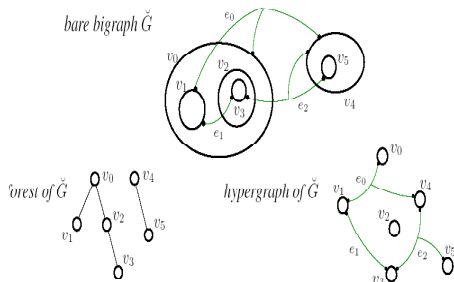# An idea on Bigraphs

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28 April 2010.

Motivation

To model ubiquitous systems
Some concepts:

- Space
- Motion
- Interaction

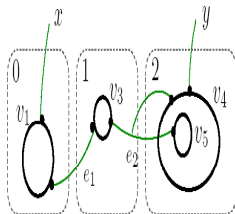# Bare Bigraphs

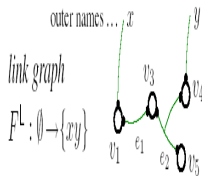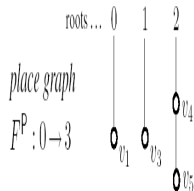Two independent structures on the same nodes.

Bigraphs

Bigraphs can be composed Each bigraph has an inner face and an outer face.

$$bigraph$$
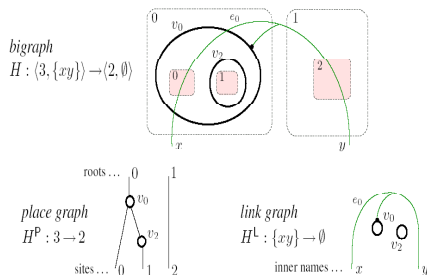$$F : \epsilon \rightarrow \langle 3, \{xy\} \rangle$$

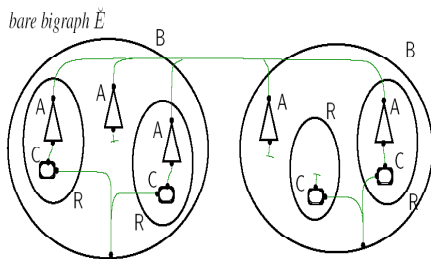# Bigraphs

A Bigraph is composed of a link graph and a place graph

Bigraphs

A Bigraph is composed of a link graph and a place graph

bigraph
$H : \langle 3, \{xy\} \rangle \to \langle 2, \emptyset \rangle$

roots ... 0   1

place graph
$H^{\mathsf{P}} : 3 \to 2$

sites ... 0 1 2

link graph
$H^{\mathsf{L}} : \{xy\} \to \emptyset$

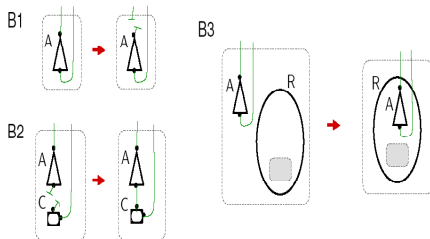inner names ... x y

Bigraphs

A more realistic example:
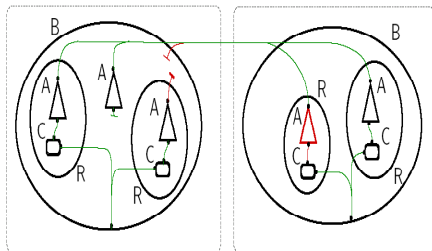

bare bigraph Ě

Dynamics of Bigraphs

Some possible reaction rules:

Dynamics of Bigraphs

After applying Rules B_1, B_3 and B_2:

Modelling Ambients in Bigraphs

$$\mathsf{amb}_x.(\mathsf{in}_y.d_0 \,|\, d_1) \,|\, \mathsf{amb}_y.d_2 \longrightarrow \mathsf{amb}_y.(\mathsf{amb}_x.(d_0 \,|\, d_1) \,|\, d_2)$$
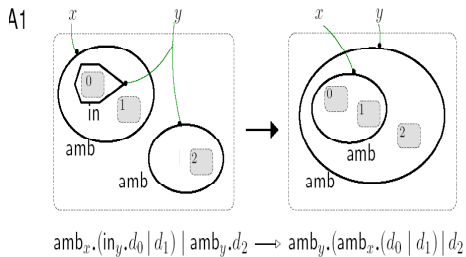
Modelling CCS in Bigraphs

$\mathsf{alt}.(\mathsf{send}_x.d_0 \mid d_1) \mid \mathsf{alt}.(\mathsf{get}_x.d_2 \mid d_3)$ $\qquad$ $x \mid d_0 \mid d_2$