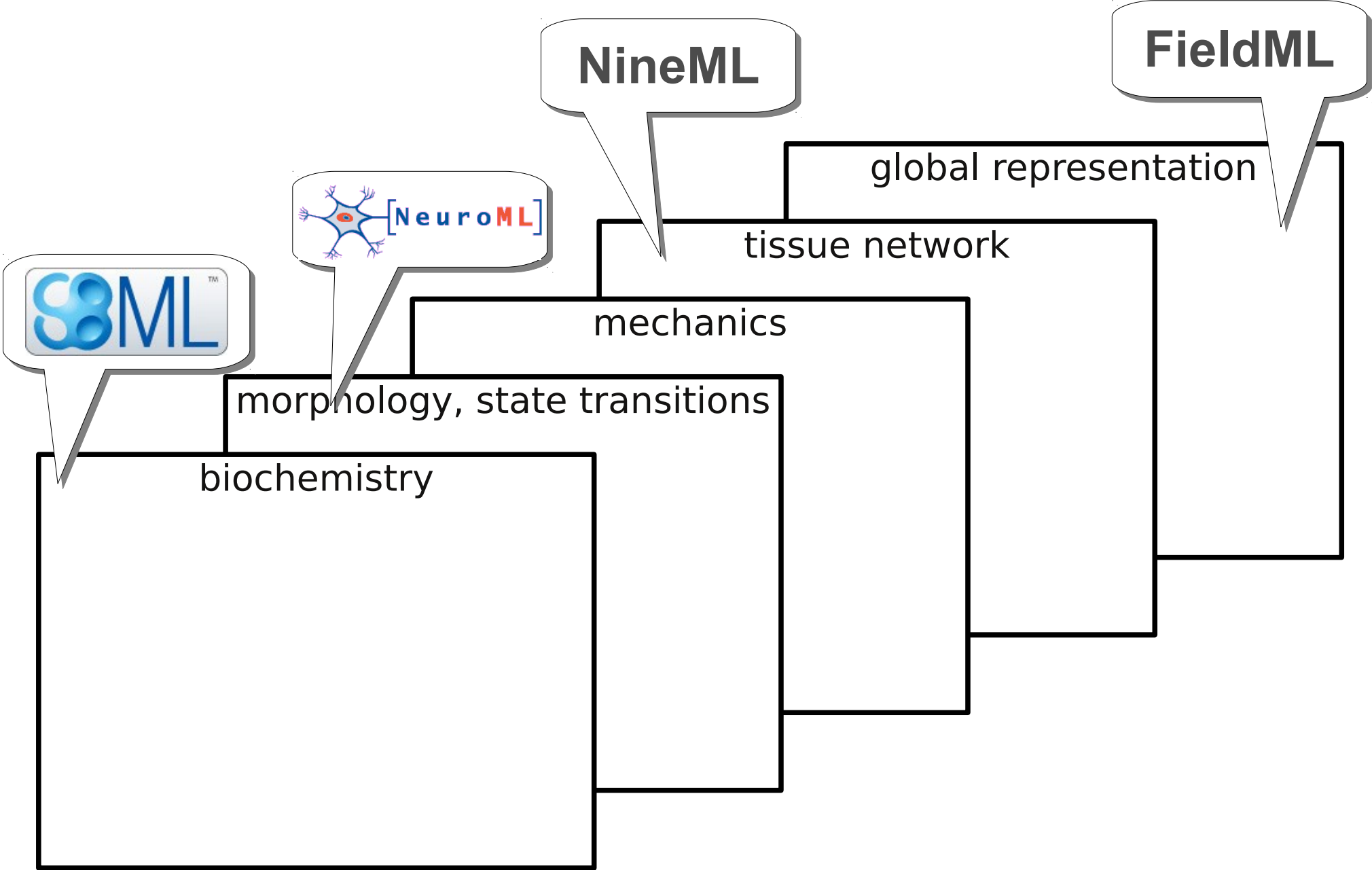
What if the world-wide web was built like this?



The correct way to do it

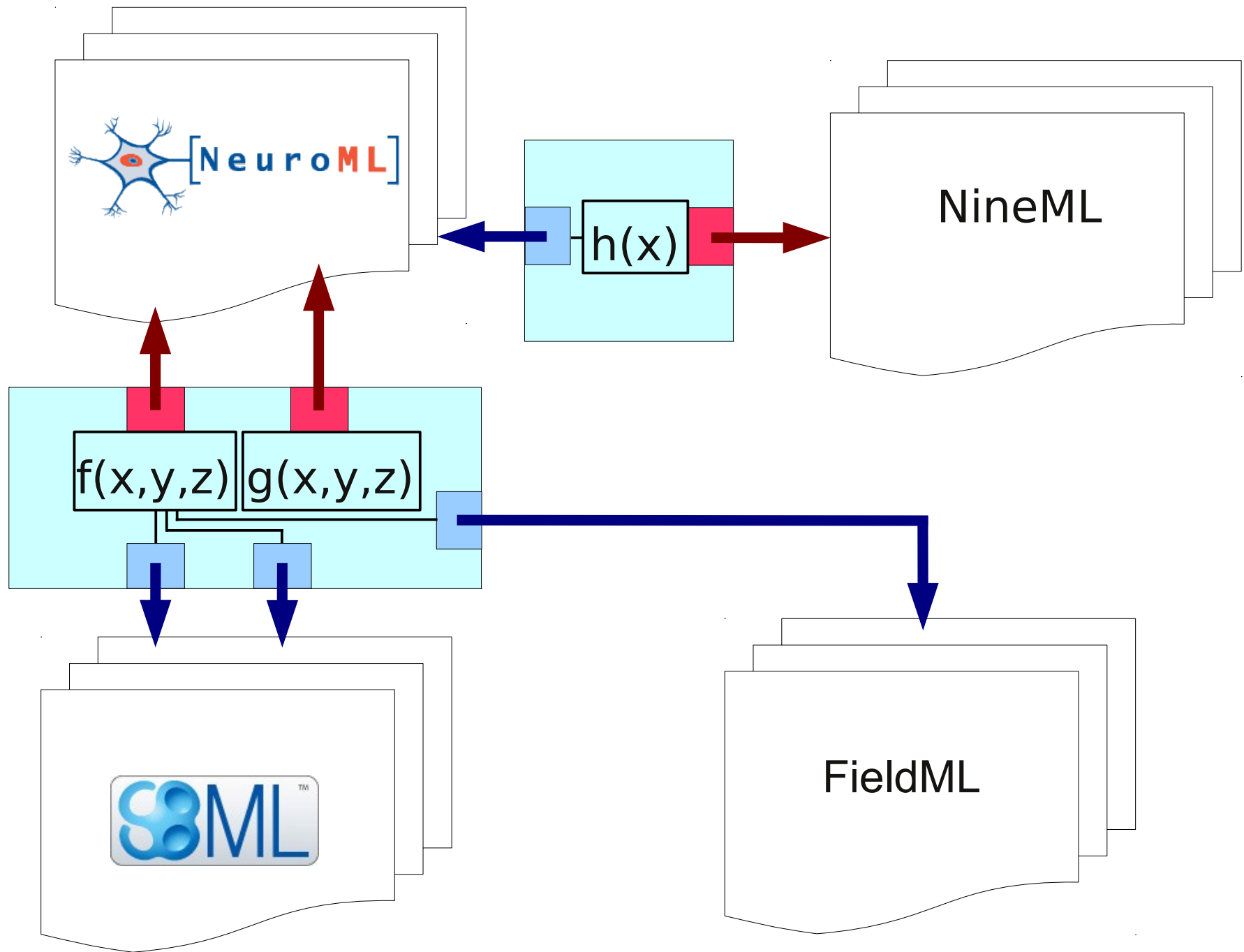


Non-overlapping languages to cover all models



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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