Formal verification of plastic user interfaces

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Plastic UIs

Plasticity: capability of user interfaces to withstand variations of **context of use** (platform, environment, user) while preserving quality in use.

Case Study:

Nuclear power plant

Redistribution & Remolding

Research question:

How to ensure quality of Plastic UIs?

State of the art

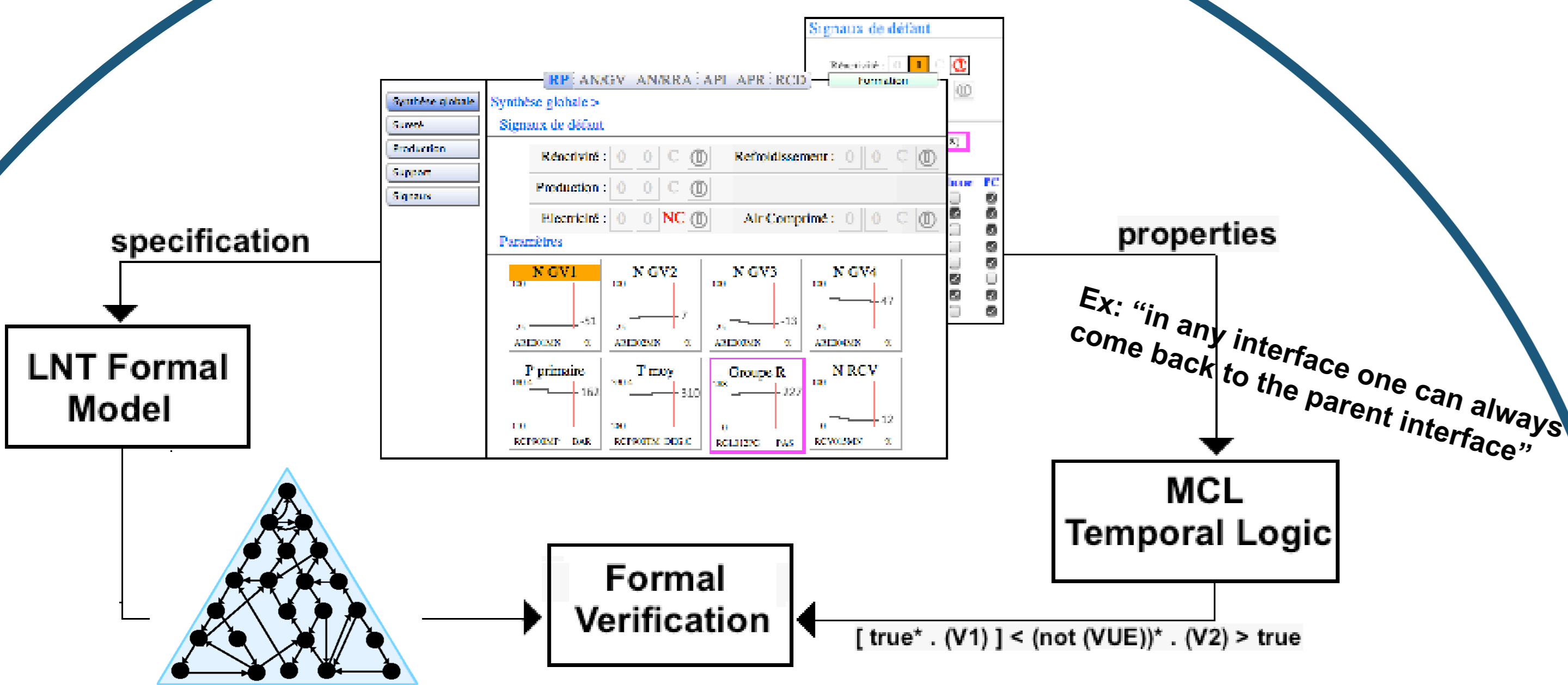User interfaces verification techniques:
- Classical testing
- Simulation
- Formal Verification

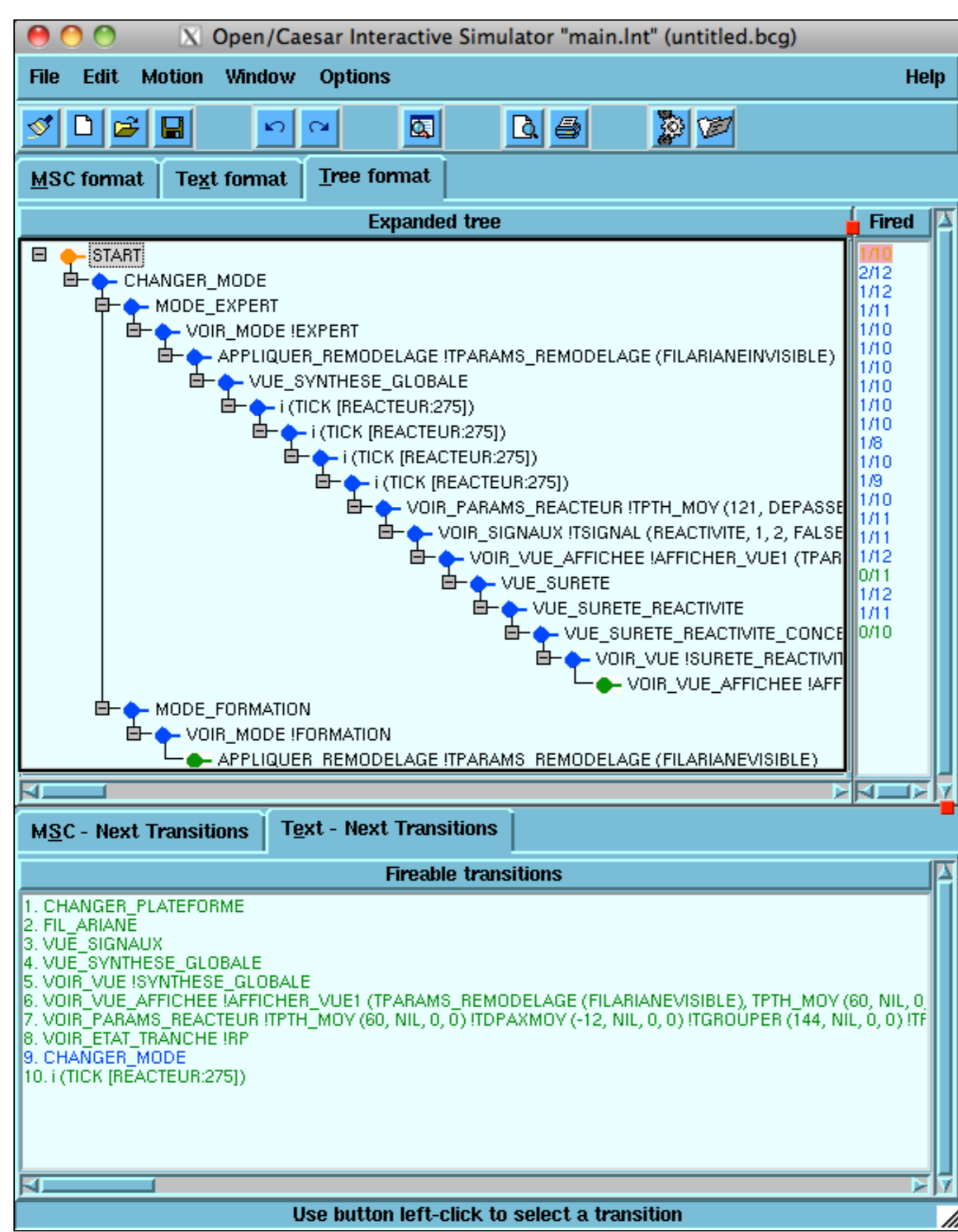**Limitation: Don't handle Plastic UIs**

Some formal verification techniques:
- Equivalence checking
- Model checking
- Visual checking
- Compositional verification
- Performance evaluation
- Parallel verification (on grids)

Contribution

specification

LNT Formal Model

properties

Ex: "in any interface one can always come back to the parent interface"

MCL Temporal Logic

Formal Verification

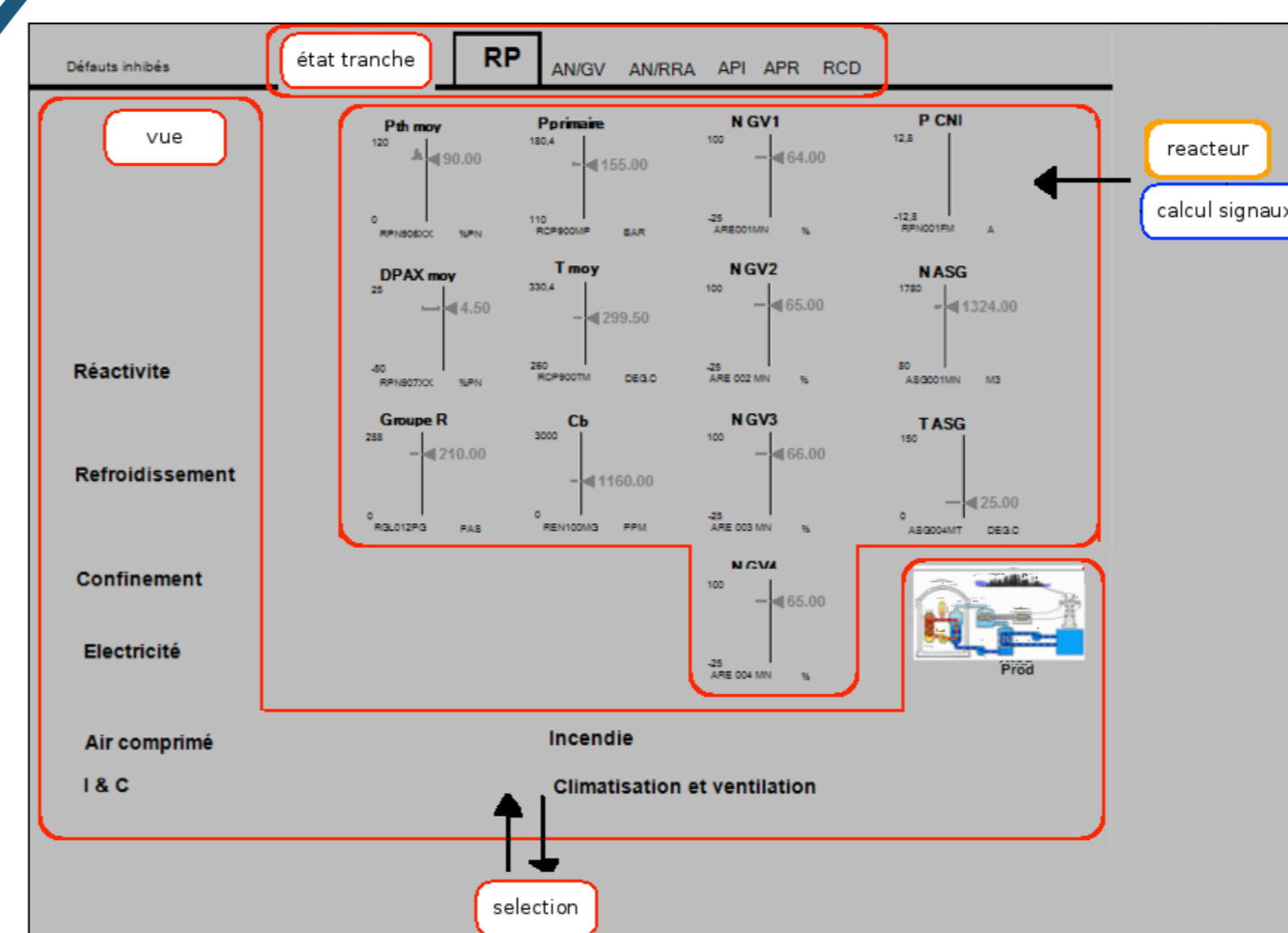[true* . (V1)] < (not (VUE))* . (V2) > true

CADP 2014 Toolbox

Techniques used:
- Model checking
- Simulation

Results

Formal model in LNT of interfaces for a nuclear power plant overview

Item	Module	Nb.Lignes
1	etat tranche.lnt	45
2	vue.lnt	448
3	reacteur.lnt	718
4	reacteur.tnt	2
5	reacteur.fnt	24
6	calcul signaux.lnt	294
7	selection.lnt	144
8	biblioteque.lnt	374
9	biblioteque.tnt	11
10	scenarios	328
11	main.lnt	183
12	operateur.lnt	46
	TOTAL	2617

- 5 properties formalized in MCL
- Properties verification

Perspectives

- Identify relevant properties for plasticity
- Properties verification for plasticity
- Equivalence checking for plasticity