Workshop combine Hackathon

SBGN Process Description

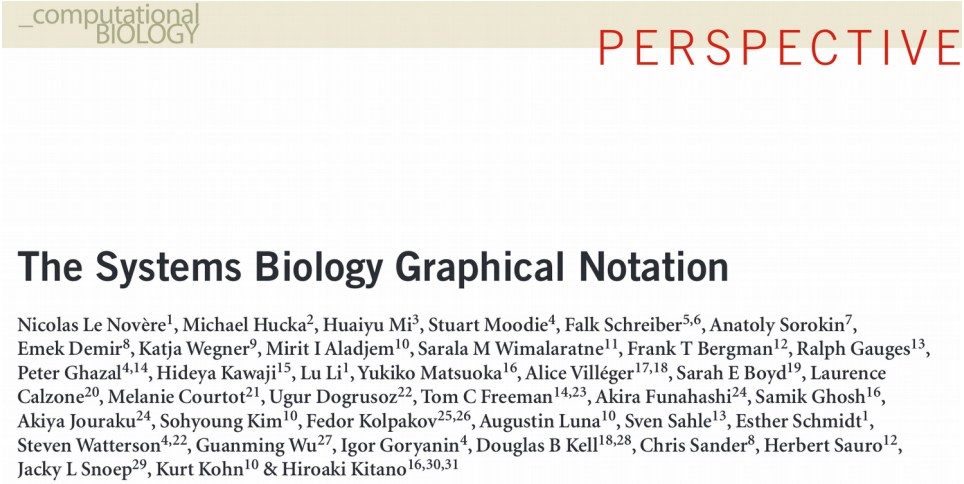
Vasundra Touré

SBGN Workshop 2016
Newcastle upon Tyne, the 24th of September 2016

The SBGN community

The SBGN community is composed of

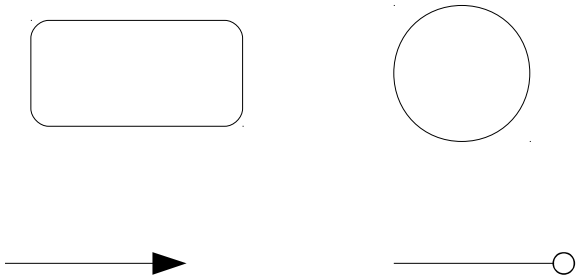
- Editors
  Huaiyu Mi – Alexander Mazein – Augustin Luna – Nicolas Le Novère – Robin Haw
- Scientific committee
- SBGN community



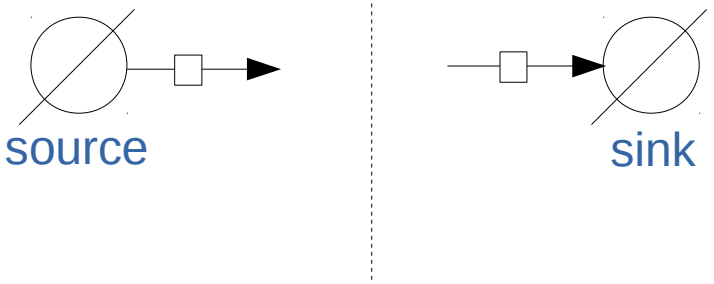
The SBGN standard

The Systems Biology Graphical Notation is a community effort to standardize visual representation of biological maps

with standardized glyphs and arcs…



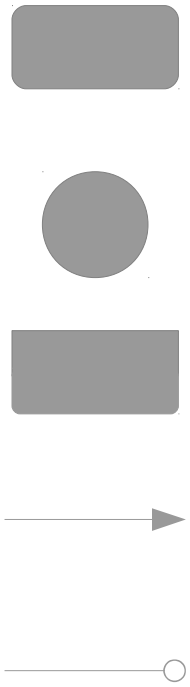
… and well-defined semantics.



Source: http://en.wikipedia.org/wiki/Systems_Biology_Graphical_Notation

The ontology used in SBGN

SBO terms are used in SBGN to distinguish the biological meaning of the symbols

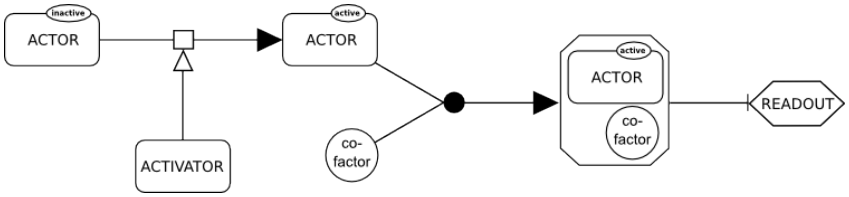


Macromolecule	SBO:0000245
Simple chemical	SBO:0000247
Nucleic Acid Feature	SBO:0000354
Production	SBO:0000393
Catalysis	SBO:0000172

The three SBGN languages

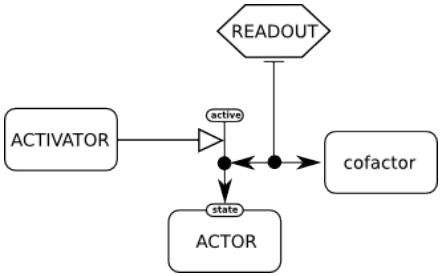
Process Description

Biochemistry



Entity Relationship

Physiology, Genetics



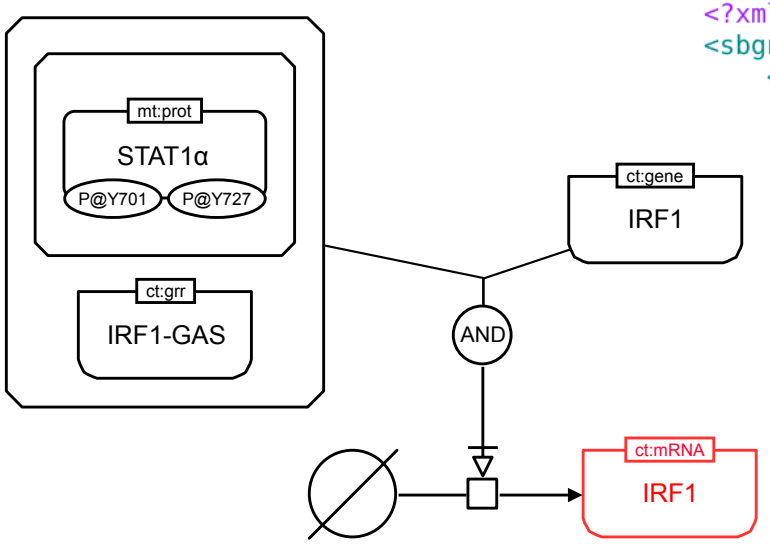
Activity Flow

Molecular biology

Source: http://en.wikipedia.org/wiki/Systems_Biology_Graphical_Notation

The storage format: SBGN-ML

Software support and exchanges are facilitated by libSBGN




```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<sbgn xmlns="http://sbgn.org/libsbgn/0.2">
    <map language="process description">
        <glyph id="glyph7" class="source and sink">
            <bbox y="313.0" x="225.0" h="60.0" w="60.0"/>
        </glyph>
        <glyph id="glyph9" class="process">
            <bbox y="333.0" x="335.0" h="20.0" w="20.0"/>
            <port y="343.0" x="325.0" id="glyph9.1"/>
            <port y="343.0" x="365.0" id="glyph9.2"/>
        </glyph>
        <glyph id="glyph6" class="nucleic acid feature">
            <label text="IRF1"/>
            <bbox y="313.0" x="415.0" h="60.0" w="120.0"/>
            <glyph id="glyph6a" class="unit of information">
                <label text="ct:mRNA"/>
                <bbox y="304.0" x="443.5" h="18.0" w="63.0"/>
            </glyph>
        </glyph>
```

SBGN

SBGN-ML

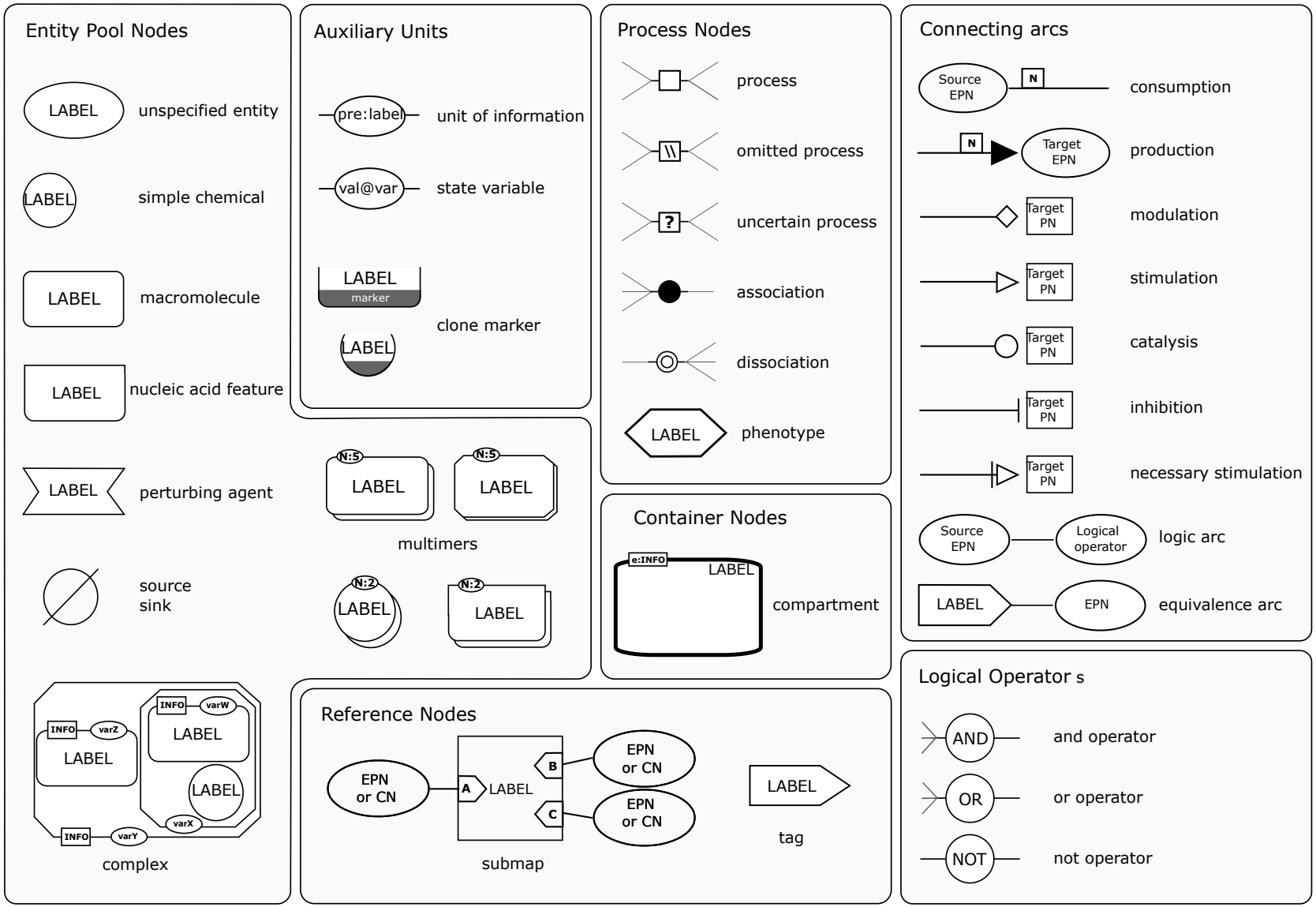
Tools supporting SBGN

- SBGN-ED: Viewer / Editor
- SBGNViz: Viewer / Editor for PD
- PathVisio: Viewer / Editor

List of tools available:
http://sbgn.github.io/sbgn/software_support

Universität Rostock Traditio et Innovatio

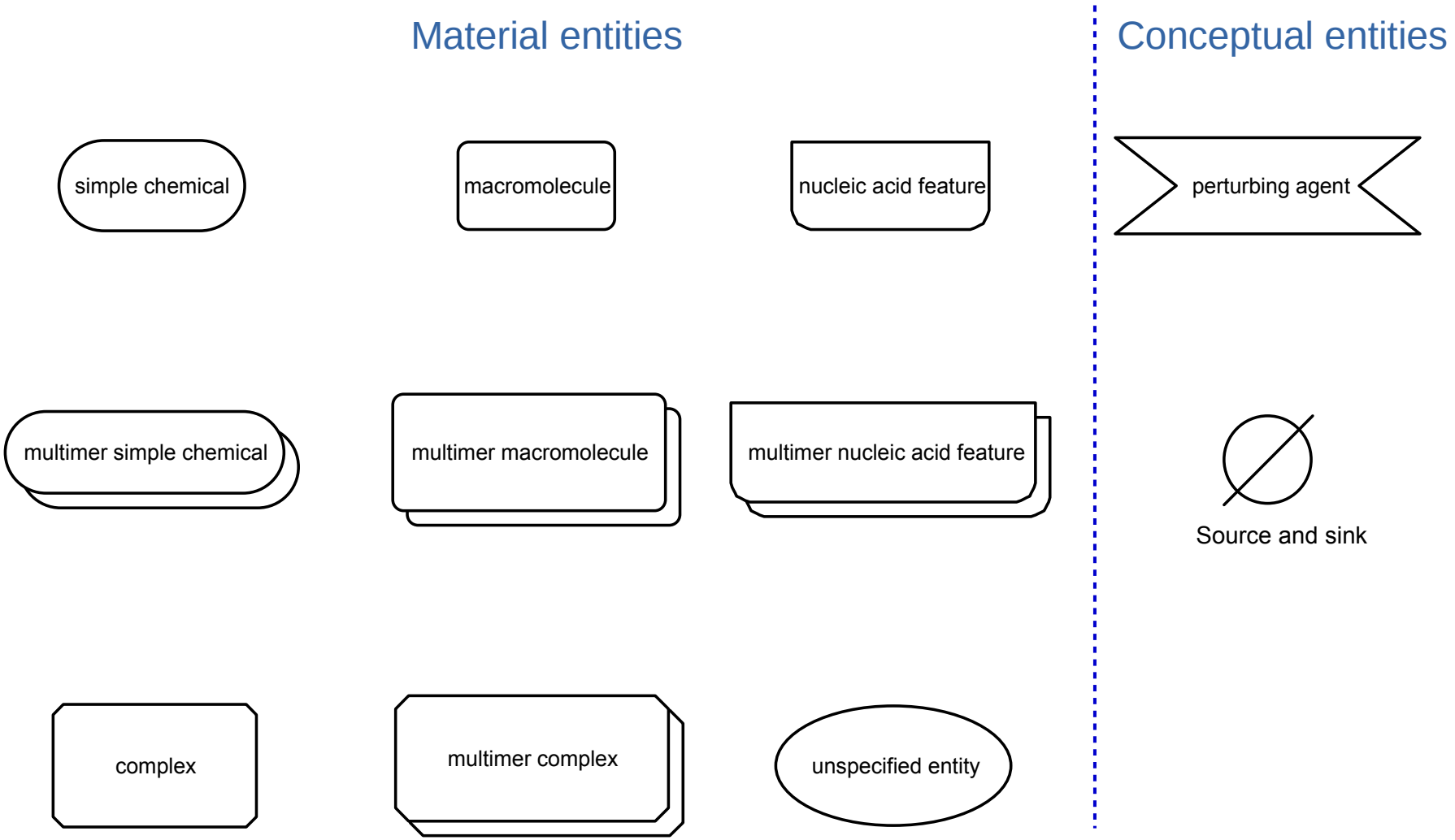
The SBGN Process Description



Source: http://sbgn.github.io/sbgn/templates

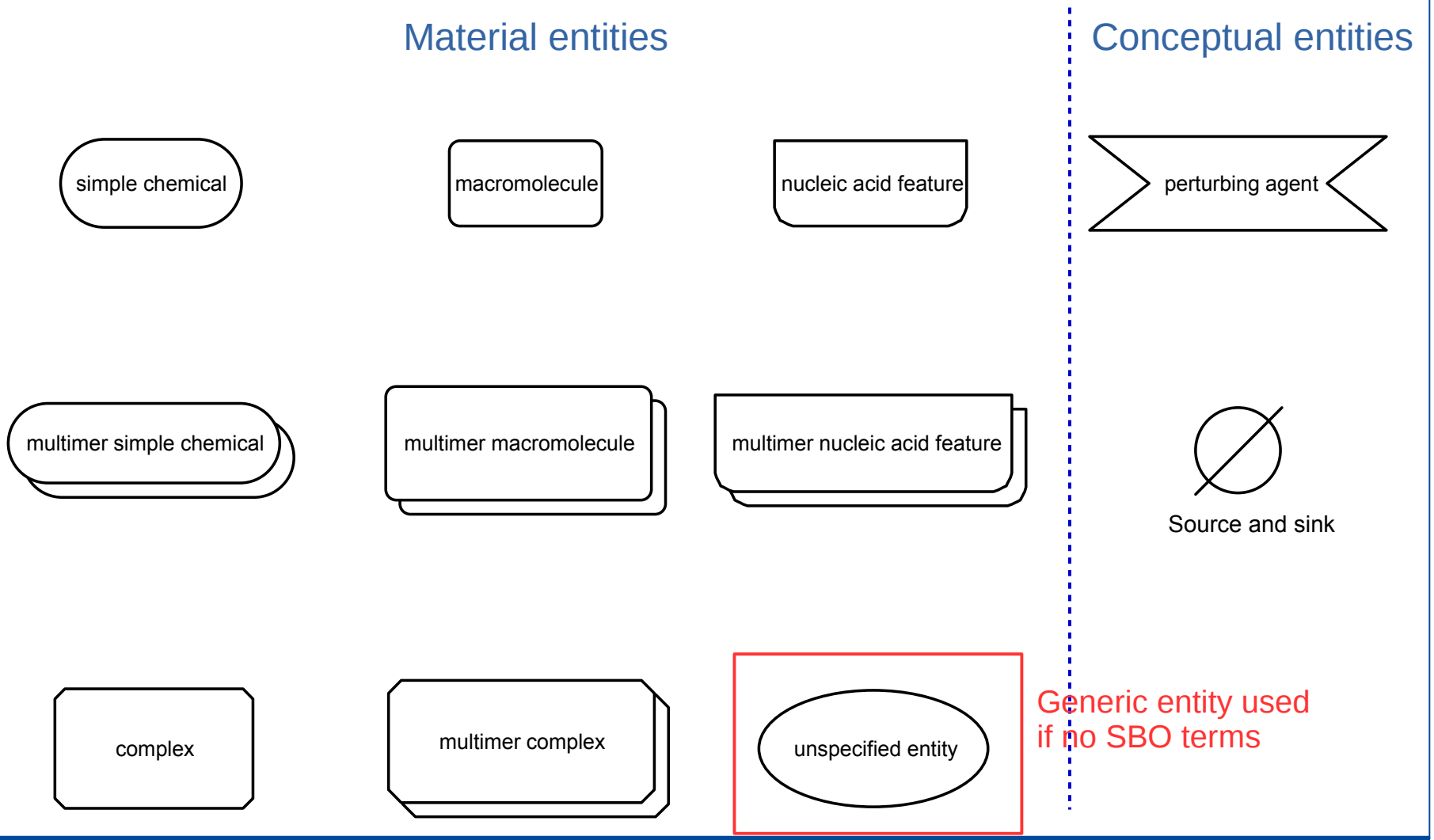
The Entity Pool Nodes

EPNs indicate the chemical structure of the entity



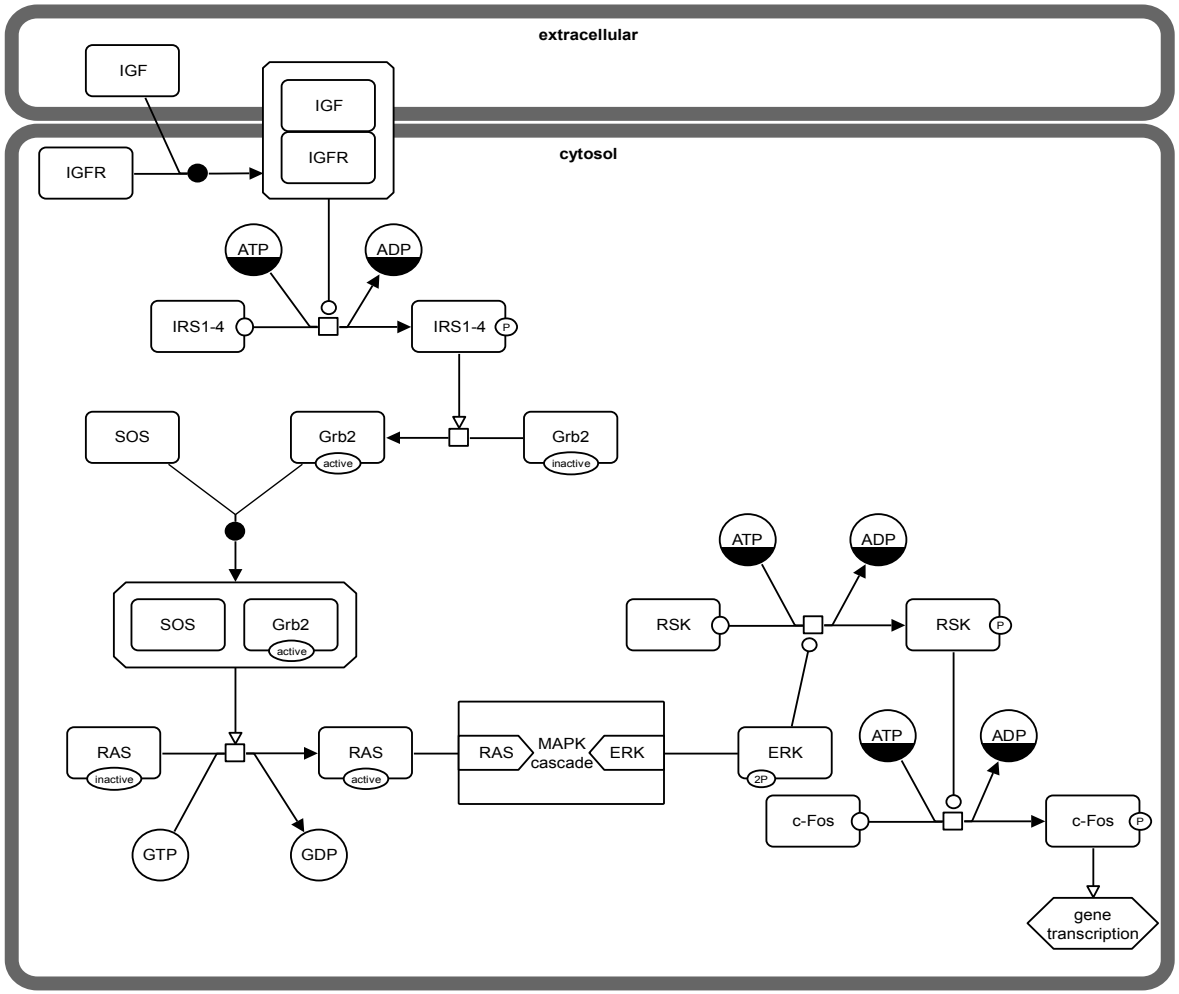
The Entity Pool Nodes

EPNs indicate the chemical structure of the entity



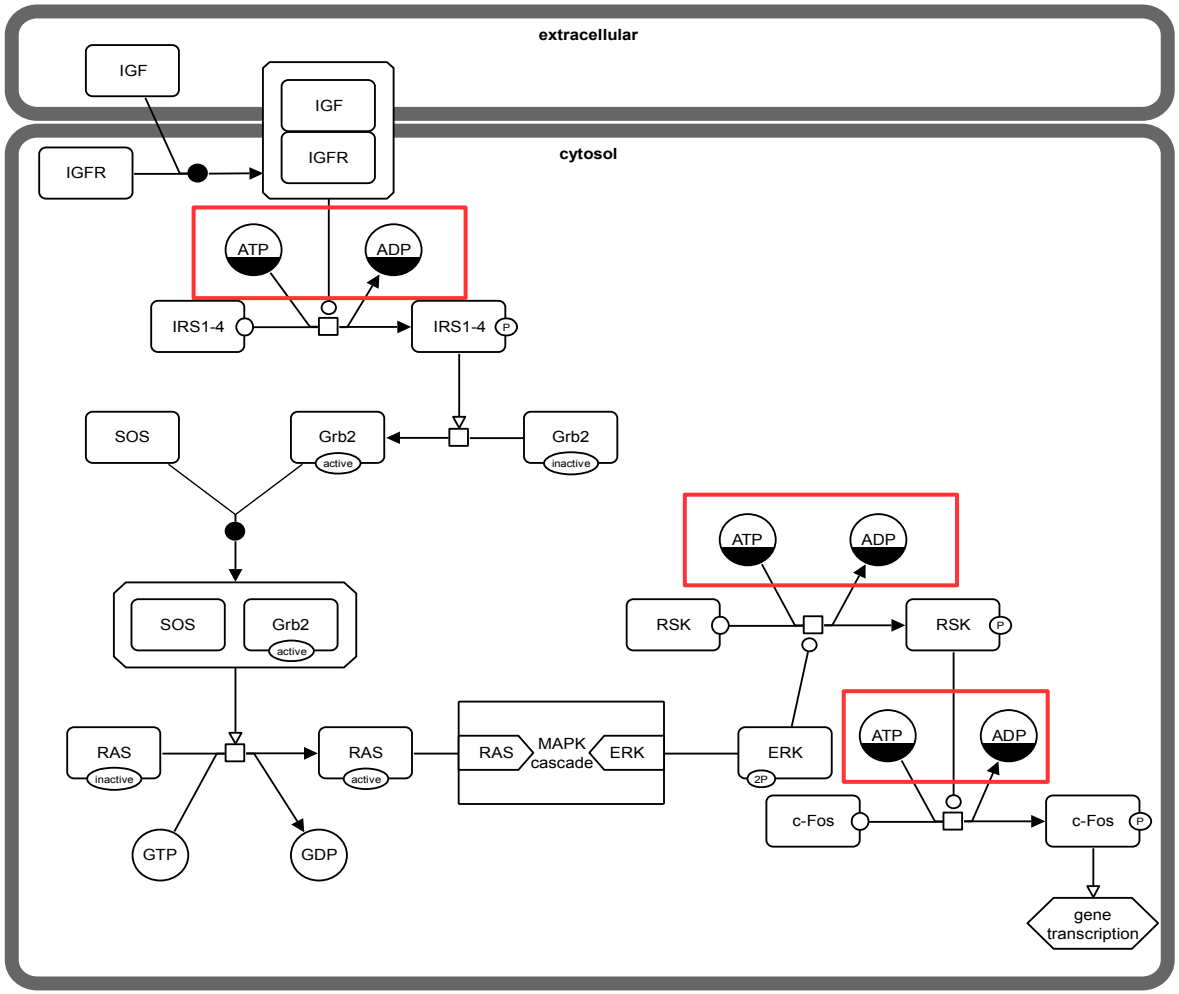
The Clone Markers

Identify identical EPNs in a given network



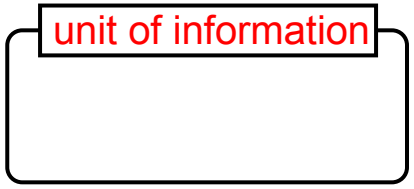
The Clone Markers

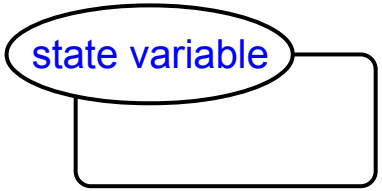
Identify identical EPNs in a given network



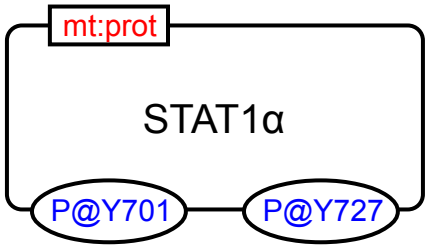
The Auxiliary Units

Additional information that can be part of glyphs

1. 

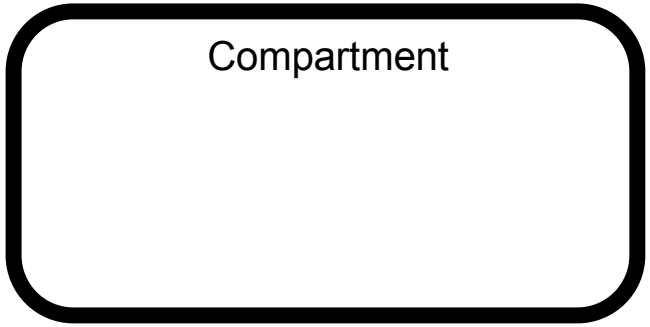
2. 

Example



The Container Node

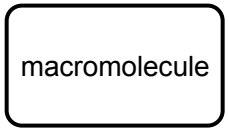
Encloses Entity Pool Nodes – also called Compartment



Specificity:

- border is thicker than EPNs
- can hold units of information

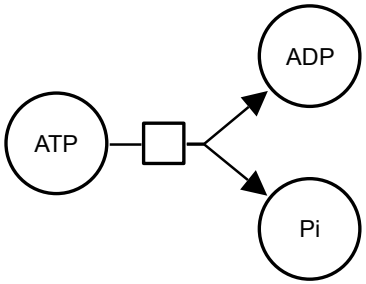
Reminder from EPNs



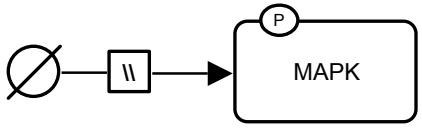
The Process Nodes

Represent processes that transforms biochemicals (EPNs) into the same or other biochemicals

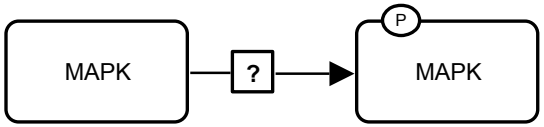
process



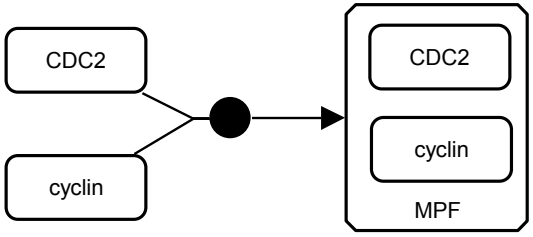
omitted process



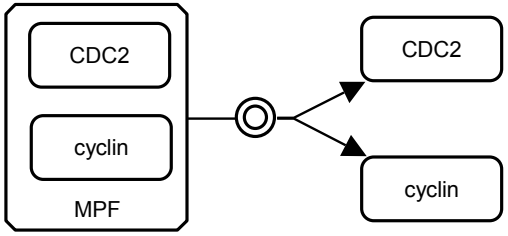
uncertain process



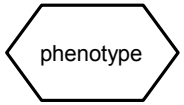
association



dissociation



phenotype



Connecting Arcs

Link between entity pools and processes

consumption

production

necessary stimulation

modulation

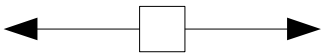
catalysis

stimulation

inhibition

logic arc

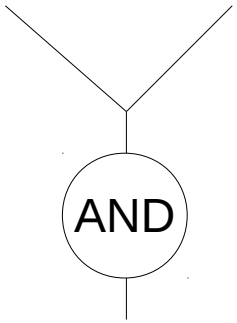
equivalence arc

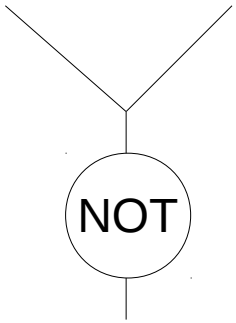


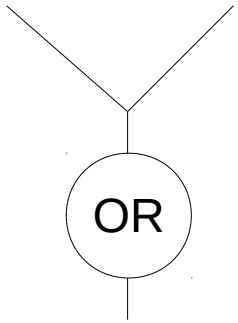
reversible

Logical Operators

Logical connection involving two or more inputs

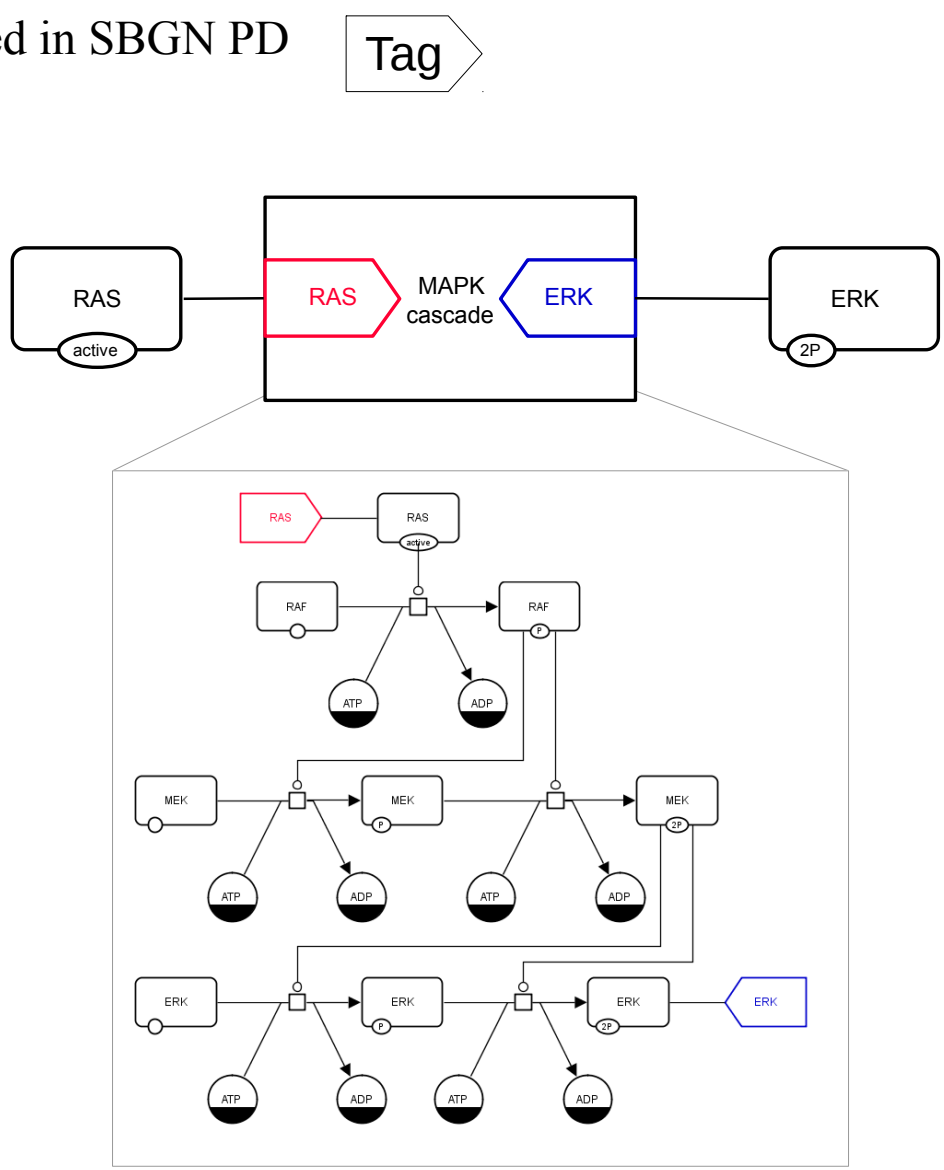






Reference Nodes

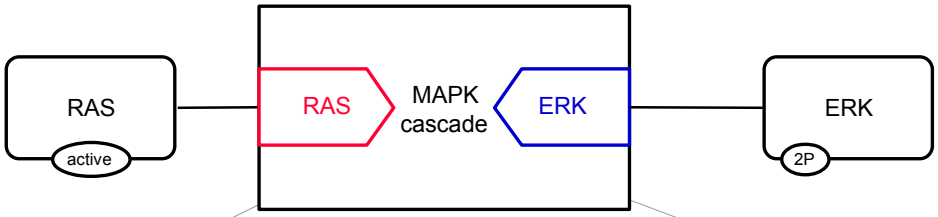
Submaps are supported in SBGN PD



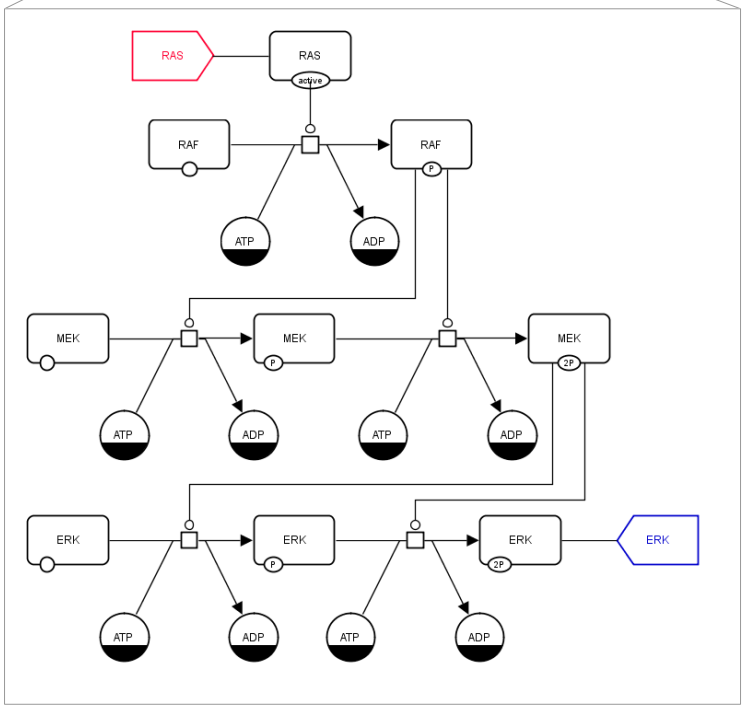
Reference Nodes

Submaps are supported in SBGN PD

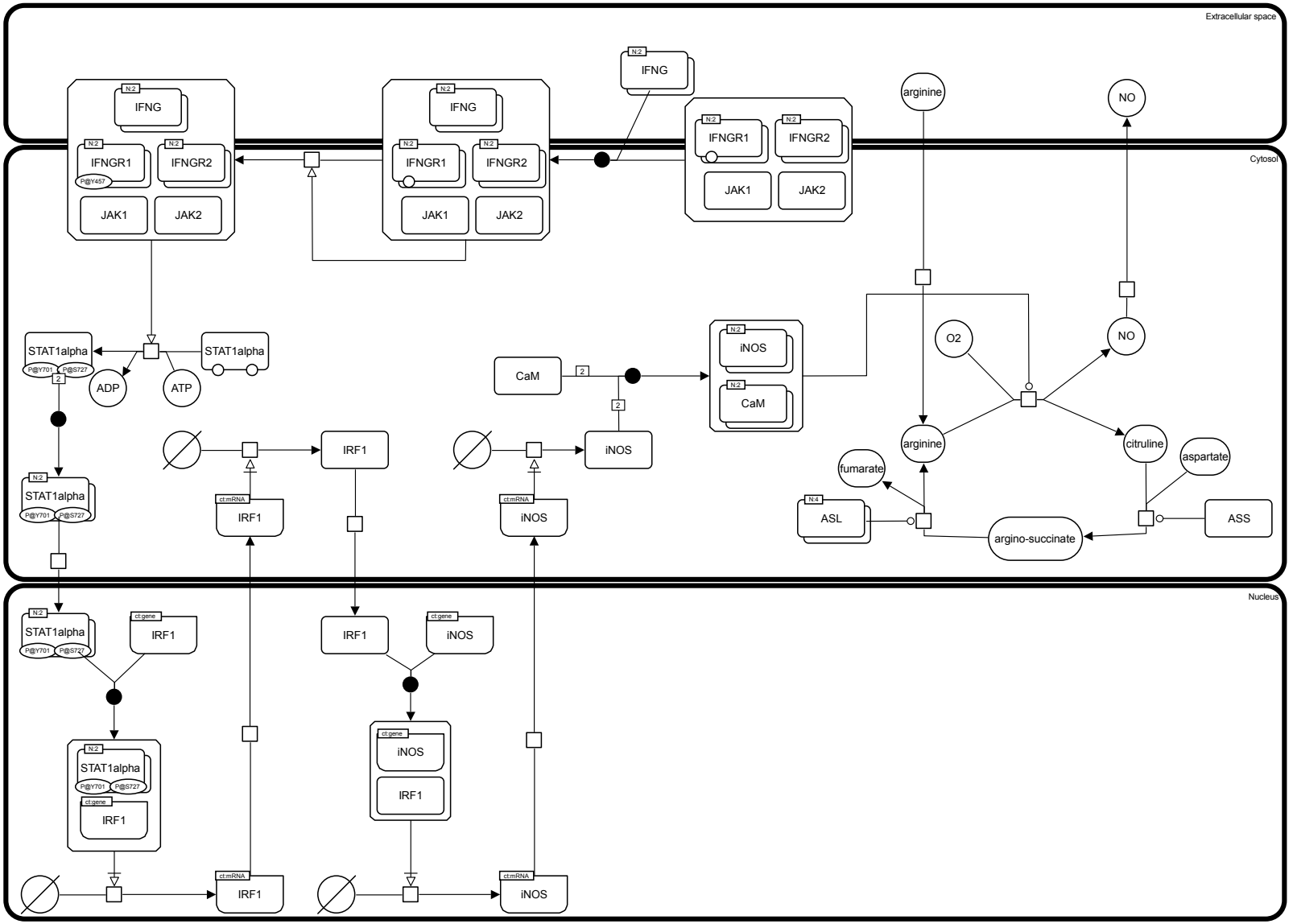
Map 1



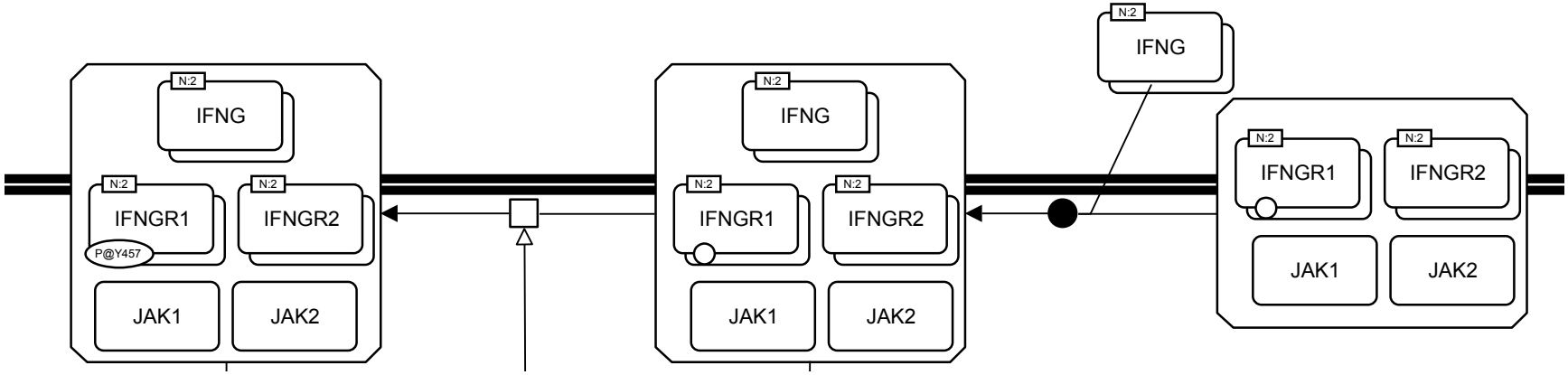
Map2



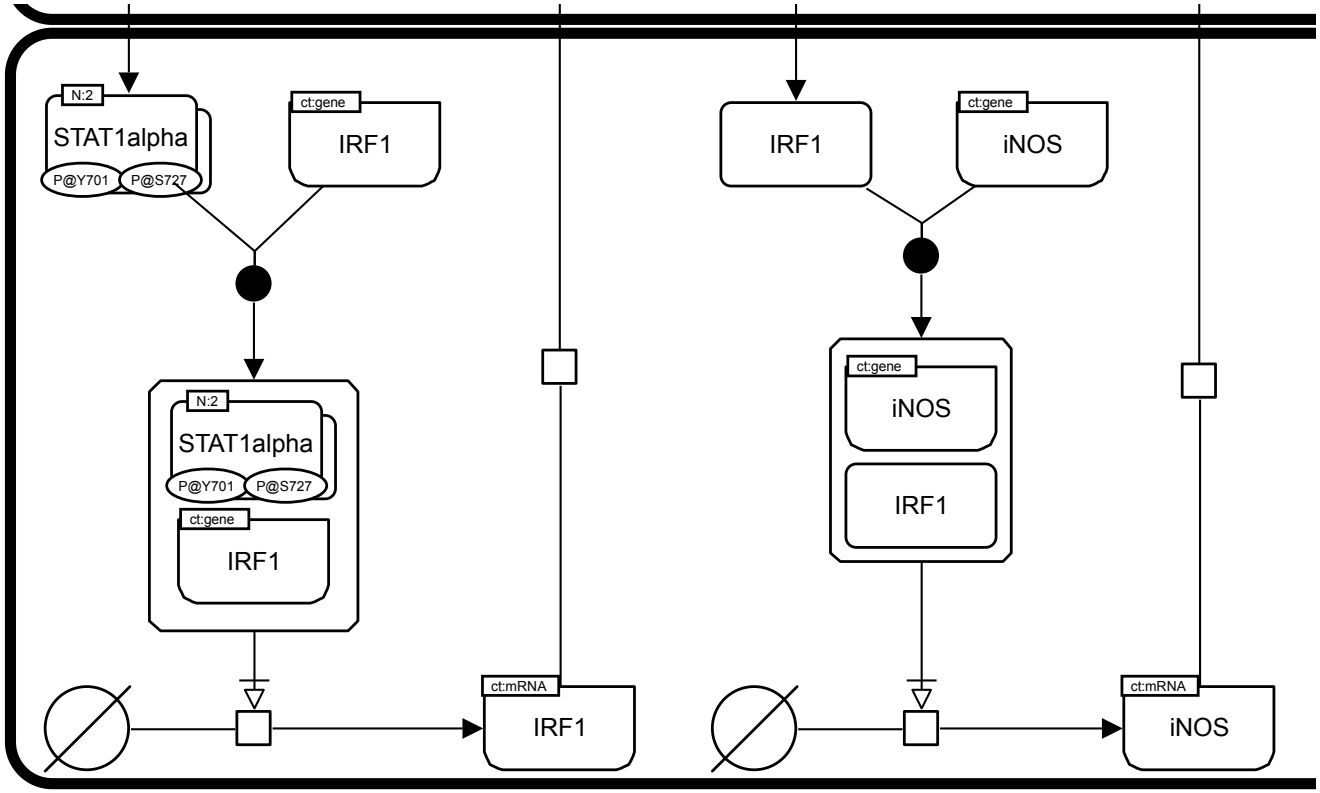
Example of network: the INOS pathway



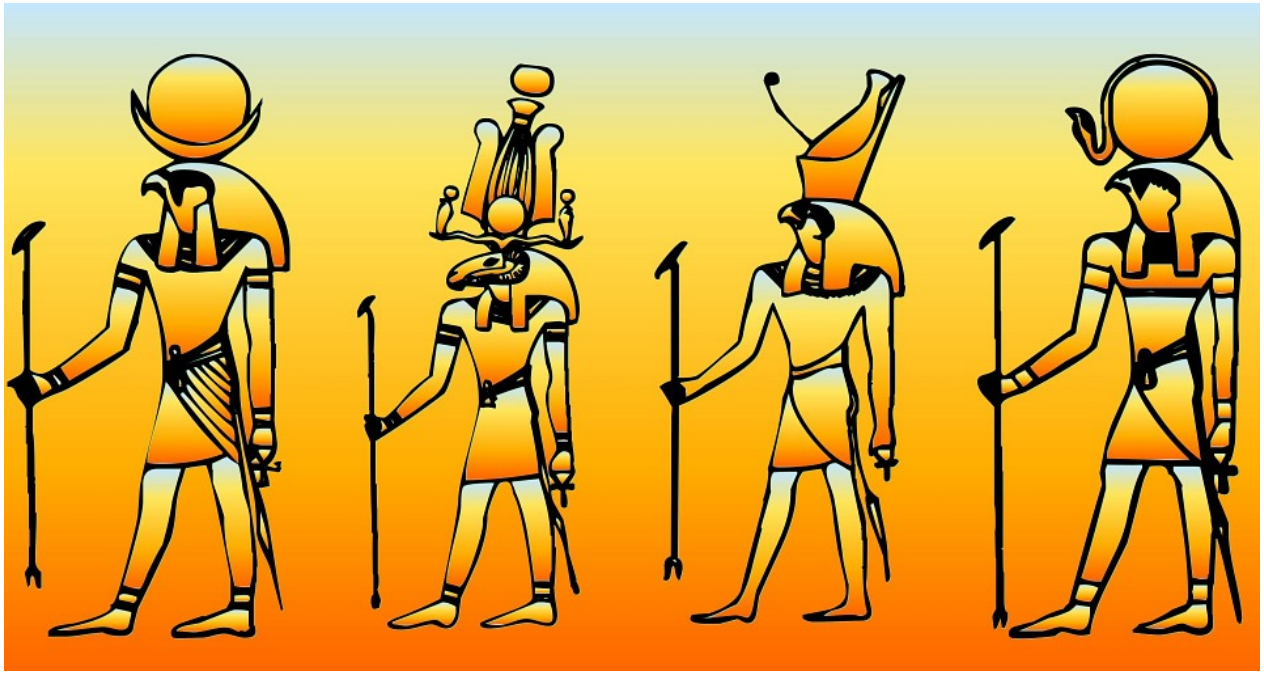
Example of network: the INOS pathway



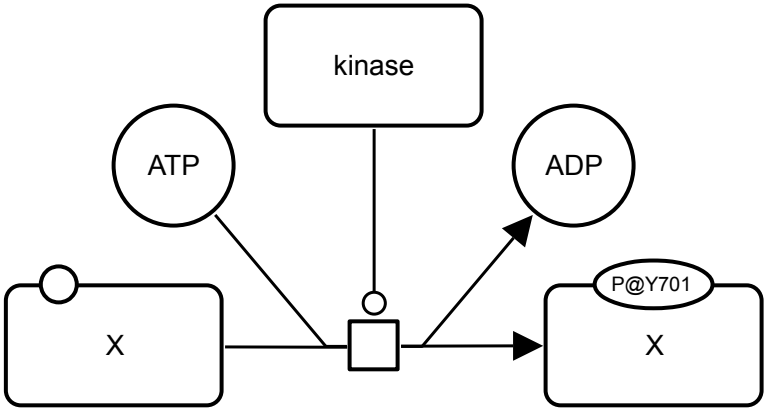
Example of network: the INOS pathway

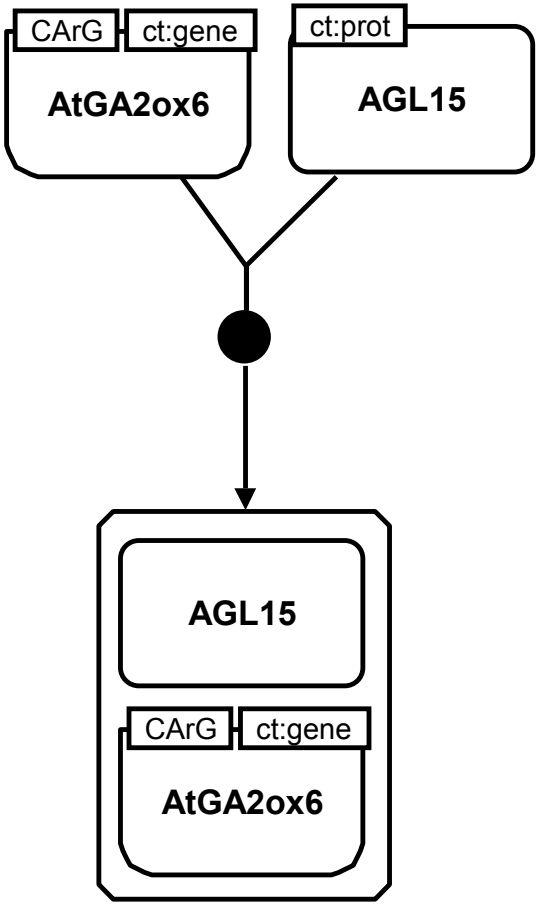


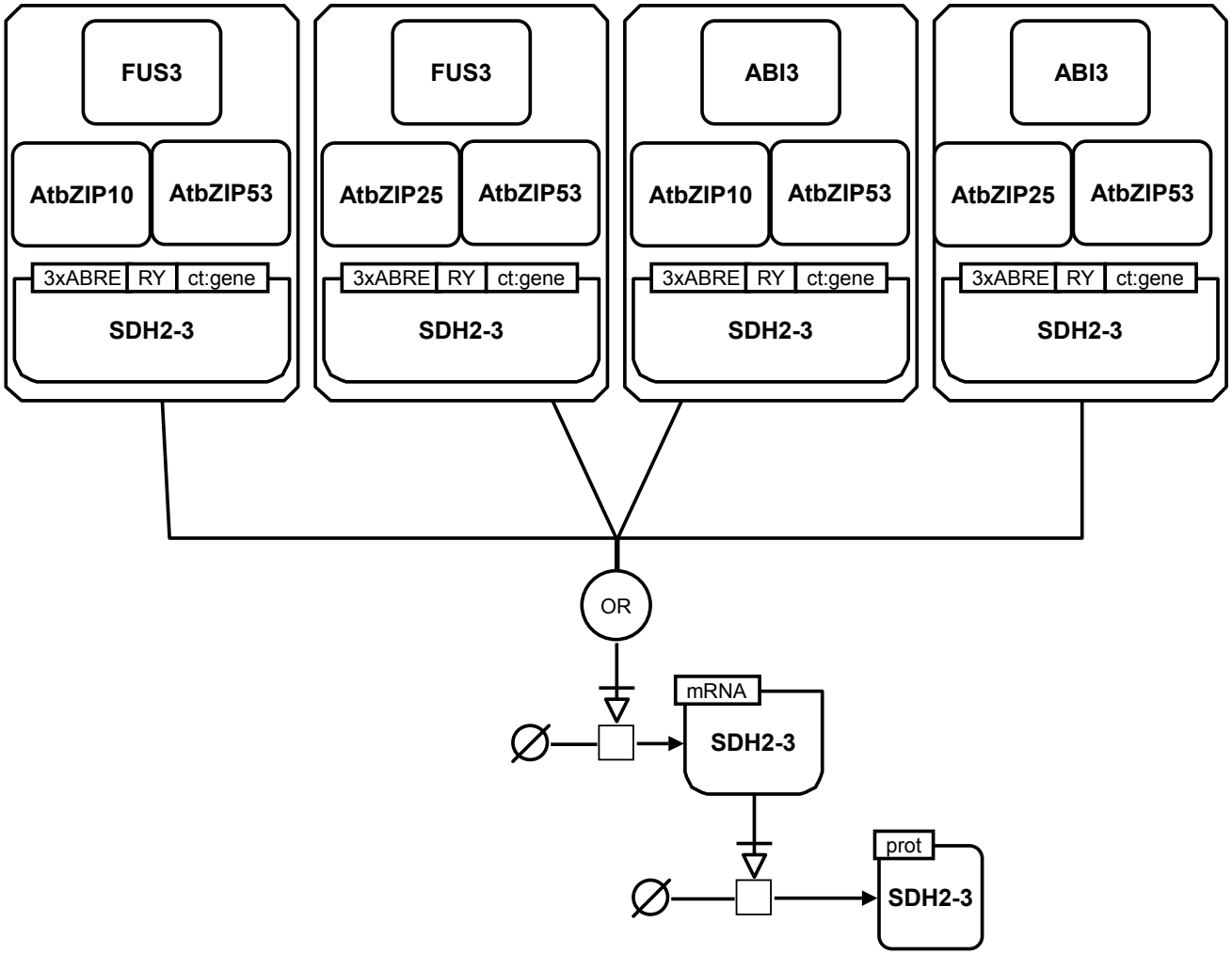
Now it‘s your turn!



Interpret the examples on following slides


kinase
ATP
ADP
P@Y701
X
X


CArG
ct:gene
AtGA2ox6
ct:prot
AGL15
AGL15
CArG
ct:gene
AtGA2ox6


FUS3
AtbZIP10
AtbZIP53
3xABRE
RY
ct:gene
SDH2-3
FUS3
AtbZIP25
AtbZIP53
3xABRE
RY
ct:gene
SDH2-3
ABI3
AtbZIP10
AtbZIP53
3xABRE
RY
ct:gene
SDH2-3
ABI3
AtbZIP25
AtbZIP53
3xABRE
RY
ct:gene
SDH2-3
OR
mRNA
SDH2-3
prot
SDH2-3

Useful links

- SBGN website:
  - http://sbgn.github.io/sbgn
- SBGN discussion
  - https://groups.google.com/forum/#!forum/sbgn-discuss
- SBGN core-related projects
  - https://github.com/sbgn