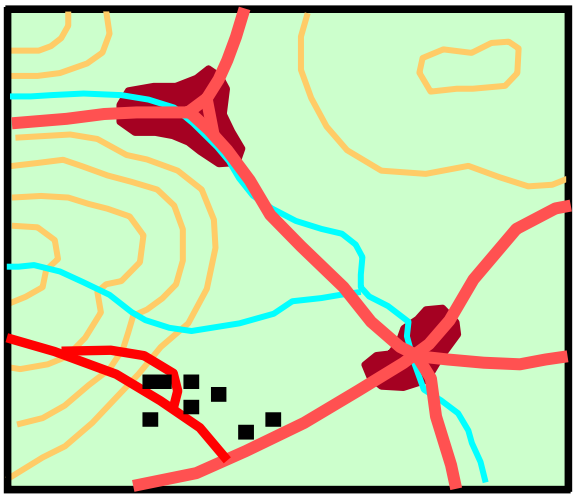
First Thoughts for the Orchestration of Generalisation Methods on Heterogenous Landscapes



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PhD Supervisor : Anne Ruas

Co-supervisor : Cécile Duchêne

Outline of the presentation

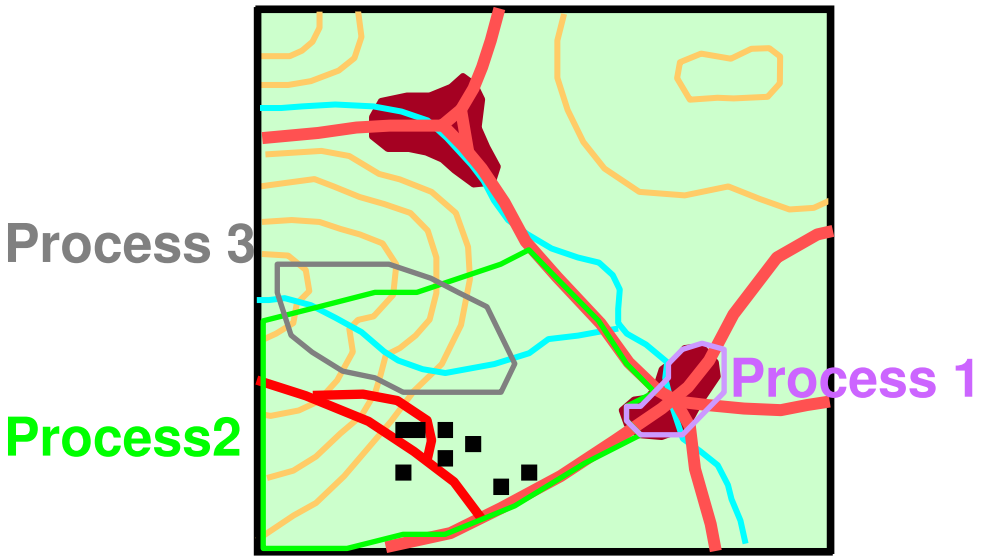
- Objectives
- Key problems of orchestration
  - Identify relevant geographic spaces
  - Find out orchestration techniques
  - Manage side effects
  - Ensure harmony et interoperability
- The test protocol
- Conclusion and further work

Objectives

Goal of the PhD :

- **Design a generic orchestration model for generalisation models and processes on relevant geographic spaces**
- Generalisation = $\{(Space_i , Process_j)\}_{i,j}$

  where Process = generalisation process or side effects process
- Base conclusions on practical tests



Objectives

Many different generalisation models and approaches

Generalisation Model or Approach	References	Examples of Relevant Geographic Spaces
AGENT	(Ruas 99) (Barrault et al 2001)	Urban spaces Mountain roads
Elastic Beams	(Bader 2001)	Road overlapping conflicts
Least Squares Adjustment	(Sester 2000) (Harrie 2001)	Not too dense spaces
CartACom	(Duchêne 2004)	Rural spaces
GAEL	(Gaffuri 2008)	Particular relief spaces
Stochastic Model	(Ware et al 1998) (Monnot et al 2007)	Roads and buildings spaces
Machine Learning	(Mustière 2001) (Neun 2008)	Spaces with similar patterns
...	...	...

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Key problems of orchestration
Identify relevant geographic spaces

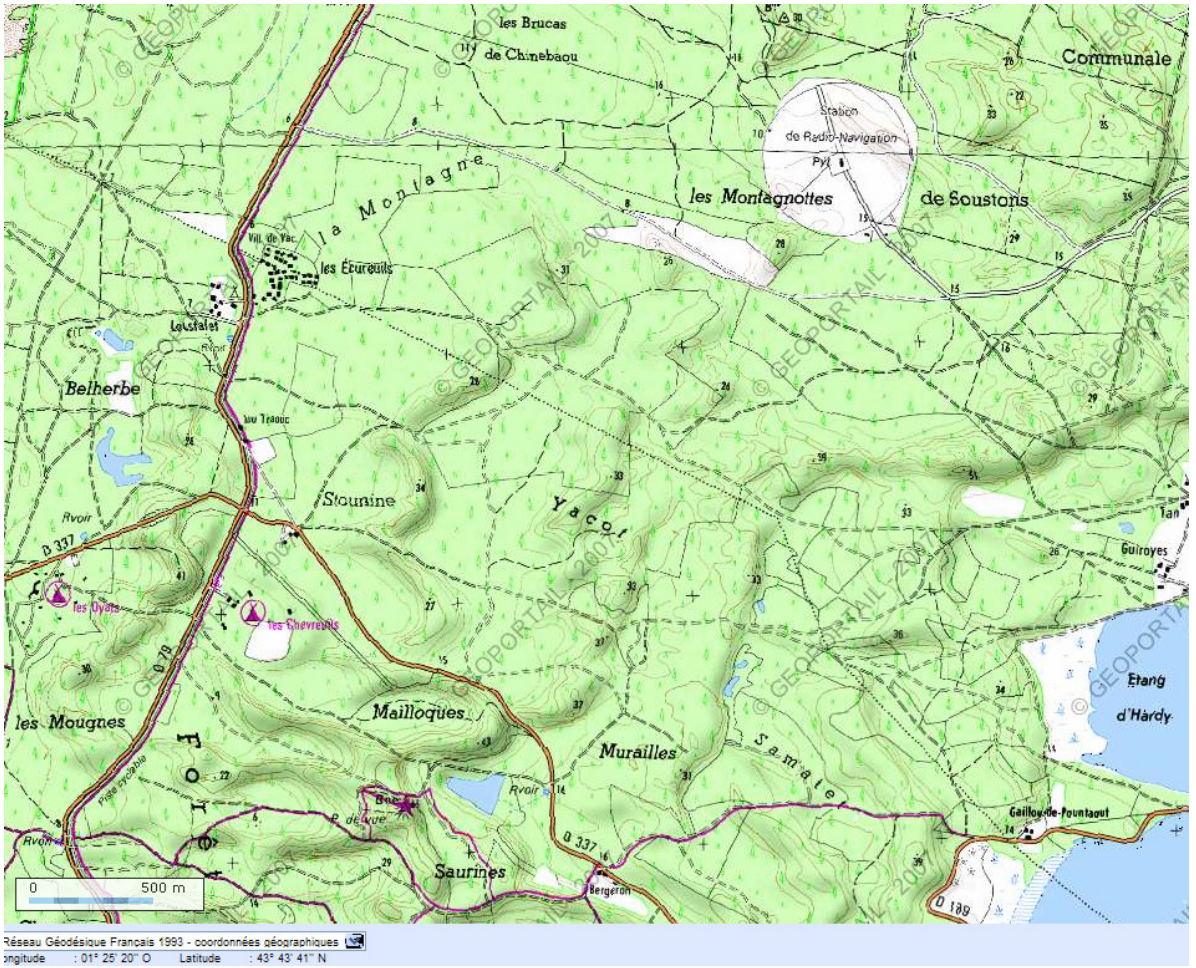
- Spaces deduced from knowledge on models

Ex. : AGENT is relevant for urban spaces

Key problems of orchestration
Identify relevant geographic spaces

- Spaces deduced from knowledge in generalisation

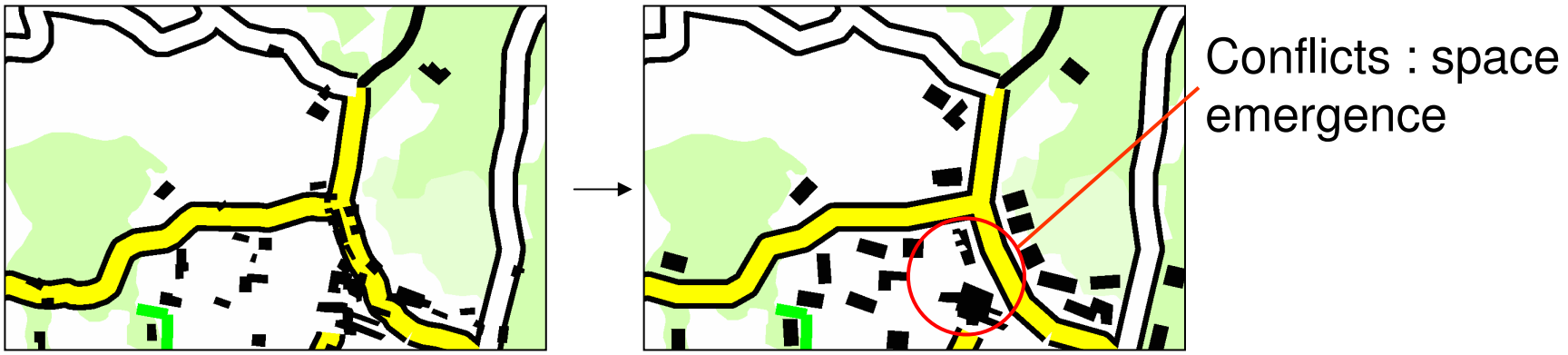
Ex. Forested spaces



Key problems of orchestration
Identify relevant geographic spaces

- Emerging spaces :

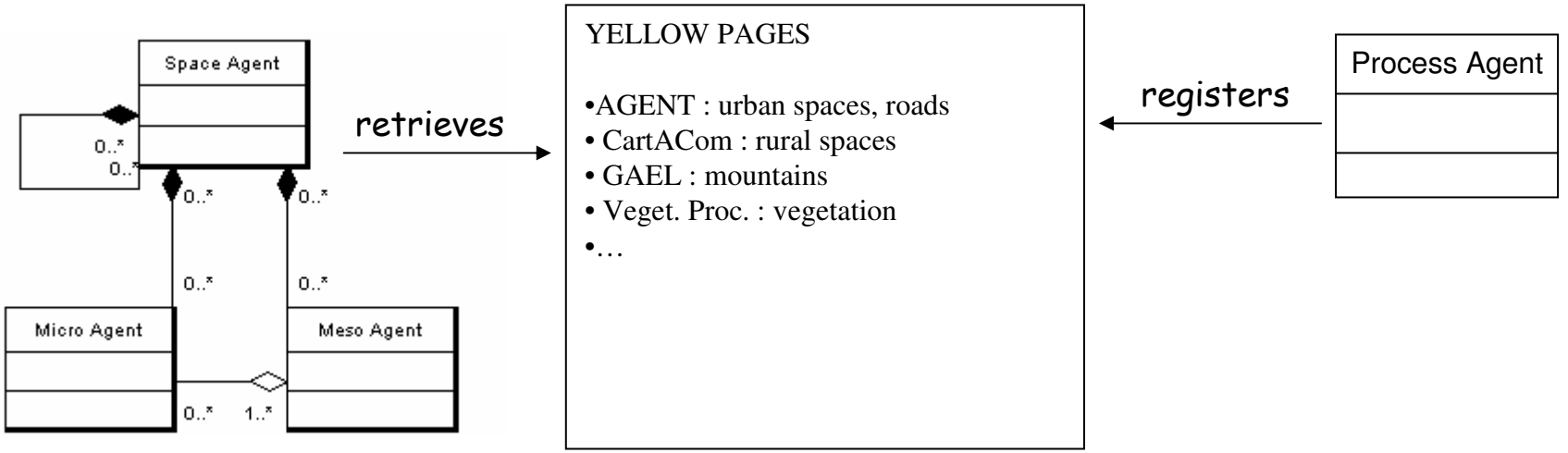
Ex. : Remaining conflicts after CartACom process



Key problems of orchestration
Find out orchestration techniques

How to automatically associate and sequence spaces and processes ?

- Multi-Agents System

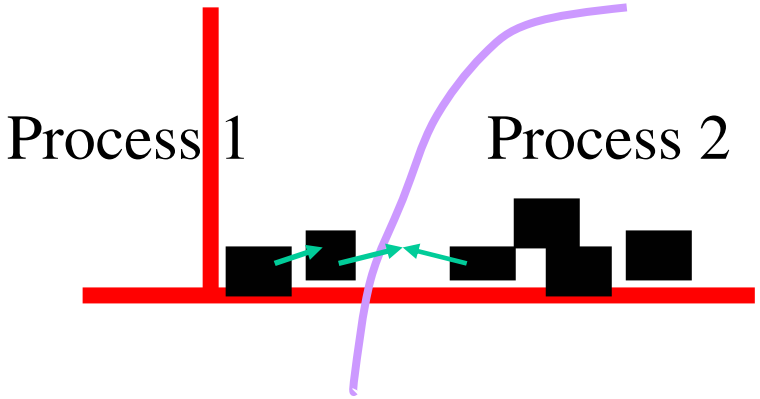


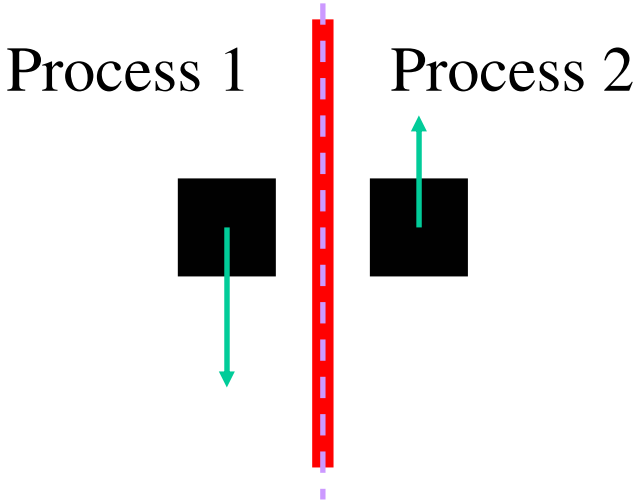
- Other techniques : workflows [Petzold *et al* 2006], web services chaining [Lemmens 2006], stochastic methods [Ware & Jones 1998]…

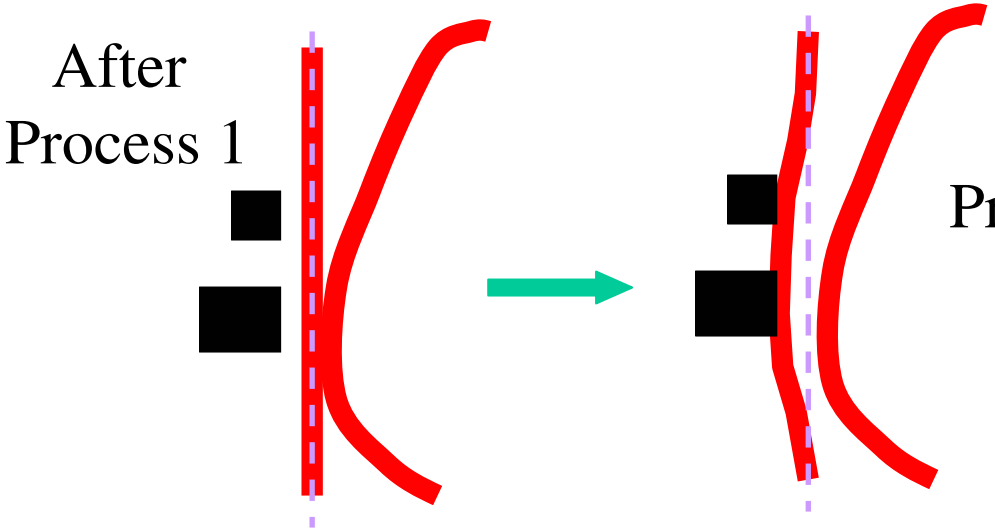
Key problems of orchestration
Side effects management

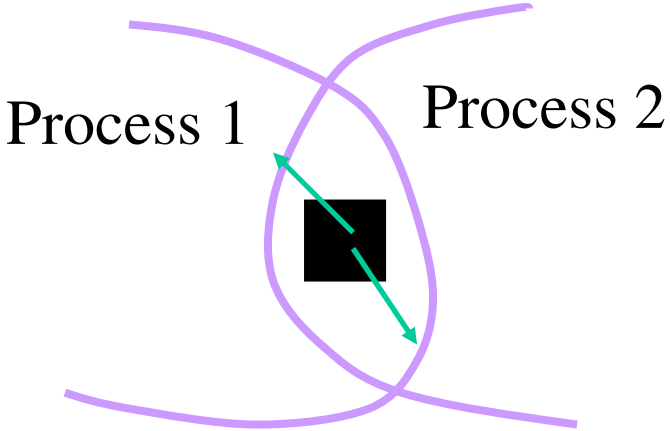
Without side effects management

When to trigger ? How ?





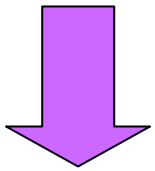




Key problems of orchestration
Ensure harmony and interoperability

- The problem of harmony (homogeneity of treatment)
- The problem of interoperability
  ex. : AGENT ⟶ constraints Least squares ⟶ equations

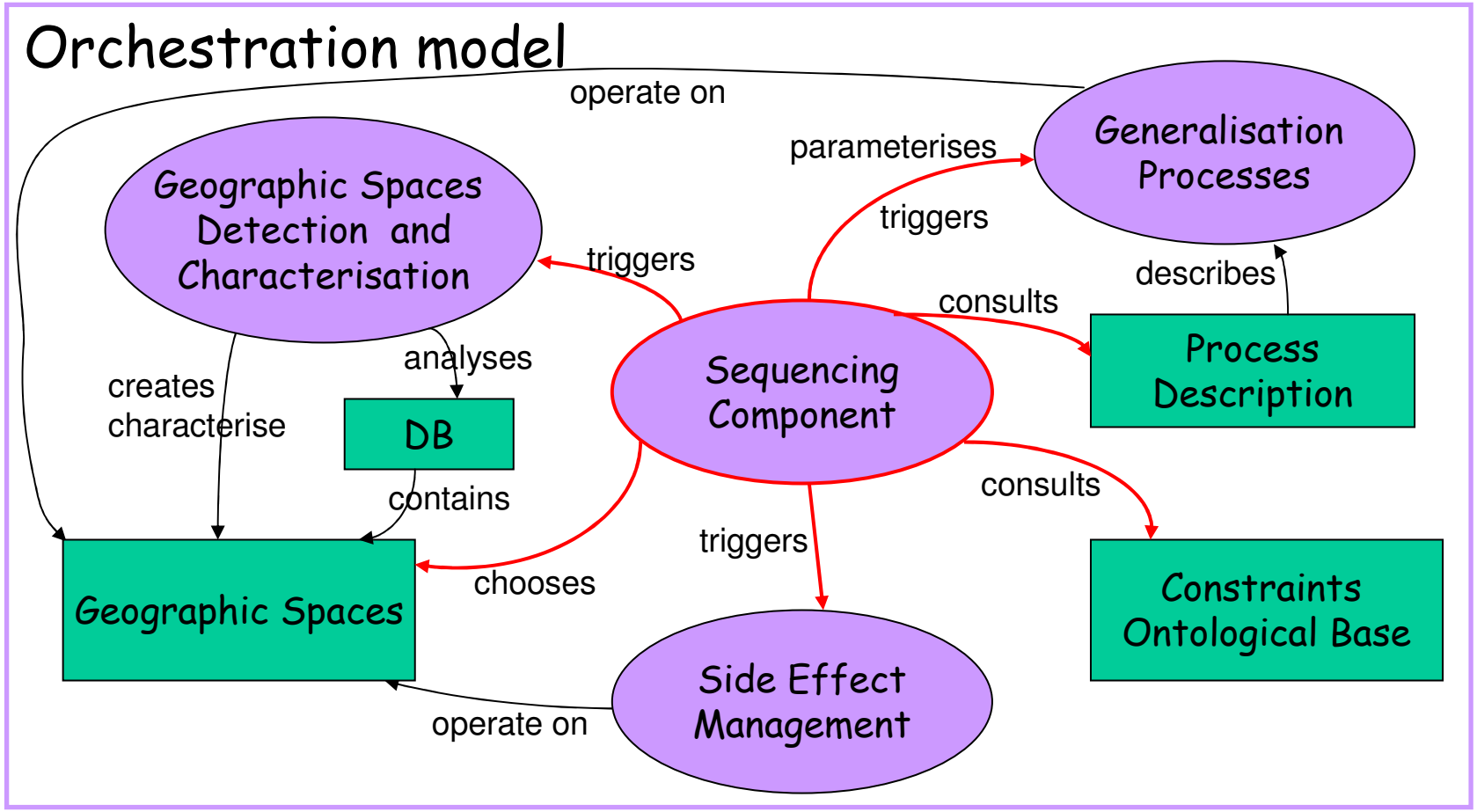
A common solution



- Ontological base of generalisation constraints
- Translation tools for inputs/outputs from/to the base of constraints
- Formalise, model constraints : "a building should be bigger than 300 m²"

Key problems of orchestration
Summary

Components and resources of the proposed orchestration model



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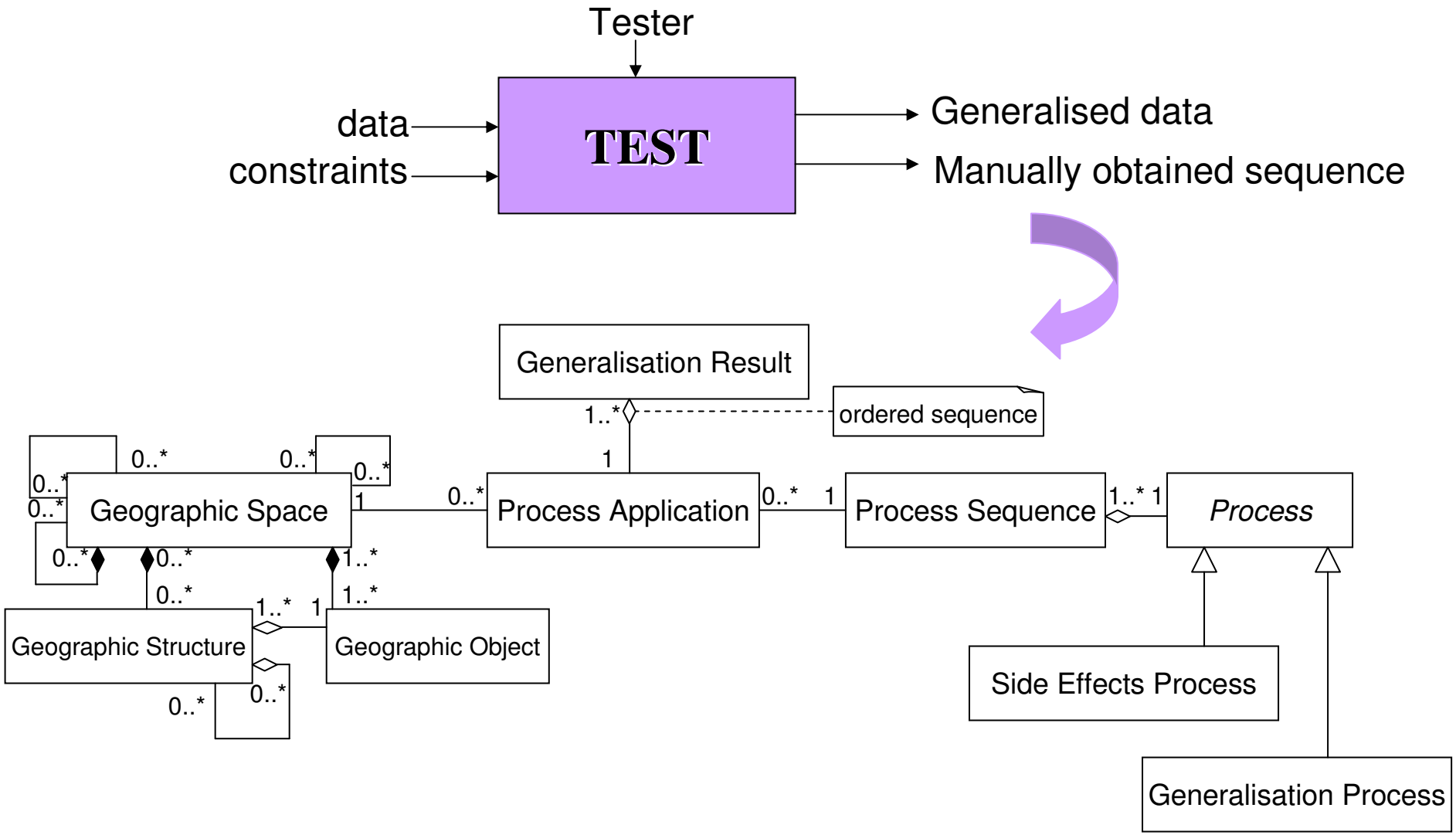
The Test Protocol

- Manual sequences of application of models on predefined spaces
- Aim of the test : Learn on
  - the relevant spaces
  - process sequencing
  - emerging behaviours
  - side effects

- On the same platform (Clarity) :
  - AGENT [Barrault *et al 2001*]
  - CartACom [Duchêne 2004]
  - GAEL [Gaffuri 2008]
  - Elastic Beams [Bader 2001]
  - Vegetation Generalisation [Touya *et al* 2007]
  - Roundabout Typification [Touya 2007]
  - Least Squares Adjustment [Harrie 2001]

The Test Protocol



Conclusion

- Model orchestration rather than a brand new model
- 4 key problems identified :
  - Identify relevant geographic spaces
  - Find out orchestration techniques
  - Manage side effects
  - Build an ontological base of constraints
- A test protocol designed

Further Work

- Tests set-up (CartACom and Least Square migration,…)
- Carry out the tests

- Tests analysis
- Constraints ontological base modelling
- Orchestration modelling

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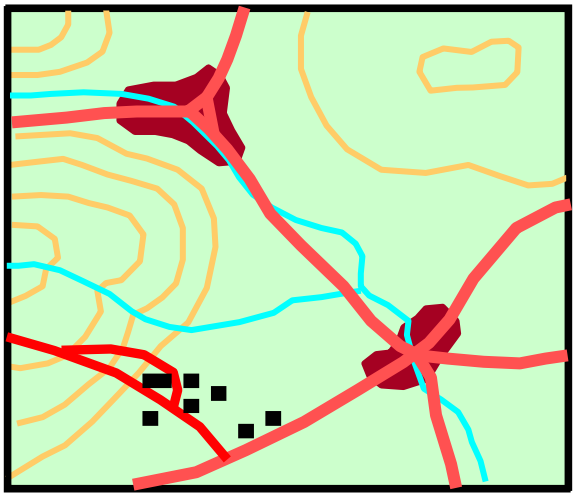

THANKS FOR YOUR ATTENTION !