

CellDesigner™ and SBGN

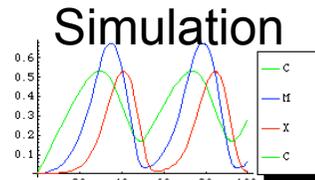
CellML SBGN SBO BioPAX MIASE Workshop 2009

April 2009

The Systems Biology Institute

What is CellDesigner?

Modeling tool for biochemical and gene-regulatory network

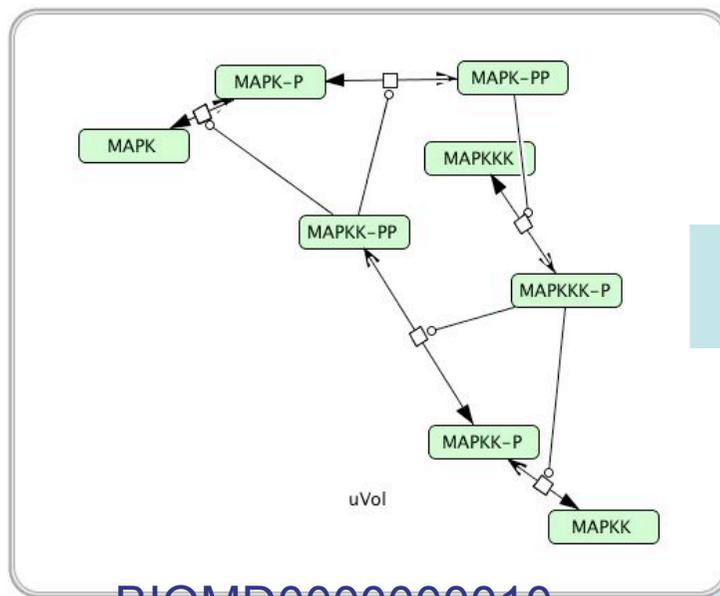


SBML ODE Solver
Copasi

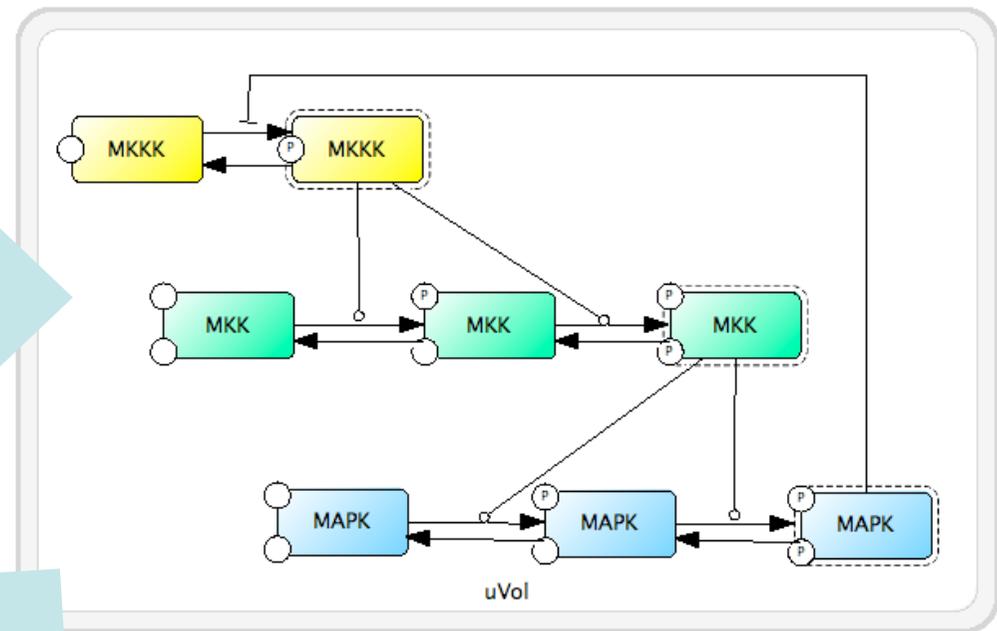


The screenshot displays the CellDesigner software interface. On the left, a hierarchical model tree shows components like 'MKX' and 'MKX_P'. The central workspace contains a detailed biochemical network diagram with nodes and reaction arrows. Below the diagram, a simulation graph shows the time evolution of various species concentrations. On the right, a web browser window shows the SGD (Saccharomyces Genome Database) entry for MYO1 (YH023W), including its description, GO annotations, and mutant phenotype information.

Read SBML file
(via libSBML)



Add graphical notation



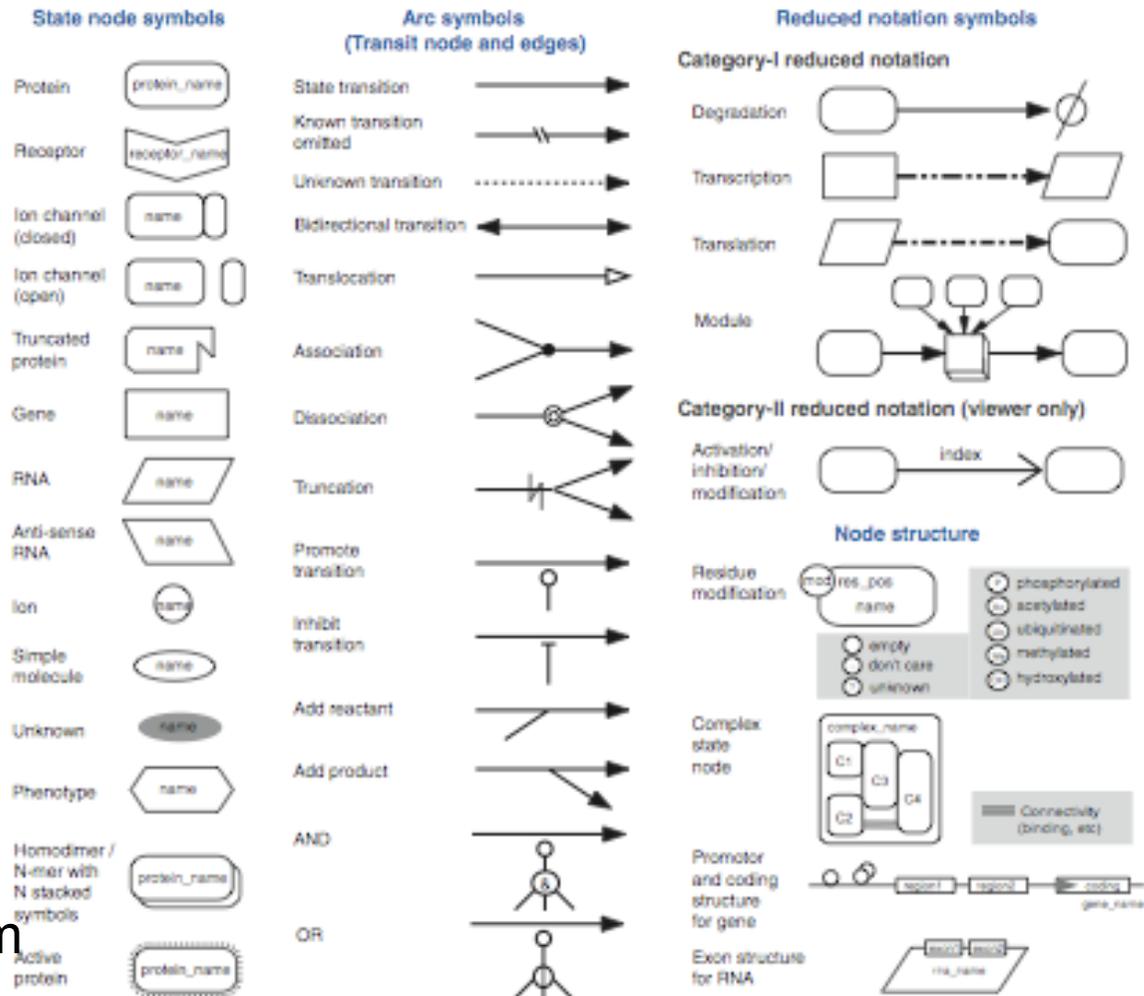
Stored in CD annotation

Capture details of state transitions

- CellDesigner Graphical Notation was designed based on Kitano's 2003/2005 Proposals

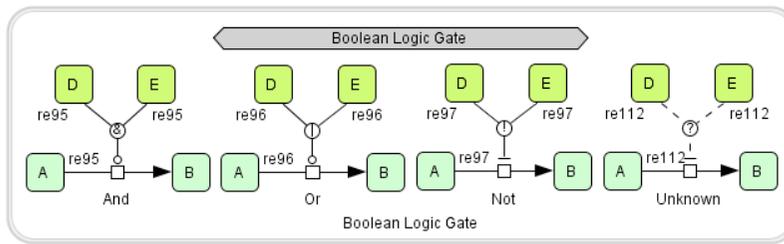
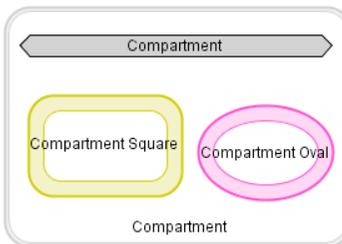
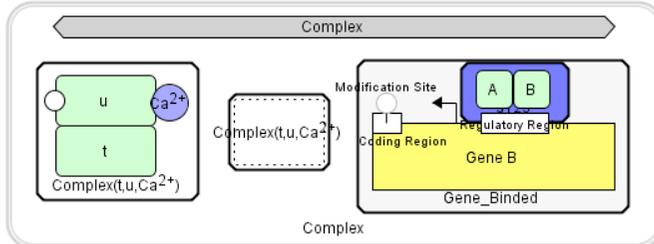
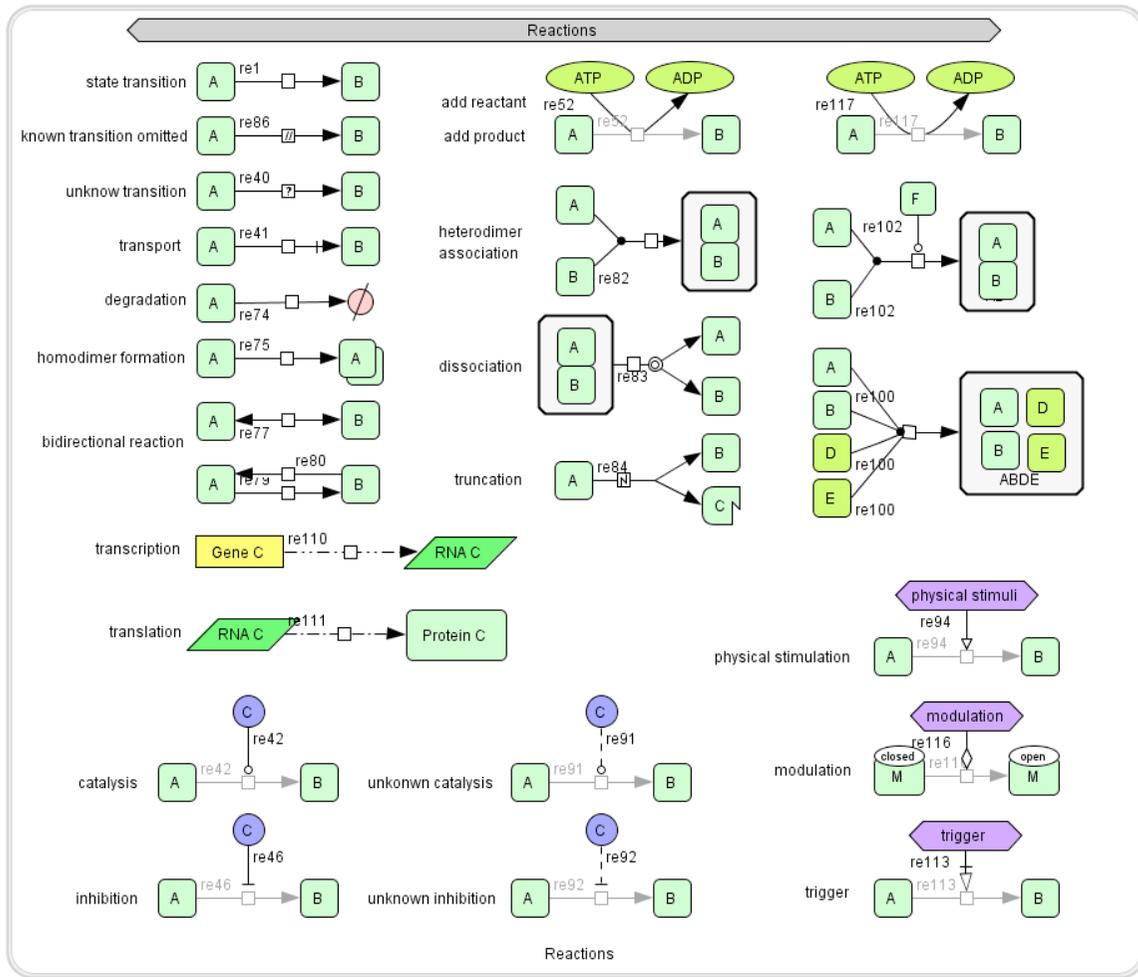
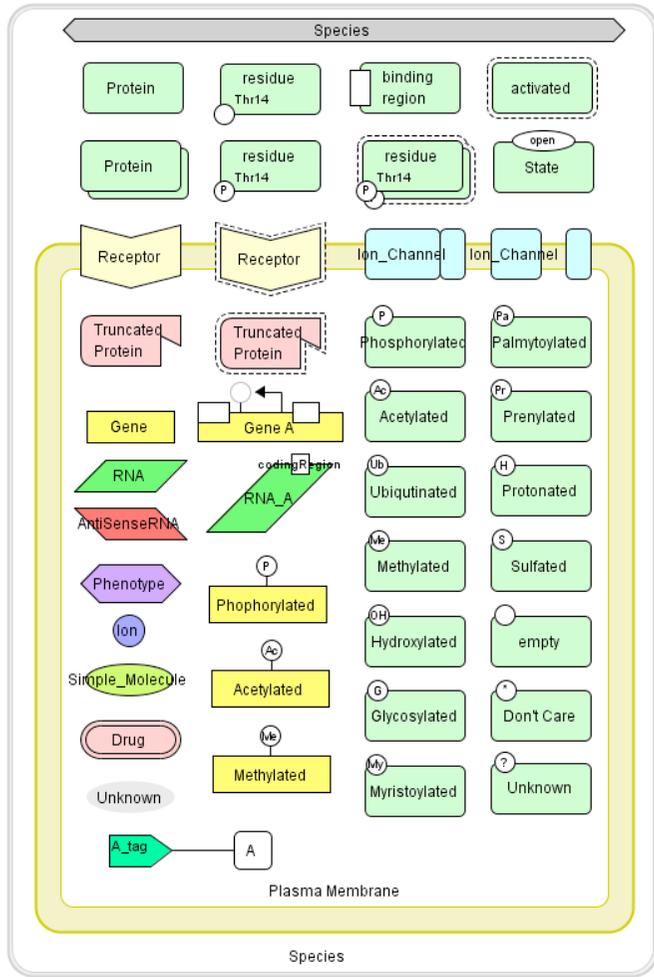


- SBGN Process Diagram Level 1 released Aug 2008.



Kitano, H. et al. "Using process diagram for the graphical representation of biological networks", *Nature Biotechnology* **23**(8), 961-966 (2005)

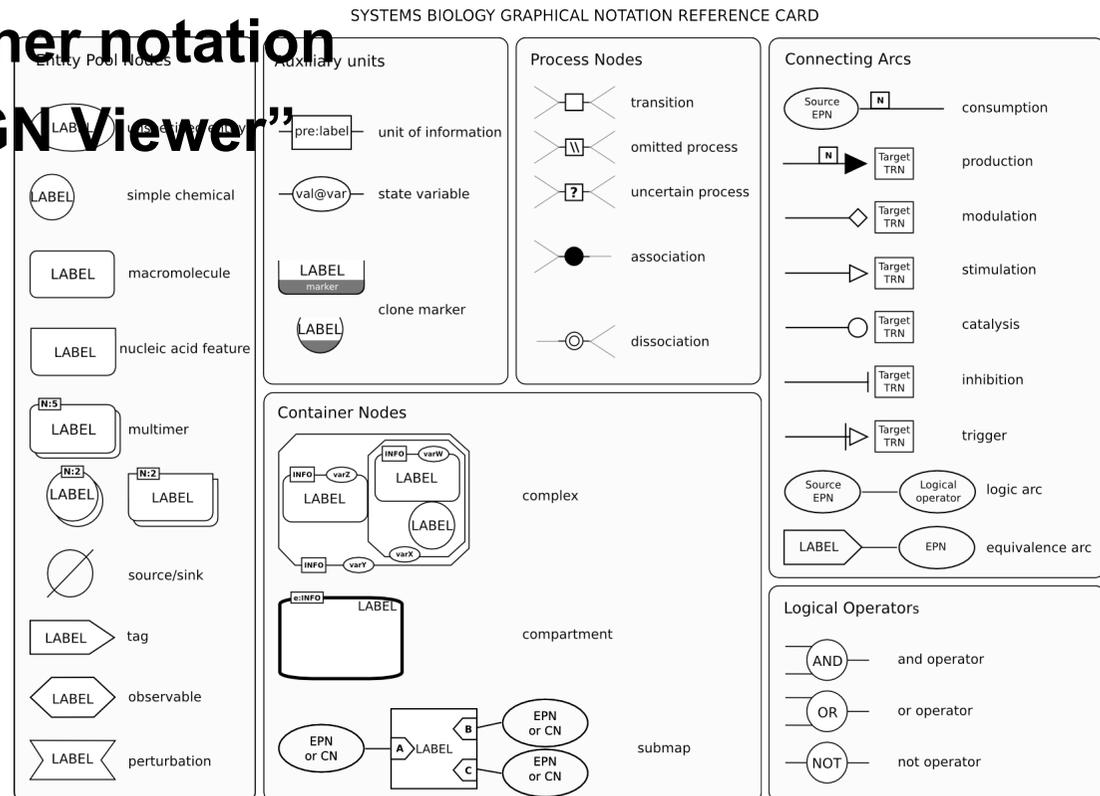
CellDesigner Ver.4 Graphical Notation



- CellDesigner commits to be compliant to SBGN Process Diagram
- While keeping compatibilities with CD specific notations.

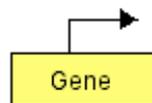
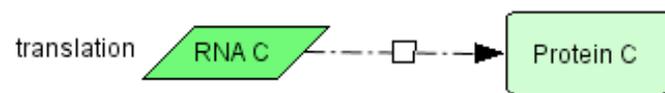
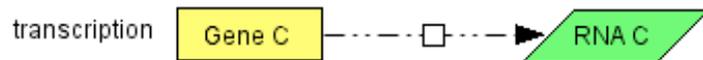
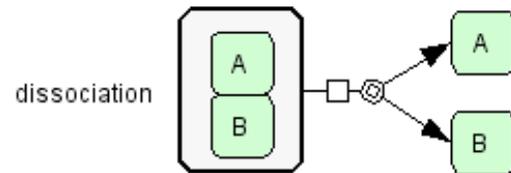
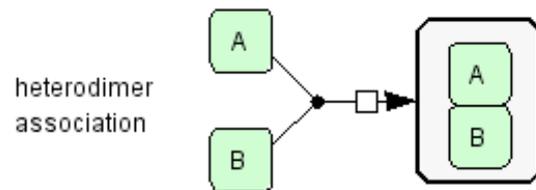
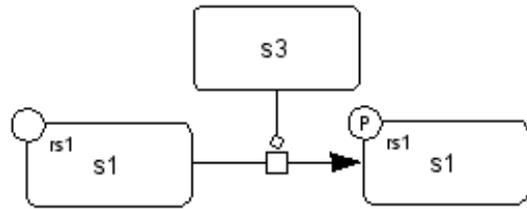
• New Glyphs

- 1) Add to CellDesigner notation
- 2) Visualize in “SBGN Viewer”

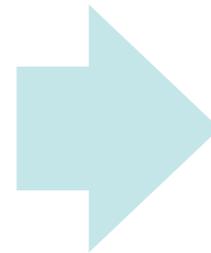
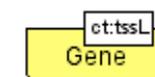
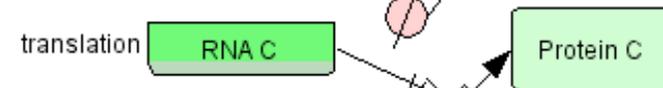
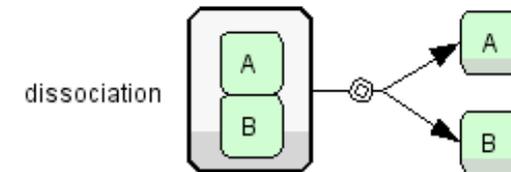
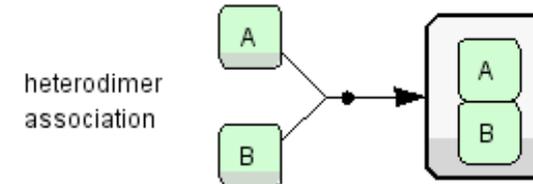
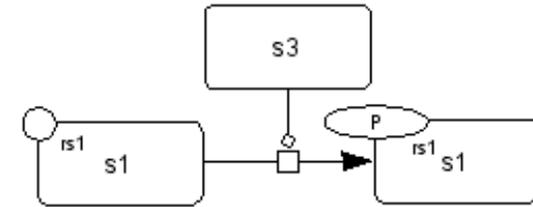


CellDesigner SBGN Viewer

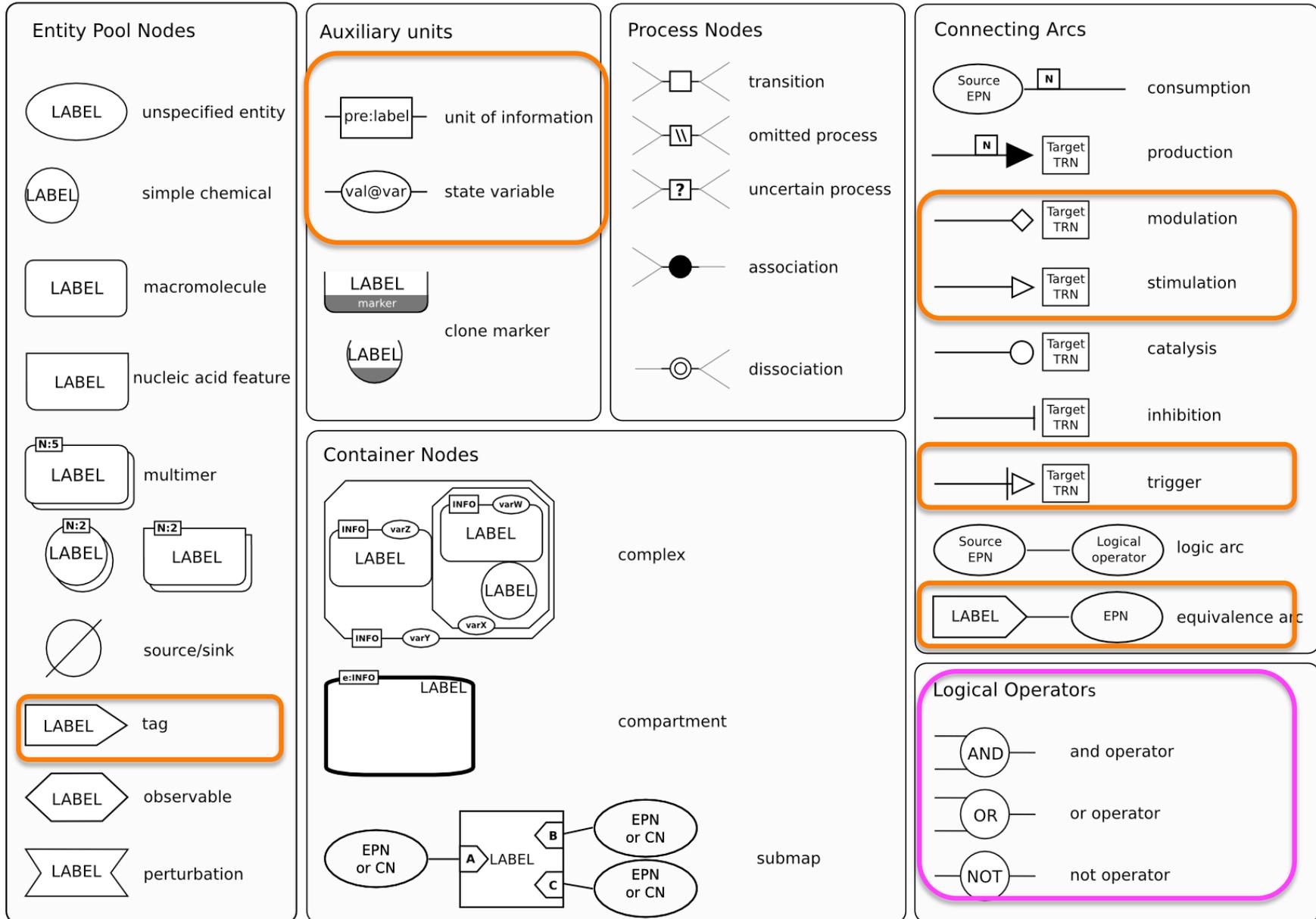
CellDesigner view



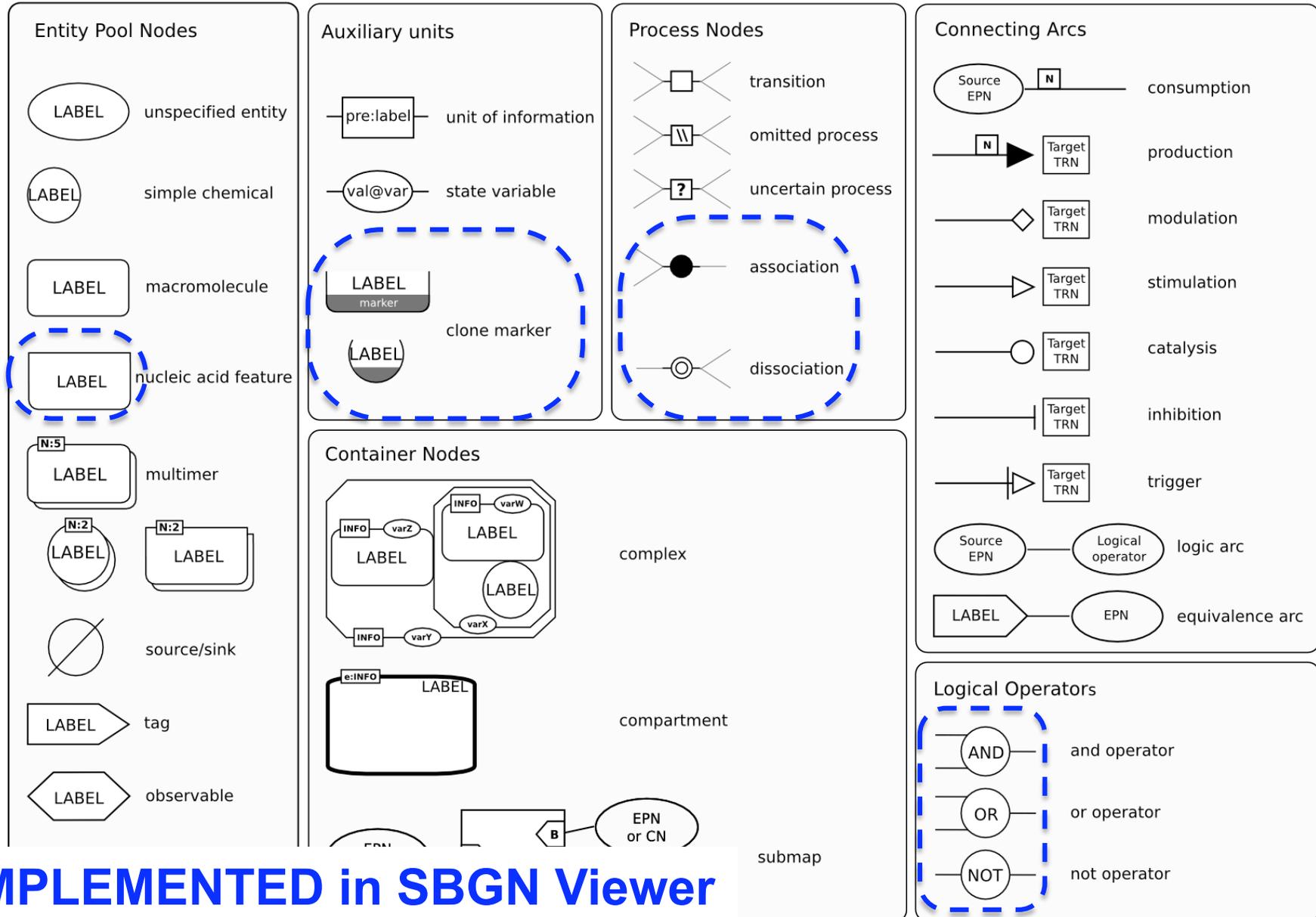
CellDesigner SBGN view



SYSTEMS BIOLOGY GRAPHICAL NOTATION REFERENCE CARD

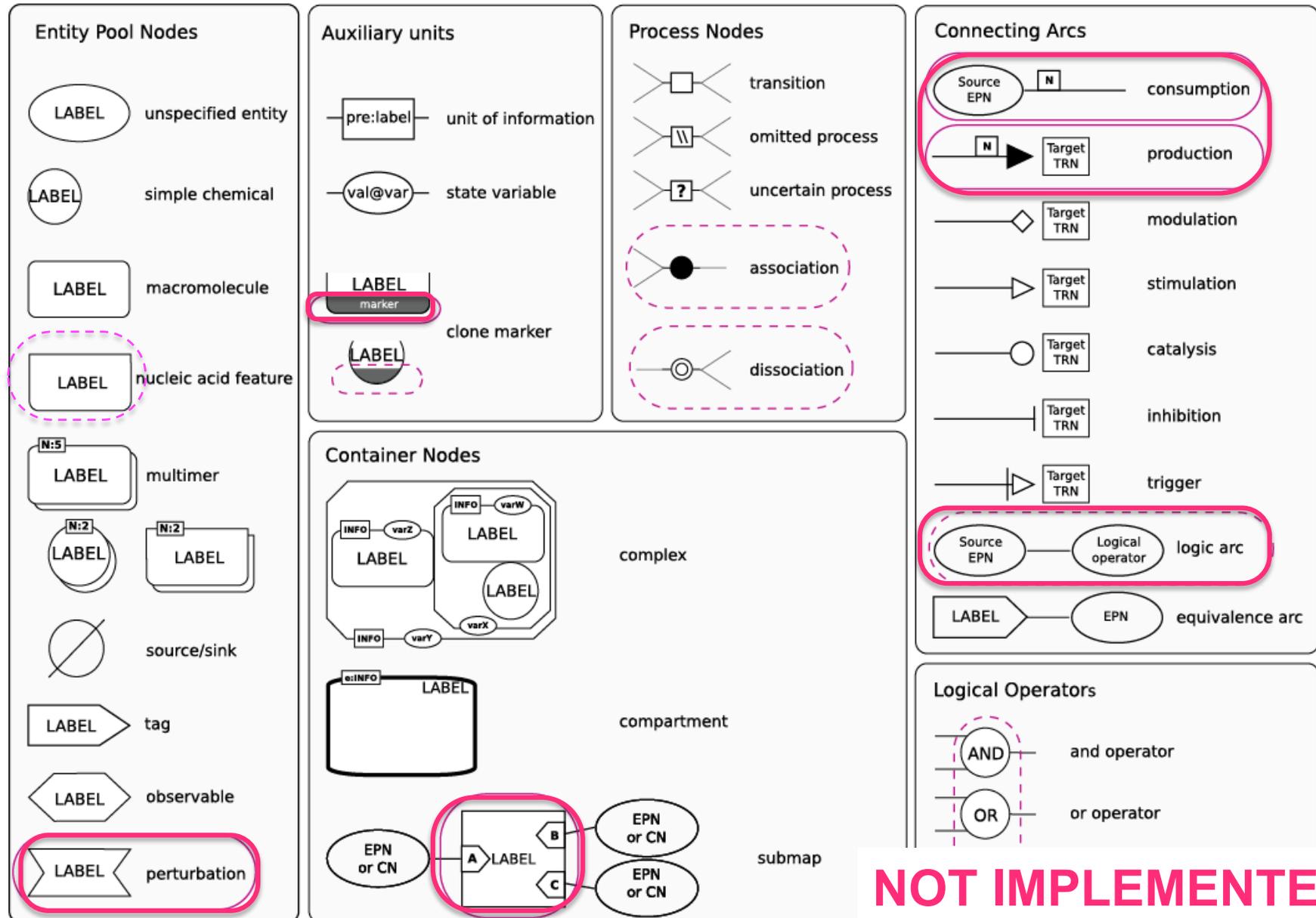


SYSTEMS BIOLOGY GRAPHICAL NOTATION REFERENCE CARD



IMPLEMENTED in SBGN Viewer

SYSTEMS BIOLOGY GRAPHICAL NOTATION REFERENCE CARD



NOT IMPLEMENTED

CellDesigner

Future SBGN PD implementation

- **4.1**
 - **SBML L2V3/4 support** (MIRIAM, SBO)
 - **part of SBGN PD1**
- **4.5 or 5.0 later**
 - **Enhanced graphical notation**
 - EPN
 - Perturbation
 - **Enhance SBGN viewer**
 - Connecting Arc
 - Production
 - Consumption
 - Enable to edit the position of unit of information
 - **Conversion from PD to AF**

 - **libSBGN**

Download CellDesigner from <http://celldesigner.org>

The screenshot shows the CellDesigner.org website. The main heading is "CellDesigner™: A modeling tool of biochemical networks". Below this, there is a "Download CellDesigner" button and the text "Current Release Version: CellDesigner 4.0.1". A notice mentions that CD 4.0 implemented most of Systems Biology Graphical Notation (SBGN) Process Diagram level 1 draft proposal. There are also notices for Mac Leopard (10.5.5) users and Ubuntu Linux users, providing terminal commands for installation. A "Check also:" section lists "Plugins / Utilities" and "BioModels.net models simulation results with CellDesigner 4". The "What is CellDesigner™" section describes it as a structured diagram editor for drawing gene-regulatory and biochemical networks, mentioning SBML and SBGN. A sidebar on the left contains a menu with options like Features, Download, Quick Tutorial, Documents, Help, Simulation, Model Repository, Plugins, News, and Links. A "Related Link" section lists systems-biology.org, Kitano Symbolic Systems Project, PANTHER database, and BioModels.Net. A "Headlines" section on the right lists recent news items, including "Import from BioModels.net", "CellDesigner Tutorial at ICSB-2008", "Panther Pathway released a new Viewer Applet compatible with CellDesigner 4.0", "CellDesigner 4.0.1 Released!", "CellDesigner 4.0 Released!", "Encounter Install Error? check libSBML version.", "Plugins / Utilities page is now available", "CellDesigner tutorial at ICSB 2008", and "CellDesigner is featured in front page of Science".

Acknowledgement

- CellDesigner
 - SBI
 - Haruka Sugimura
 - Oikawa-san
 - Yukiko Matsuoka
 - Samik Ghosh
 - Hiroaki Kitano
 - Keio University
 - Akira Funahashi
 - Akiya Jouraku
 - MKI
 - Norihiko Kikuchi
- CellDesigner Applet
 - SRI
 - Huaiyu Mi
 - Anushya Muruganujan
- SBML ODE Solver
 - Univ. Vienna
 - Rainer Mache
 - Christopher Flamm
- Copasi
 - Univ. Heidelberg
 - Ralph Gauges
 - Sven Sahle
 - Ursula Kummer
- SBW
 - Univ. Washington
 - Frank Bergmann
 - Herbert Sauro
- SBML
 - SBML community
 - Michael Hucka (Caltech)
 - Ben Bornstein (Caltech)
 - Bruce Shapiro (Caltech)
 - Sarah Keating (Univ. Hertfordshire)
 - Akiya Jouraku (Keio Univ.)
 - Akira Funahashi (Keio Univ.)
- SBGN
 - SBGN Community
 - Nicolas Le Novere (EBI)
 - Michael Hucka (Caltech)
 - Hiroaki Kitano (SBI)
 - Akira Funahashi (Keio Univ.)

Thank you!