SBGN Overview and Status

Systems Biology Graphical Notation

What is SBGN?

- A way to unambiguously describe biochemical and cellular events in graphs
- A graphical representation of quantitative models and biochemical pathways, at different levels of granularity

- Limited amount of symbols (~30) → Smooth learning curve

- Can be translated into executable models, can graphically represent models (e.g. SBML, BioPAX), but can also exists independently

- Three languages
  - Process Descriptions   → one state = one glyph
  - Entity Relationships   → one entity = one glyph
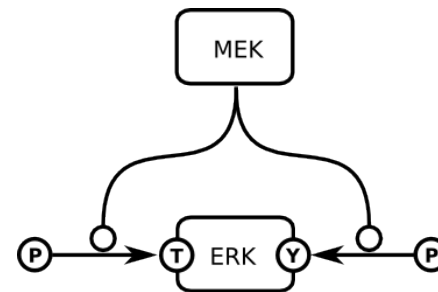 - Activity Flow   → conceptual level

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Three Languages in One

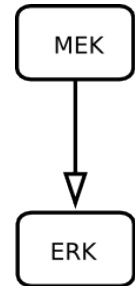## Process Description

maps
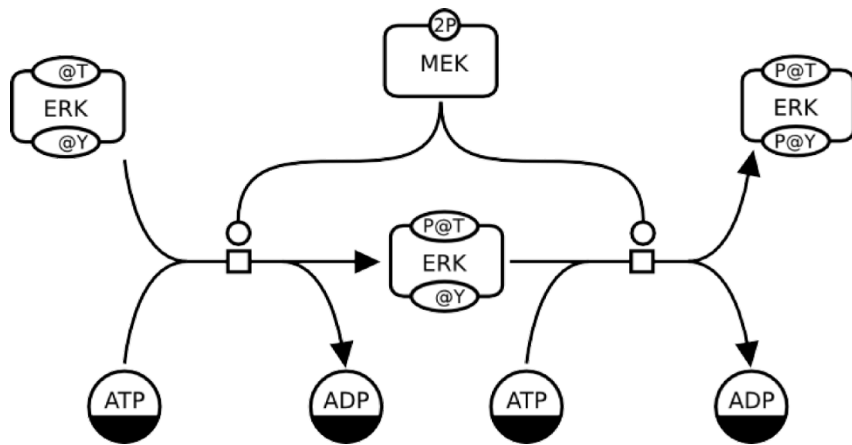
- ▶ Unambiguous
- ▶ Mechanistic
- ▶ Sequential
- ▶ Combinatorial explosion

Entity Relationships

maps

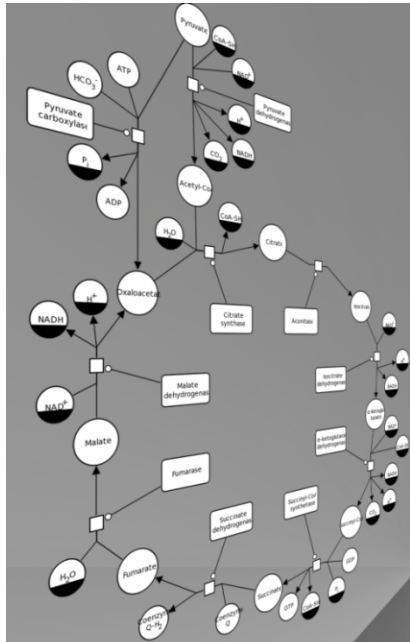- ▶ Unambiguous
- ▶ Mechanistic
- ▶ Non-Sequential

Activity Flow

maps

- ▶ Ambiguous
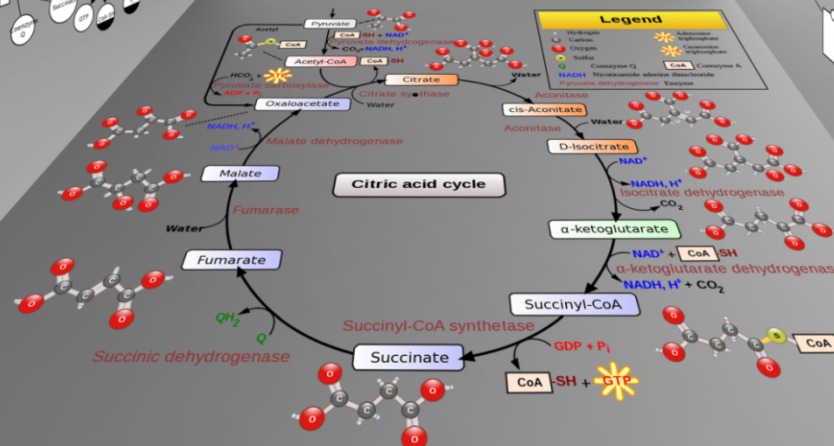- ▶ Conceptual
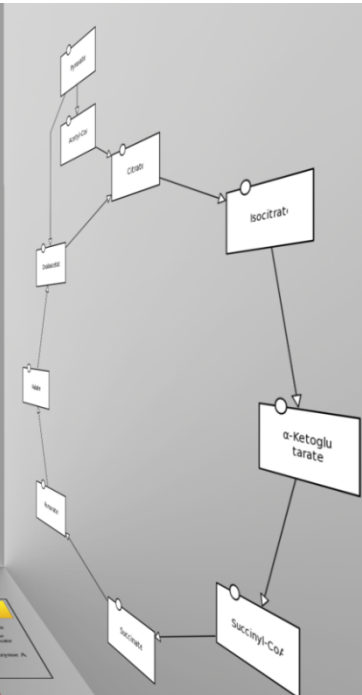- ▶ Sequential
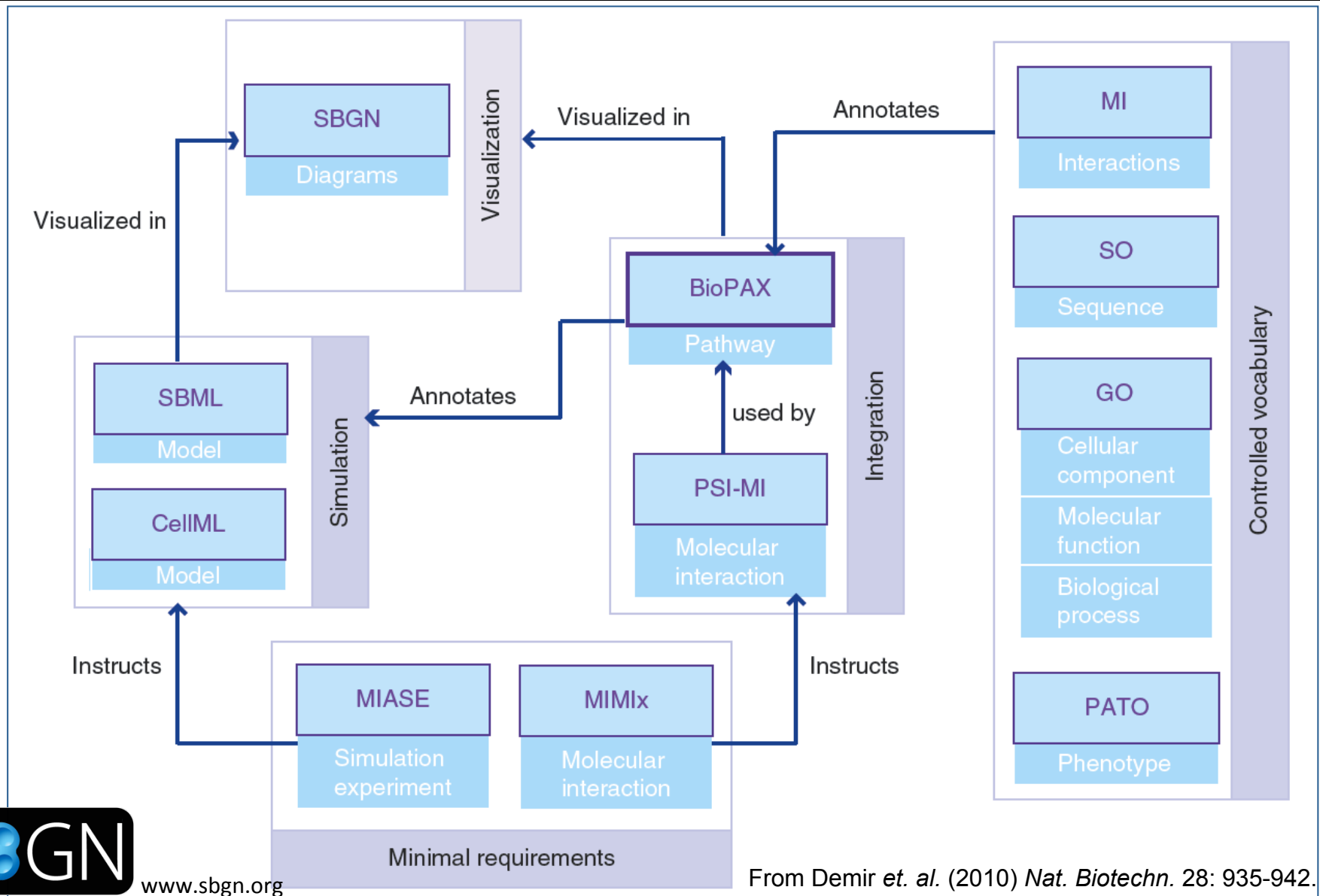
Three Languages in One

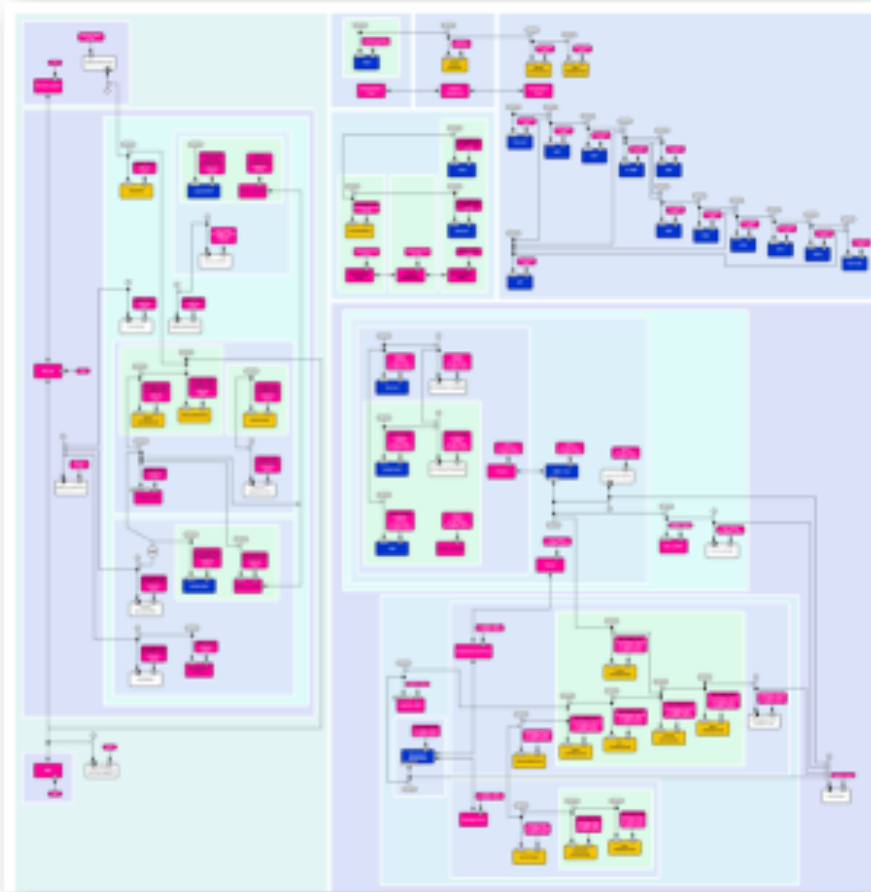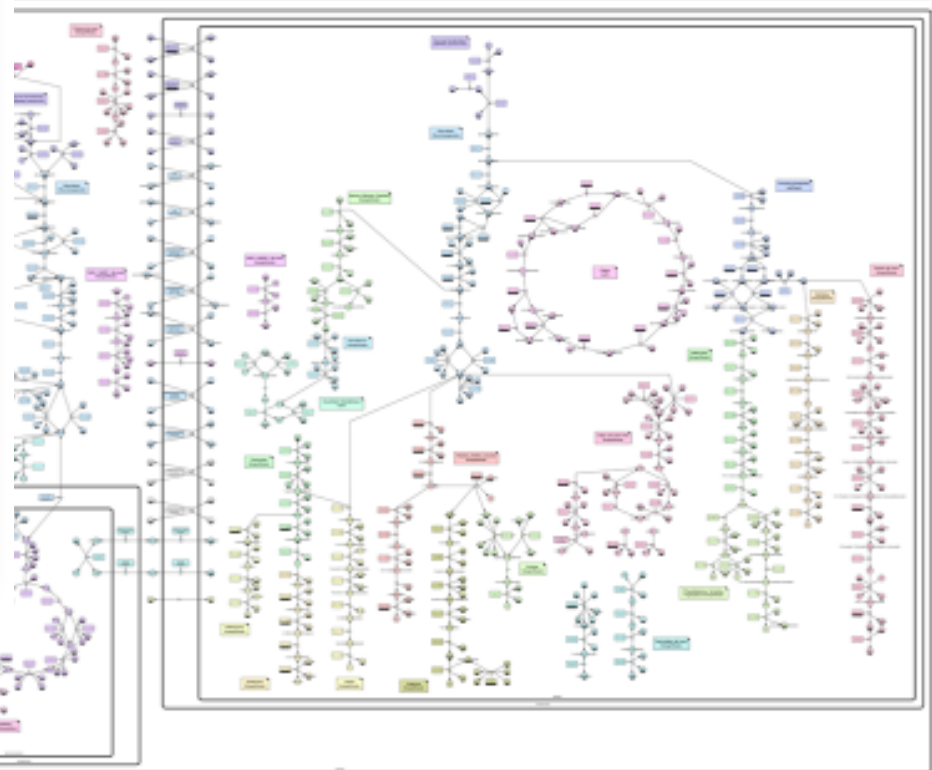Process Description   Entity Relationships   Activity Flow
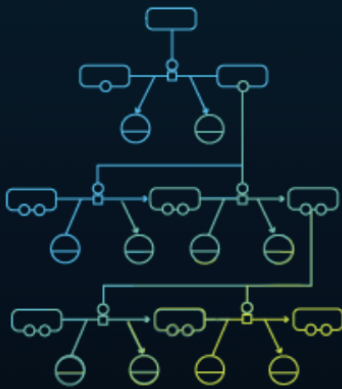
Connection to other Standards

From Demir *et. al.* (2010) *Nat. Biotechn.* 28: 935-942.

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Application Examples

Maps from SBGN best map contests

Web Page

Software

TABLE 1 | Comparison of pathway visualization tools that support SBGN notation.

Name	Ref.	Access	Availability	SBGN PD	SBGN ER	SBGN AF	SBGN validation	Mapping	Website export
SBGN-ED	9	http://sbgn-ed.org/	F	√	√	√	√	√	√
BiNoM	7	http://bioinfo-out.curie.fr/projects/binom/	F	√	—	—	—	—	—
BioUML	—	http://www.biouml.org/	F	√	—	—	—	—	—
CellDesigner	6	http://www.celldesigner.org/	F	√	—	—	—	√	—
Edinburgh Pathway Editor (EPE)	12	http://epe.sourceforge.net/	F	√	√	√	—	—	—
PathVisio	8	http://www.pathvisio.org/	F	√	—	—	—	√	√
PathwayLab	—	http://www.innetics.com/	C	√	—	—	—	—	√
Arcadia	21	http://arcadiapathways.sourceforge.net/	F	√	—	—	—	—	—
Athena	22	http://athena.codeplex.com/	F	√	—	—	—	—	—
BIOCHAM	23	http://contraintes.inria.fr/BIOCHAM/	F	√	—	—	—	—	—
JWS Online	24	http://jjj.biochem.sun.ac.za/help.html	F	√	—	—	—	—	—
Mayday	25	http://www-ps.informatik.uni-tuebingen.de/mayday/wp/	F	√	—	—	—	√	—
Netbuilder'	26	http://strc.herts.ac.uk/bio/maria/Apostrophe/	F	√	—	—	—	—	—
SBML Layout Library	27	http://sbmllayout.sf.net/	F	√	—	—	—	—	—
SubtiPathways	28	http://subtiwiki.uni-goettingen.de/subtipathways.html	F	√	—	—	—	—	—
Systems Biology Metabolic Modeling assistant	29	http://cath.gisum.uma.es:8080/sbmm/	F	√	—	—	—	—	—
VISIBIOweb	30	http://www.bilkent.edu.tr/~bcbi/pvs.html	F	√	—	—	—	—	—

From Junker *et. al.* (2012) *Nat. Protocols. 7(3)*: 579-593.

Governance

- Editors

Tobias Czauderna	Huaiyu Mi	Stuart Moodie	Falk Scheiber	Anatoly Sorokin

  – Elected for 3 years, two new editors to be elected end of this year

- Scientific committee

Last meetings

SBGN editor meetings and TelCos

HARMONY 2014
Manchester, UK

22–25 April 2014

SBGN will be part of the fourth HARMONY hackathon.
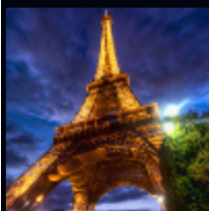
COMBINE 2013
Paris, France

16–20 September 2013

SBGN was part of the fourth COMBINE forum.

HARMONY 2013
Farmington, USA

20–23 May 2013

SBGN was part of the third HARMONY hackathon.

SBGN 9
Edinburgh, UK

29 Apr – 2 May 2013

This workship was dedicated to SBGN and it focused on the current SBGN specifications and SBGN's future development.

Documentation Split

- There was a technical specification only
  - Too technical
  - Focused on tool developers

- It was decided to split documentation into two parts
  - Technical Specification: normative official description of the language
  - User Manual: description of the use of language to teach end users

- User Manual is available for SBGN PD

Specification Status Update

- PD Level 1 Version 2 (including user manual) is availabe for review
  - https://sourceforge.net/p/sbgn/code/HEAD/tree/ProcessDiagram/trunk/Specification/sbgn_PD-level1.pdf
- ER Level 1 Version 2 is available for review
  - https://sourceforge.net/p/sbgn/code/HEAD/tree/EntityRelationship/trunk/sbgn_ER-level1.pdf
- AF Level Version 1.1 is available for review
  - https://sourceforge.net/p/sbgn/code/HEAD/tree/ActivityFlow/trunk/sbgn_AF-level1.pdf

Topics of this Meeting (Issues to discuss)

- PD Specification L1V2
- AF Specification L1V2
- ER Specification L1V2
- Mappings of SBGN to other languages (to BioPAX, SBML, …)
- SBGN and databases (Reactome, Panther, BioModelsDB, …)
- LEGO and SBGN-AF
- SBGN and SBOL Visual
- Developments for level 2 (PD, ER, AF)
- libSBGN and SBGN-ML
- Software (SBGN-ED, …)
- Teaching and Outreach
- Housekeeping (funding, SBGN competition, editor election, next meeting, …)

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