tags: `ESUG` `CORMAS` `Smalltalk`

CORMAS, a participatory and interdisciplinary Agent Based Simulation Platform

By **P. Bommel**, N. Becu, B. Bonte, **E. Delay**, C. Le Page, H. Morales, N. Papoulias, S. Stinckwich, and the CORMAS team.

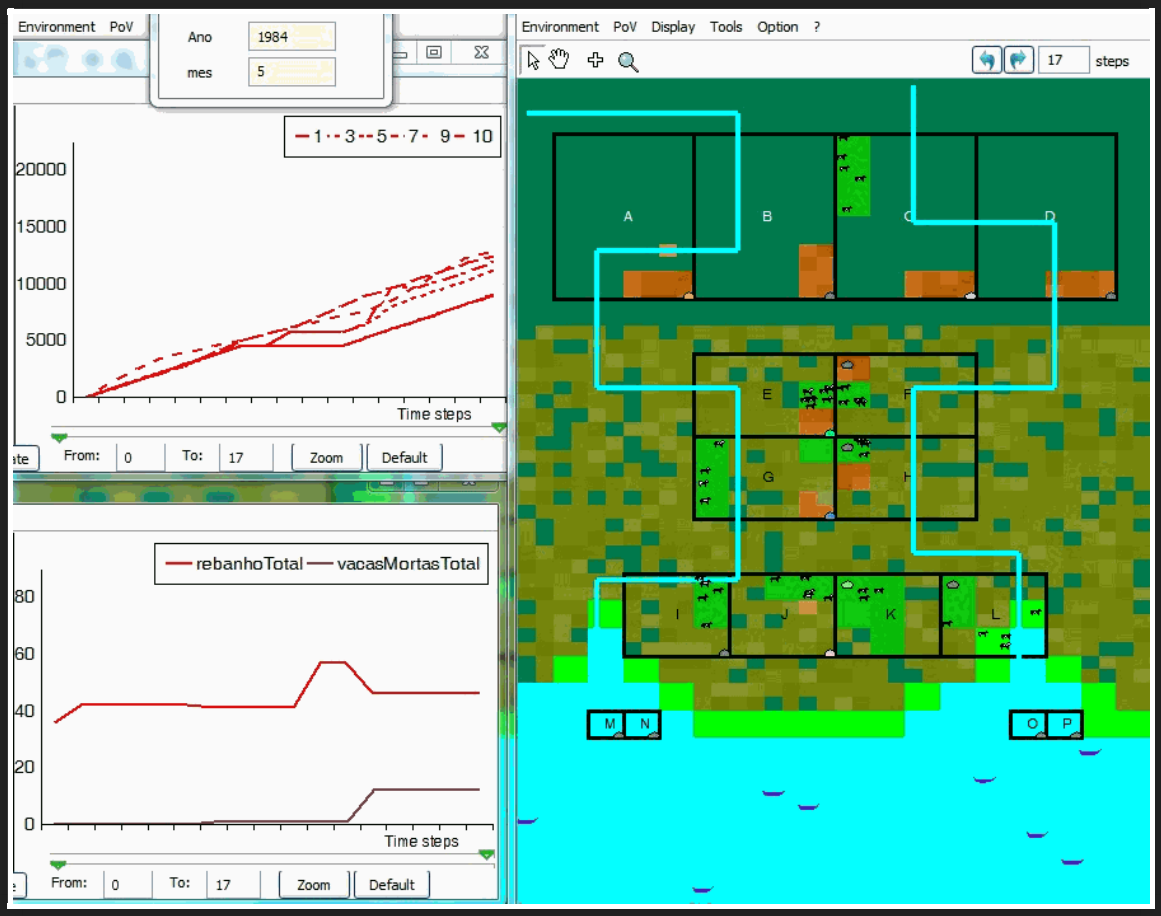
ESUG 2018 in *Università degli Studi di Cagliari* – Sardinia.

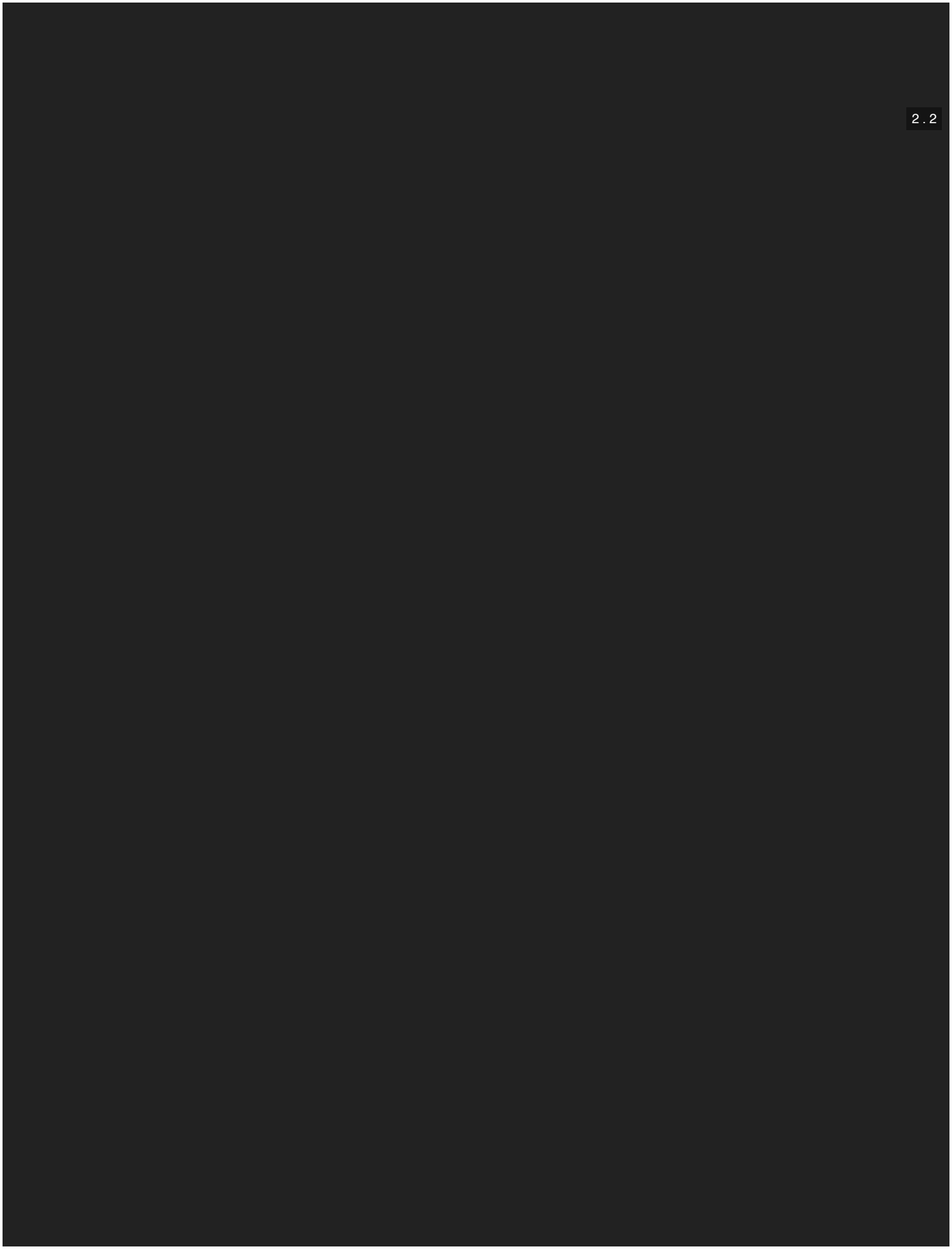
1

Software consideration

2.1

CORMAS by example

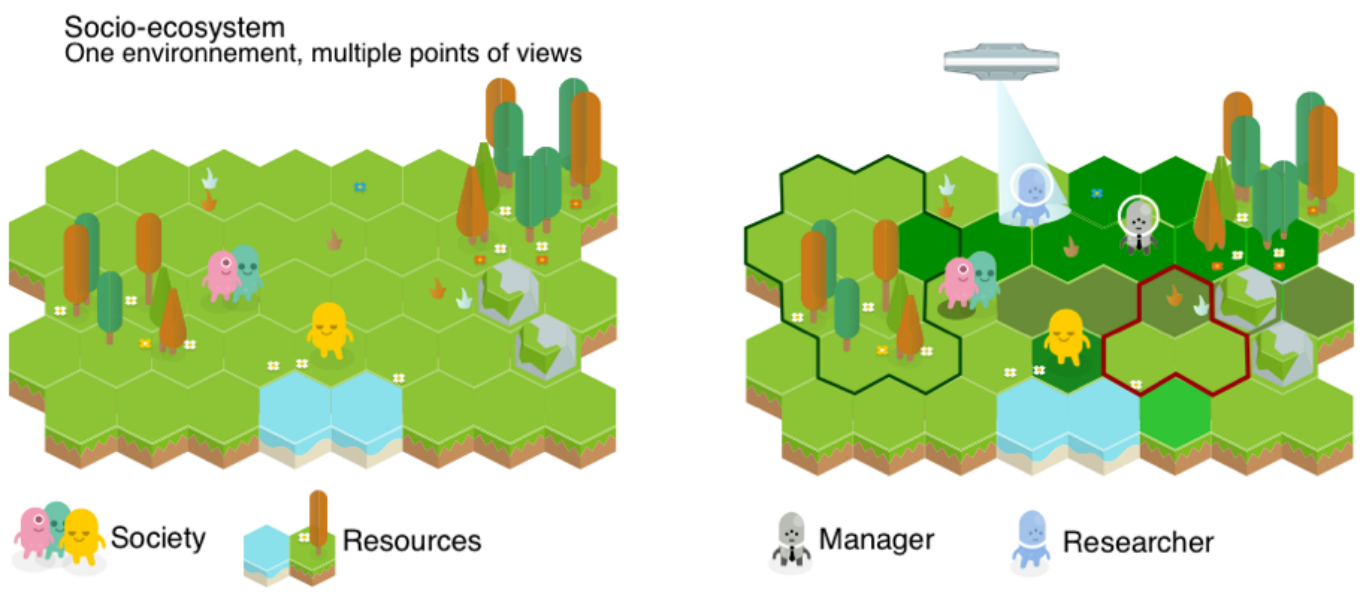



2.2

CORMAS is always about the real

2 . 3

Multiple points of views



→ Asymmetric information to raise awareness about several viewpoints

2.4

Interactive simulation

2.5

CORMAS and ComMod

Do not provide “ready to use” solutions, but
Co-design with stakeholders to get a **shared** representation.

→ Raising awareness, facilitating communication,

promoting coordination or mitigating conflicts

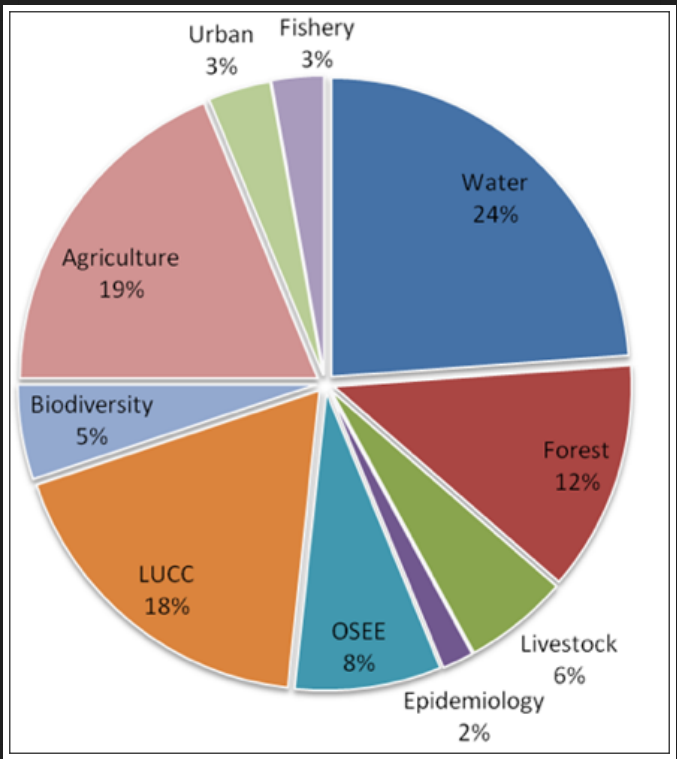
2 . 6

Convert development of simulation in hack-festival

Model built as a collective learning process

2.7

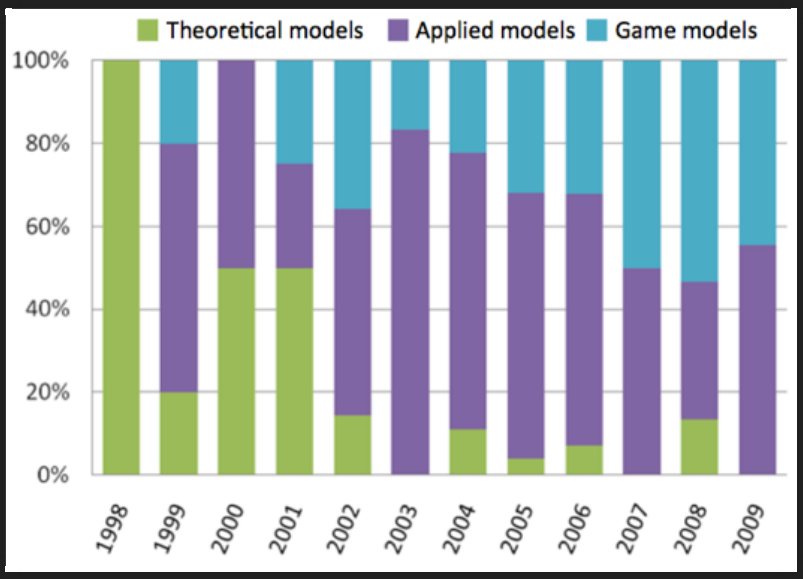
Cormas topics



2 . 8

Types of CORMAS models

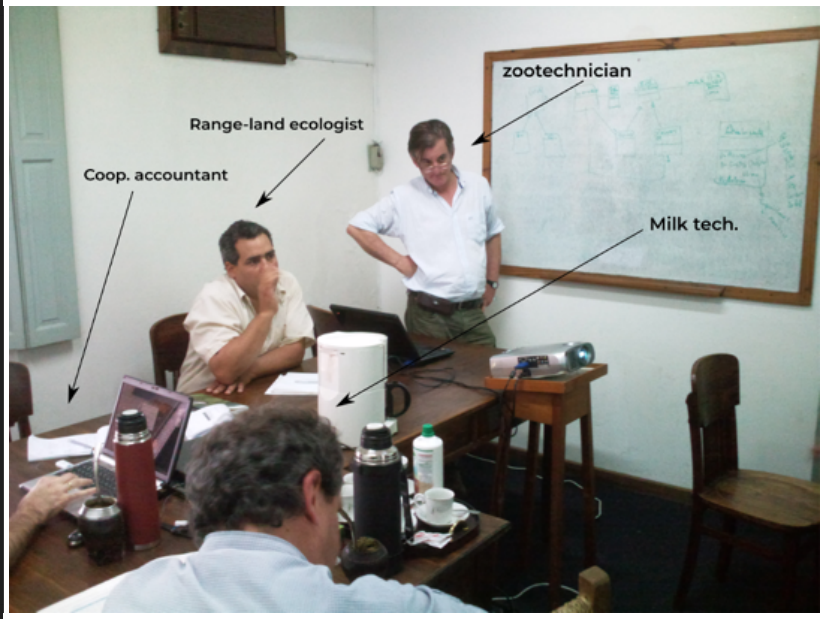
From theoretical models to computer assisted role playing-games



2 . 9

Modeling is learning

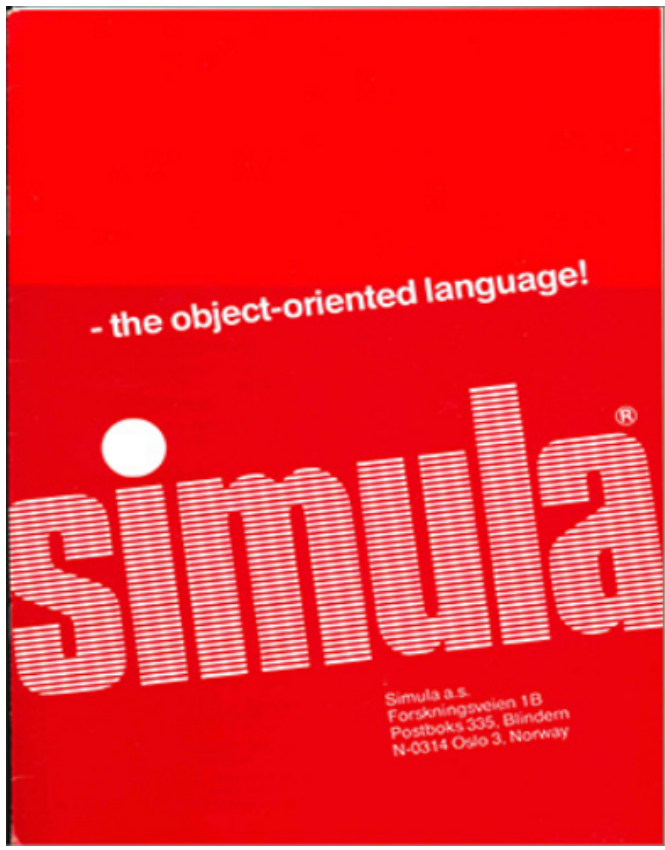
researcher / thematician = simulation dev.

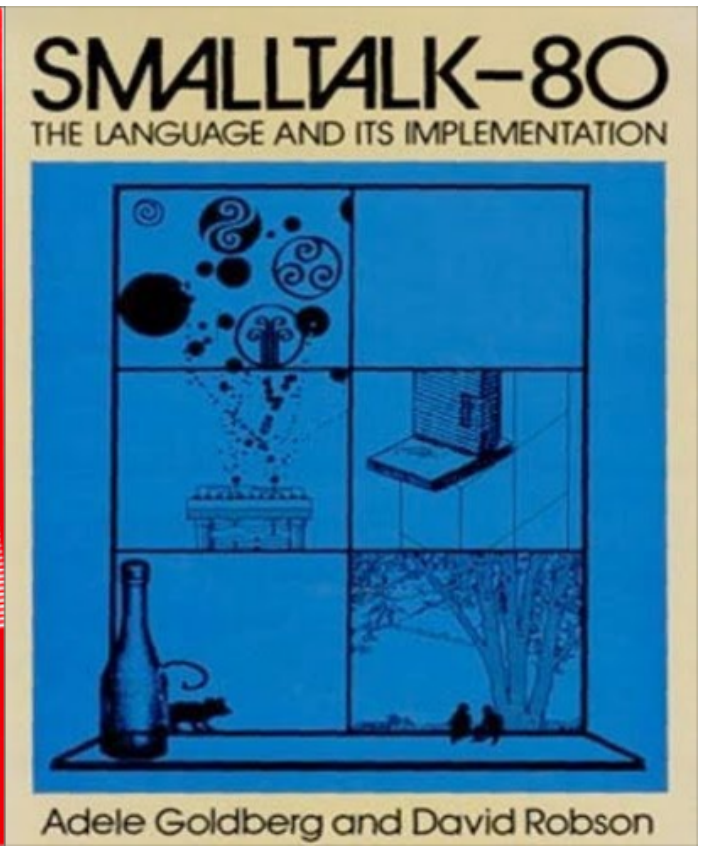


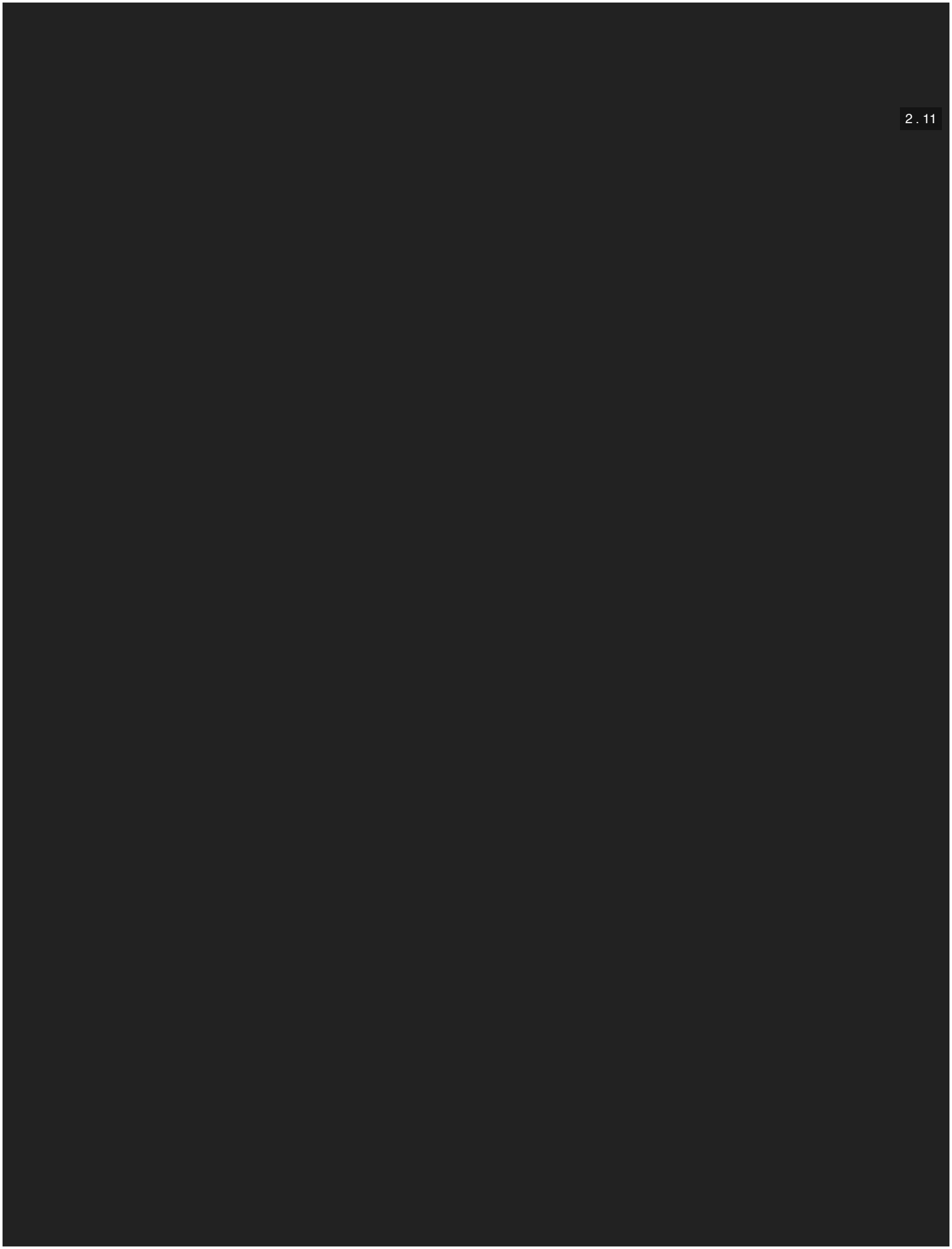
2 . 10

Modeling is learning

With a shared history, intertwined with OO !






2.11

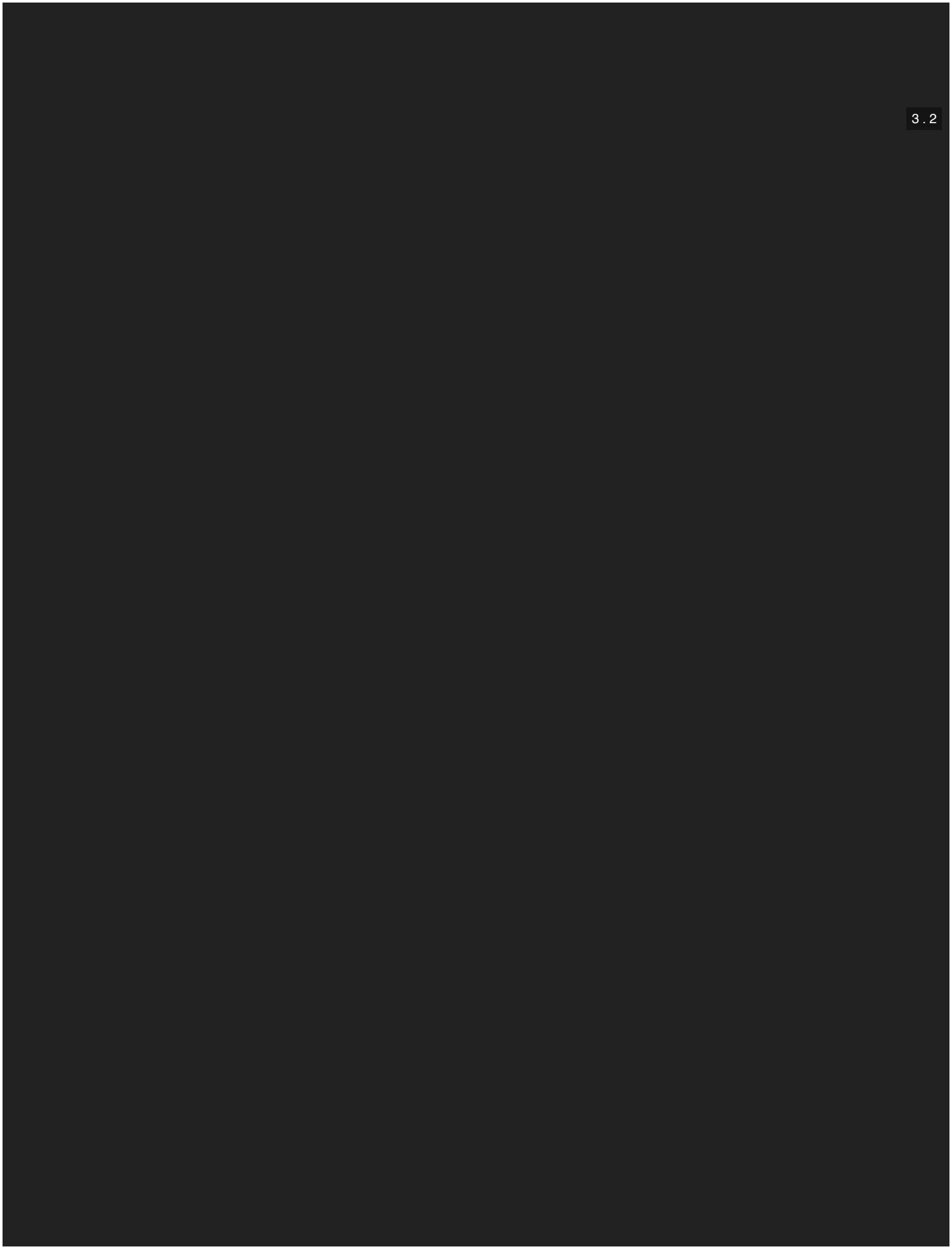
Our values

3 . 1

Building a shared vision

- take care of each indivuality
- share differents points of view
- look for a “big picture” vision

  → Promoting political spaces


3.2

Friendliness

- CORMAS meta-model is not prescriptive
  → close to stackholders description

3.3

Decentring

- Usually focused on stakeholders especially on their own practices.
- Put yourself in the place of the agent (you really think about what the agent does and perceives).
- Sharing and learning-by-modeling process generate empathy and mutual understanding

Wilensky et al., 2006. Thinking like a Wolf, a Sheep or a Firefly

3 . 4

An openWorld : transcendence

A book from an anthropologist: M. Augé, 1982, "*Génie du paganisme*". → The great difference between Monotheism and Polytheism :

- Monotheism : God is outside is creation and believers needs to ask for world tweaking
- Polytheism : Gods are inside the world and believers can interact directly with them

3 . 5

Transcendental CORMAS users

CORMAS with Pharo looks like polytheism because, users can interact with the simulation just like a polytheist believer would do with his gods.

Users can enter slowly in Smalltalk and become an **oracle**

3.6

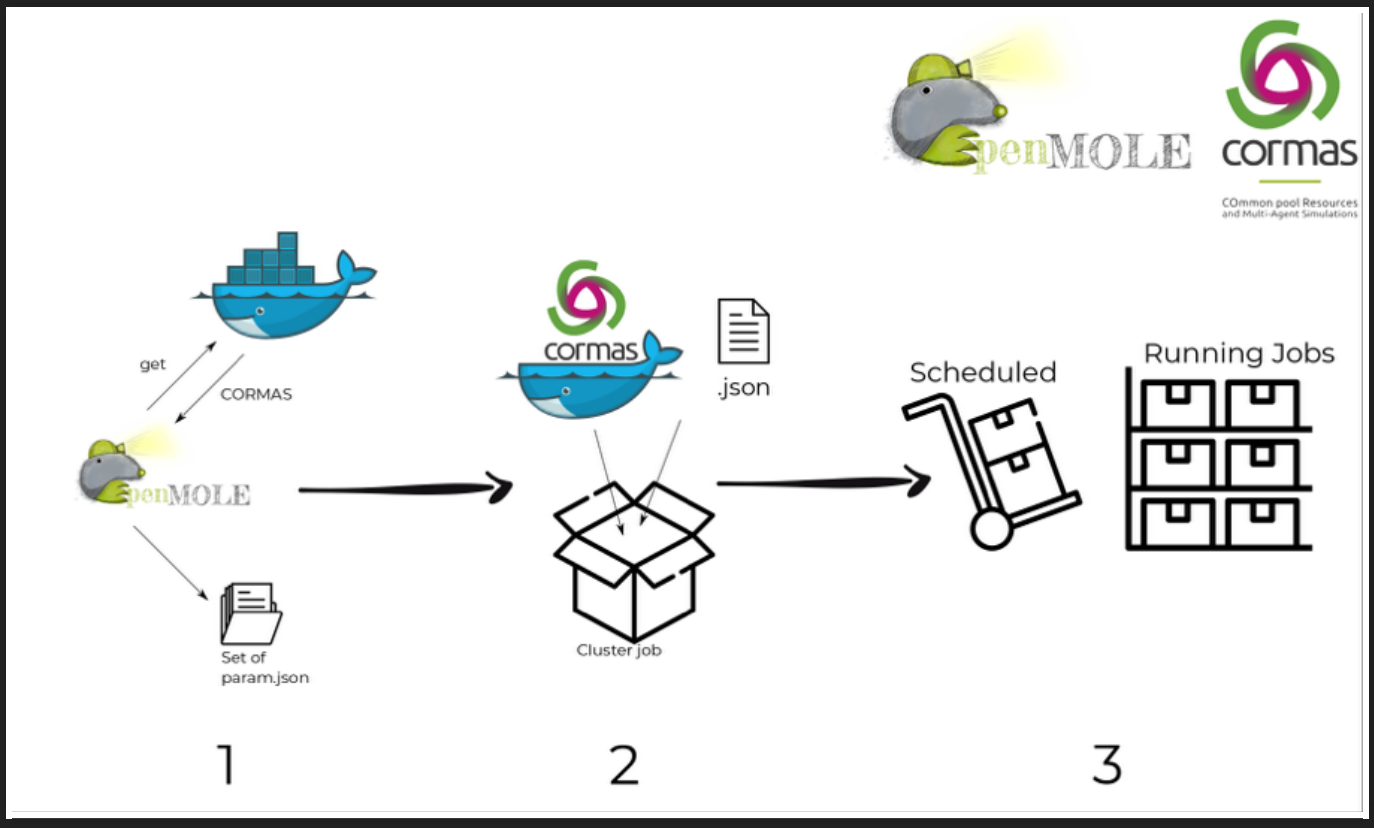
Cormas Smalltalk and HPC

(High Performance Computing)

It’s now possible to connect CORMAS/Pharo with openMole

4 . 1

How it work?



4 . 2

Example

On “Fireman” model under:

- 100 replications
  - Desktop computer → 6 min ☺
  - CIRAD cluster → 22 min ☠ ☠
- 1000 replications
  - Desktop computer → 60 min ☻
  - CIRAD cluster → 37 min ☻
- 10000 replications
  - Desktop computer → 10h ☠ ☠
  - CIRAD cluster → 1h38 ☺

4.3

Courses on ABM

MISSABMS

3 platforms: Netlogo, Gama, Cormas

5 . 1

Courses on ABM

MISSABMS

- Diversity of participants,
- Afterwards, preference for UML formalization over implementation,
- UML + Smalltalk:
  - Better understanding of OO concepts
  - Navigation between classes,
  - Live coding into the debugger (model checking)

5.2

To conclude

6 . 1

Il Buono

- Made by people for people
  - Smalltalk : through thick and thin (1998)
  - Object centred vision
  - Faster learning than other languages
- Link to real world
  - With concrete challenges: biodiversity, social equity, human/wildlife management, conflict resolution...

6.2

Il Brutto

- Dirty distribution for interactive simulation
- One monster class → work in progress
- No unit test → 👍
- Quick and dirty coded and until recently without versioning → 👍

6 . 3

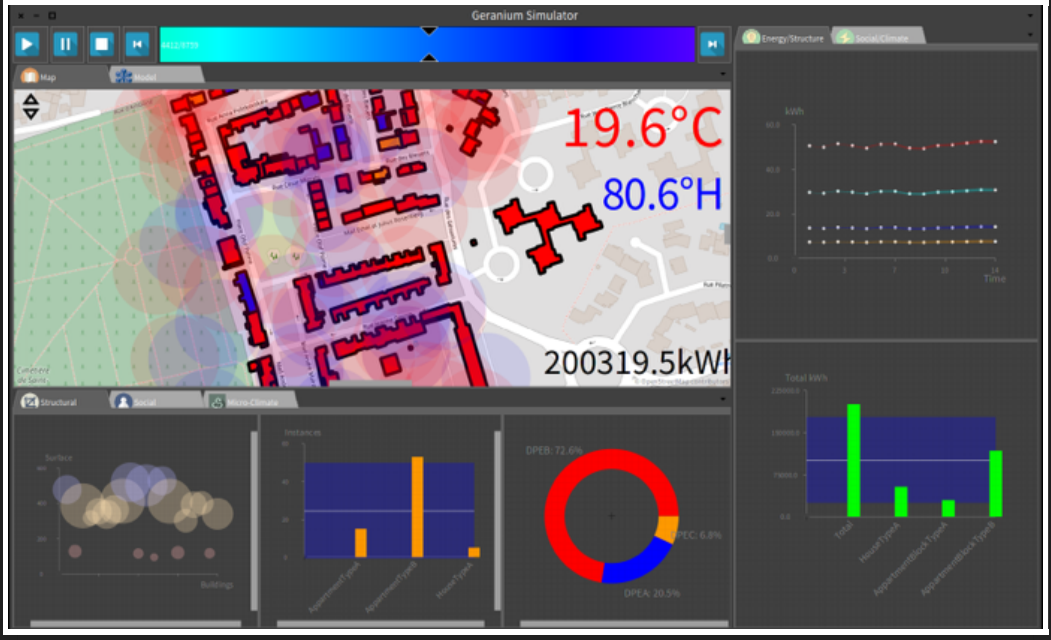
Il Cattivo

- Not (yet) GIS → needs for spatial object manipulation
- No spatial continuity
- Limited (world size, number of agents) → needs for optimisation

6 . 4

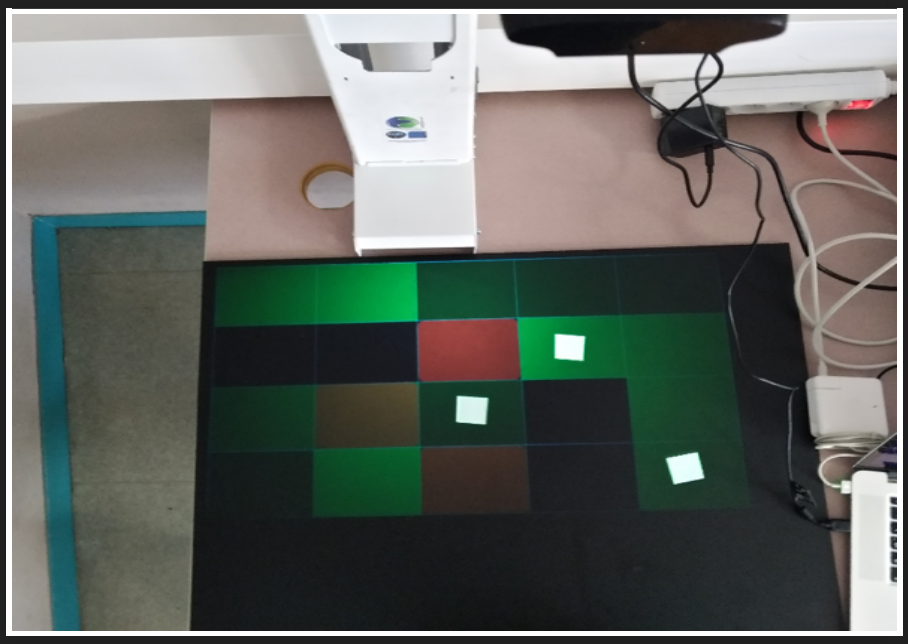
Cormas Soonish :)

- Integrating with wonderful Pharo technologies
- Roassal, Maps, Spec, GT tools, DSLs



7 . 1

Cormas Experiments



7.2

Cormas in 10 years

- Tangible objects: avatar, life-size RPG (but no 3D, no immersion glasses)
- Multi-devices : tablet, smartphone ...
- Software blocks for interactive game design
- News tools for collective design of models
- AI for hybrid simulation (when players are missing)

Focus our efforts on the **meaning** of the model (symbolic) more than its **aesthetic** (realistic)

7 . 3

Welcome ...

... to be part of the CORMAS team to play the "infinite game". https://github.com/cormas/cormas/

8

In addition

Some references

9 . 1

Some papers about CORMAS

- Bommel P., Bécu N., Le Page C., Bousquet F., 2016. Cormas, an Agent-Based simulation platform for coupling human decisions with computerized dynamics. In, T. Kaneda, H. Kanegae, Y. Toyoda, & P. Rizzi (Éd.), Simulation and Gaming in the Network Society. Volume 9 of the series Translational Systems Sciences pp 387-410. Springer Singapore. DOI:10.1007/978-981-10-0575-6_27.
- Bousquet, F., Bakam, I., Proton, H. et Le Page, C. 1998. Cormas: common-pool resources and multi-agent Systems. Lecture Notes in Artificial Intelligence 1416: 826-838.

9 . 2

Some papers about participative work and CORMAS

- Le Page C., Becu N., Bommel P., Bousquet F., 2012. Participatory Agent-Based Simulation for Renewable Resource Management: The Role of the Cormas Simulation Platform to Nurture a Community of Practice. Journal of Artificial Societies and Social Simulation 15-10 http://jasss.soc.surrey.ac.uk
- M. Etienne, et al. 2014, Companion Modelling. A Participatory Approach to Support Sustainable Development, Springer, 978-94-017-8557-0.
- Much more here and here!

9 . 3