RMoD
Analyses and Language Constructs
for Modular Object-Oriented Applications

http://rmod.lille.inria.fr

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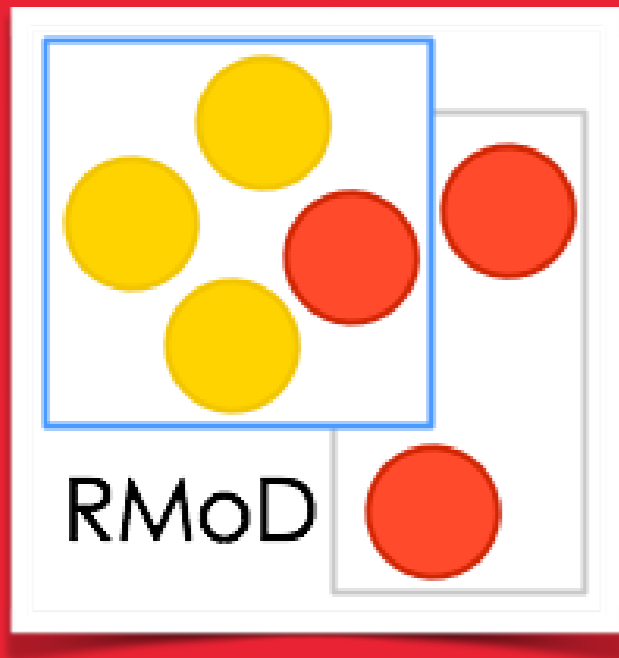
We design tools and analyses to tame software

Expertise

code analysis, metamodeling, software metrics, program understanding, *program visualization*, evolution analysis,
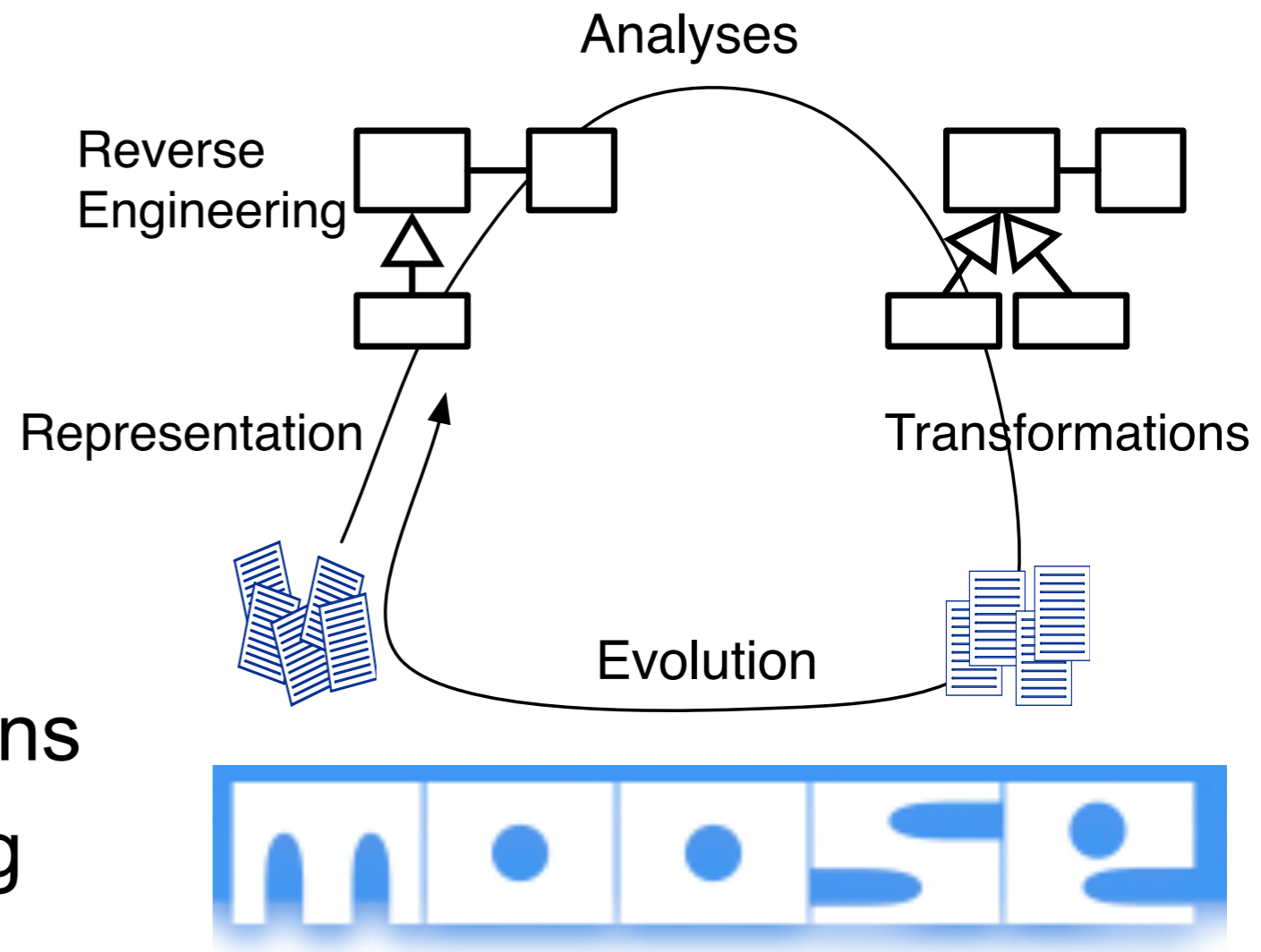refactorings, quality,
changes analysis, commit, dependencies,
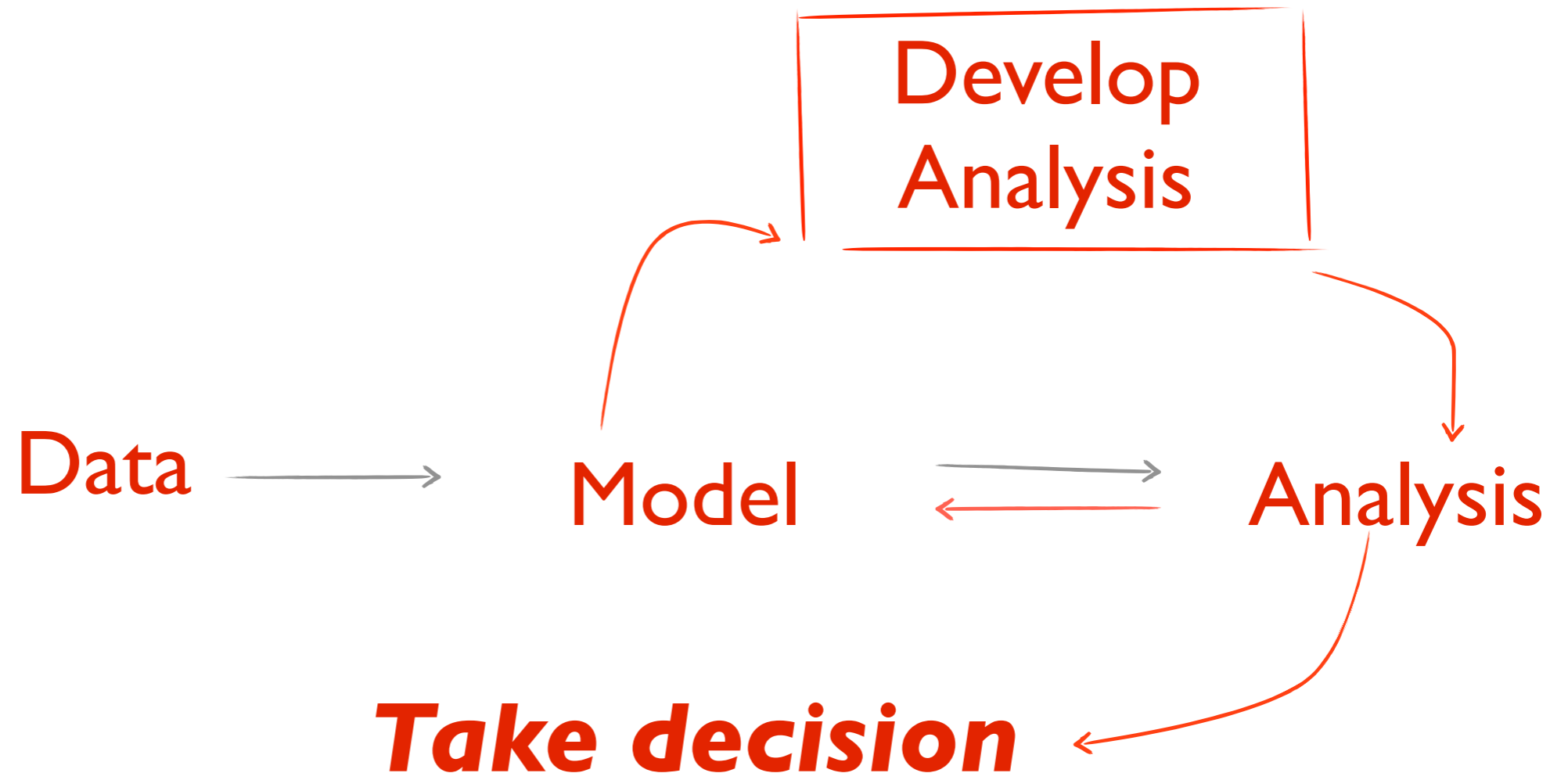rule and bug assessment
semi-automatic migration
example-based transformations
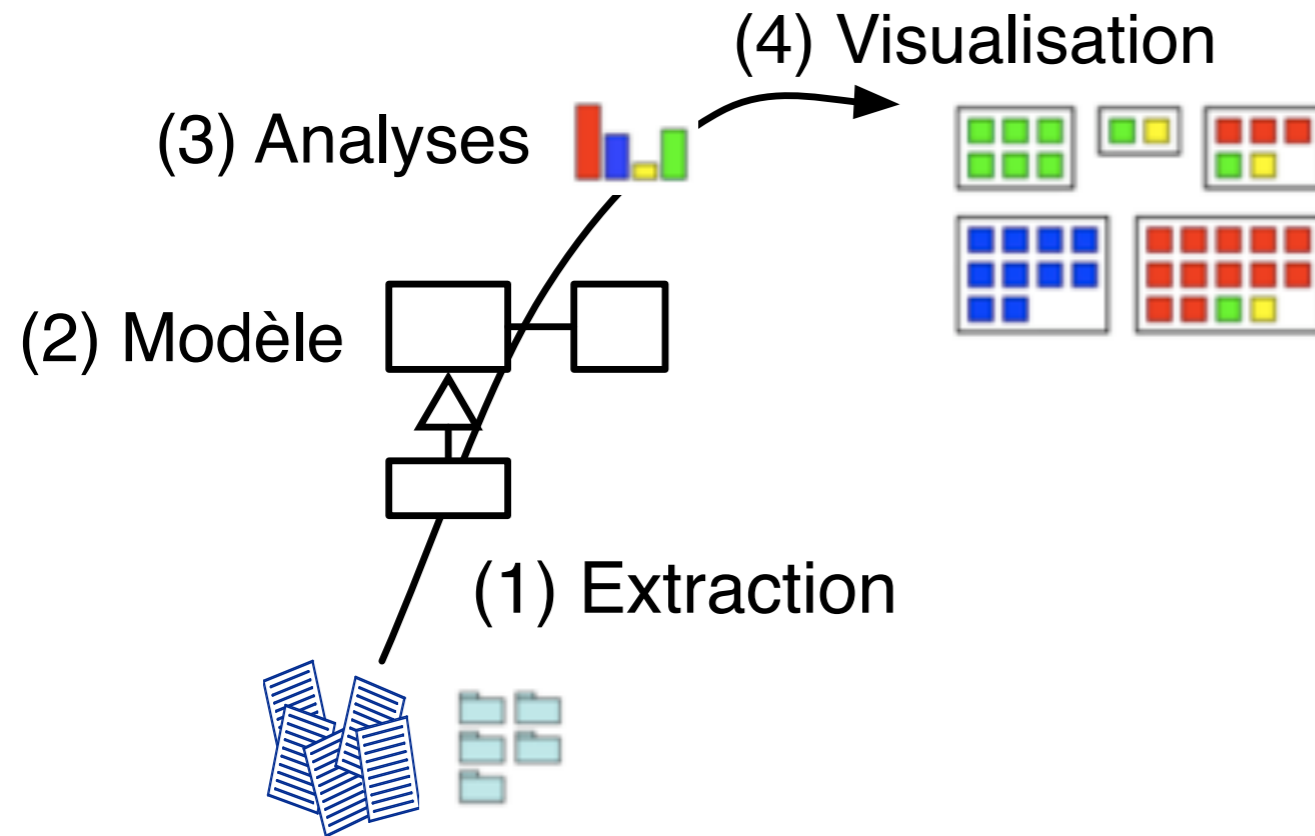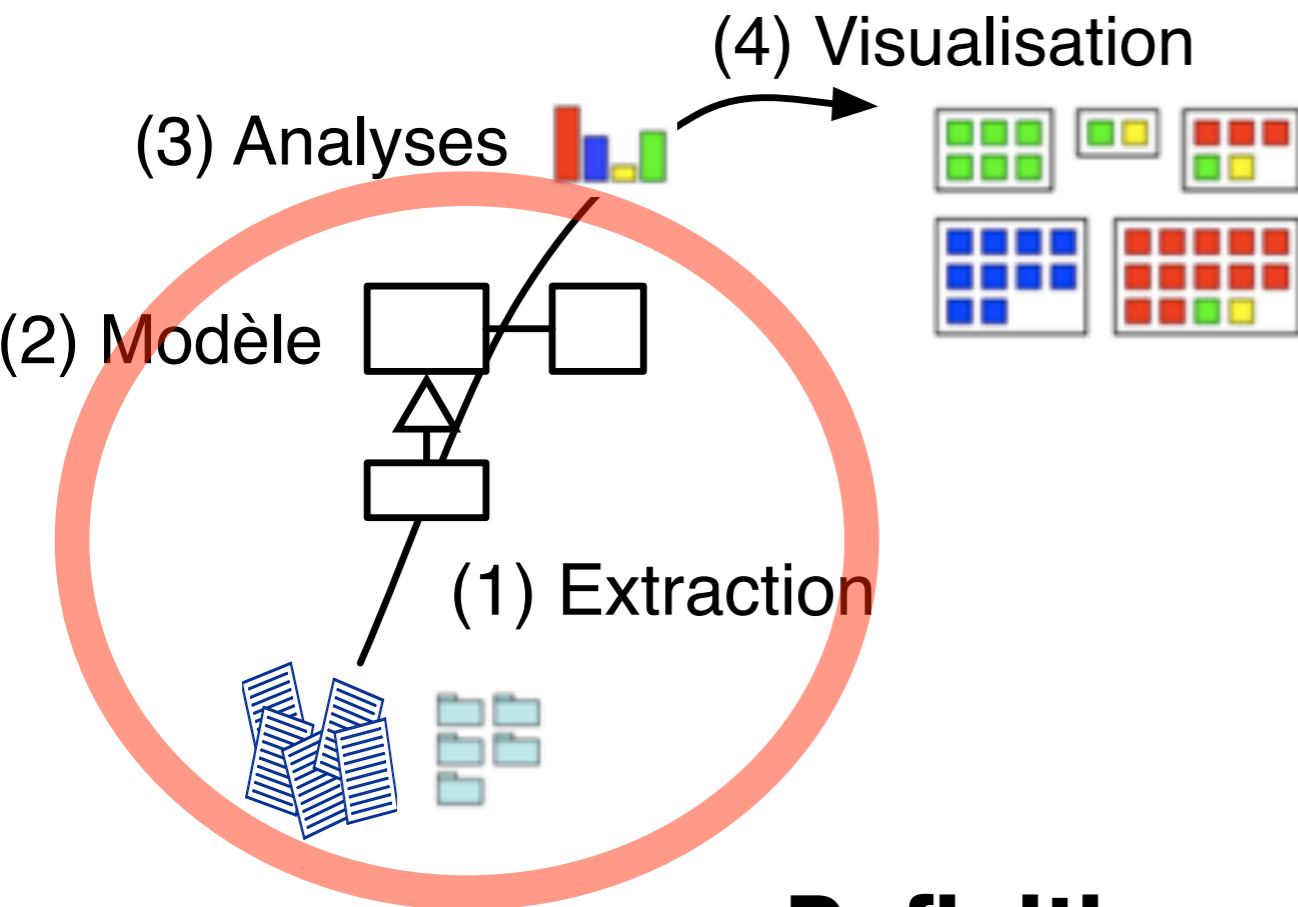test selection, rearchitecturing
blockchains, *ui-migration*

Analyses

Reverse
Engineering

Representation

Transformations

Evolution

Building dedicated tools

an analysis should lead to a decision

Example : Who is behind package X ?

(4) Visualisation

(3) Analyses

(2) Modèle

(1) Extraction

Step 1 - Model Creation/Import

(4) Visualisation

(3) Analyses

(2) Modèle

(1) Extraction

Definition of a model to represent entities

Data Extraction (CVS...)

Step 2 - Analyses

(4) Visualisation

(3) Analyses

(2) Modèle

(1) Extraction
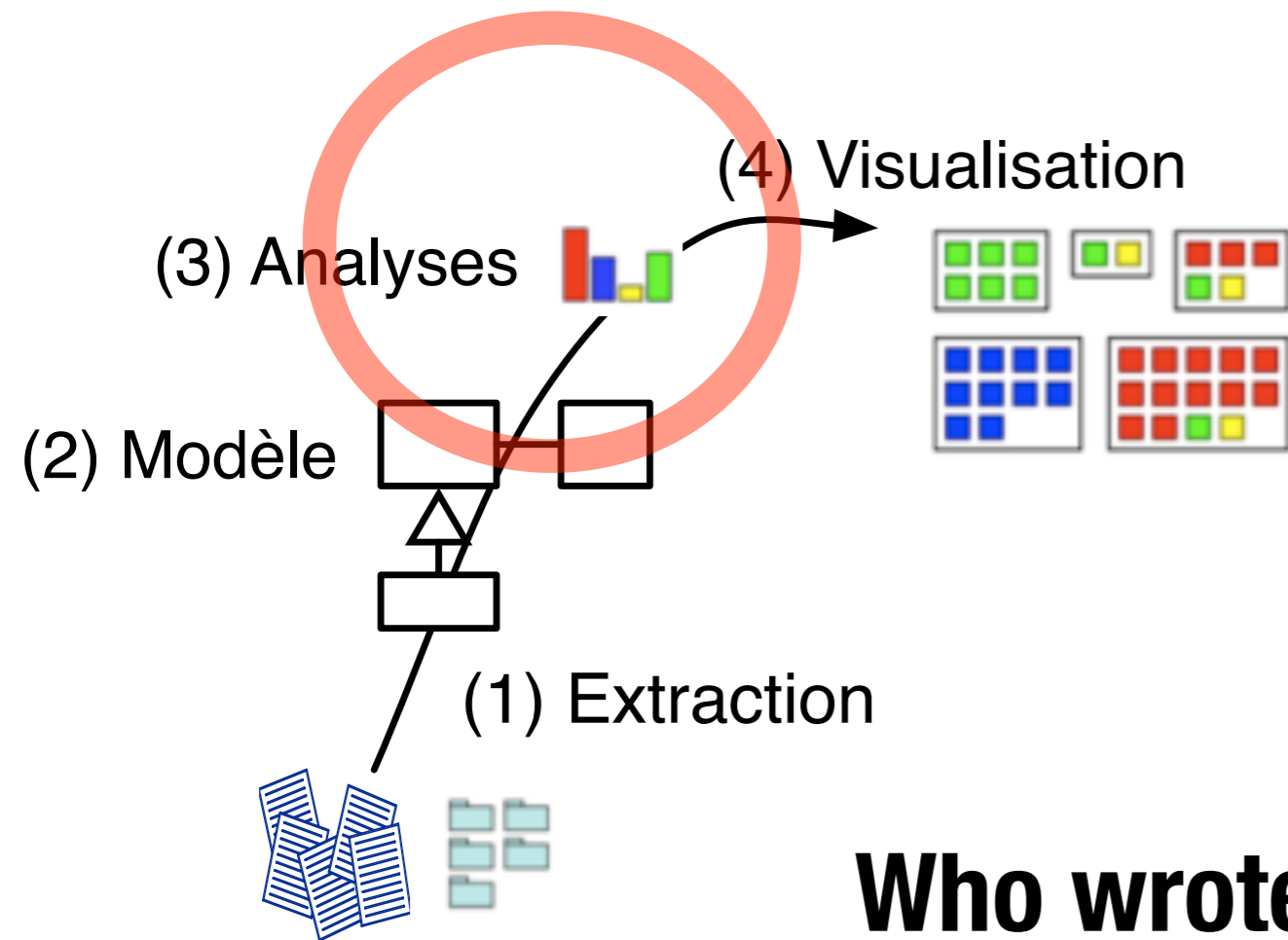
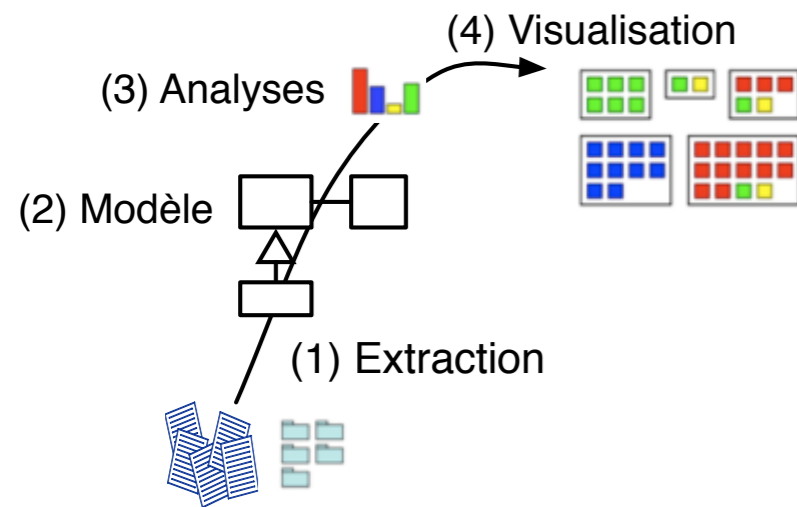**Who wrote how many lines of code?**

Step : 3 - Creating the Map
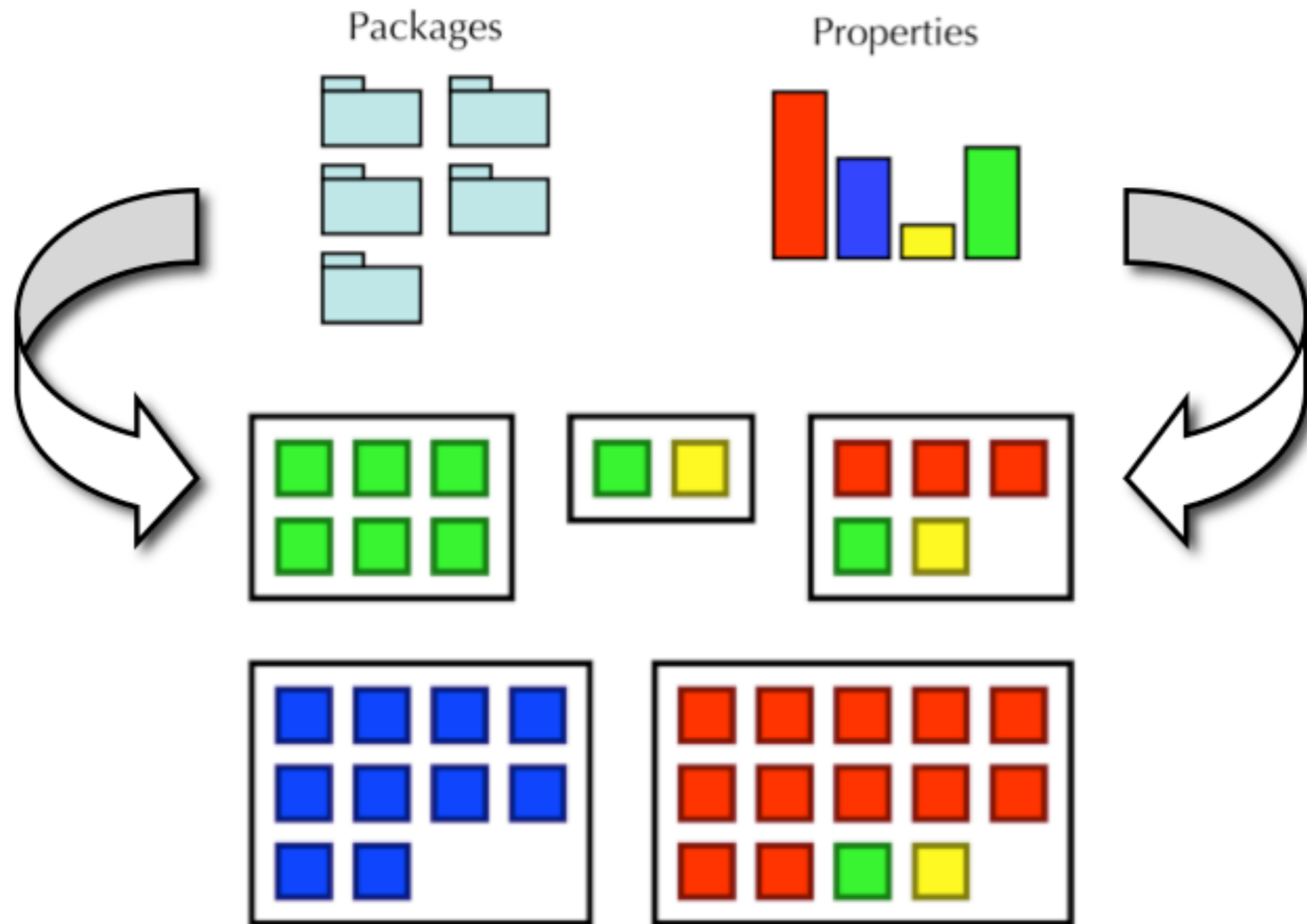
All JBoss at a glance
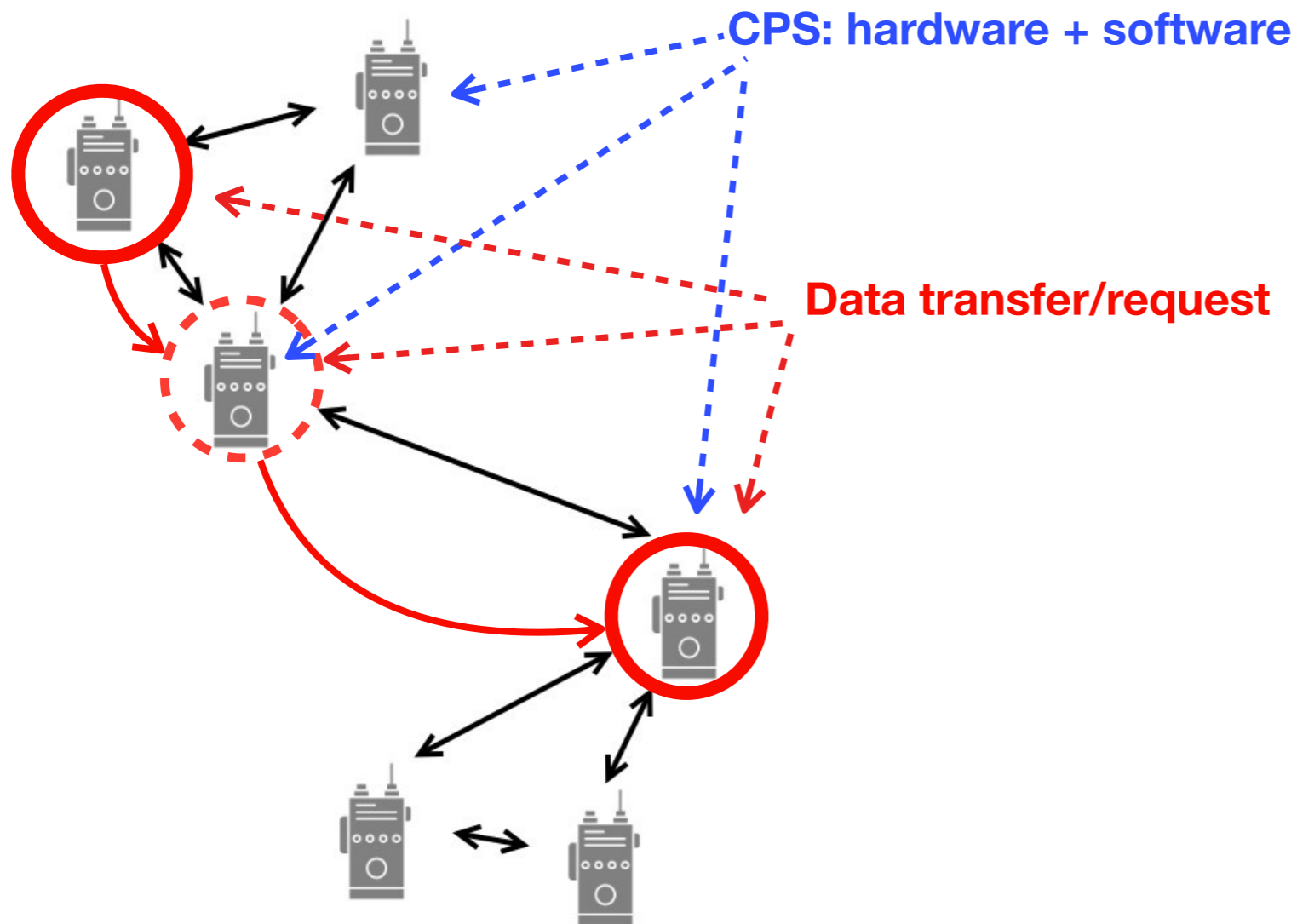
Interactive tool
Data in perspective

(4) Visualisation

(3) Analyses

(2) Modèle

(1) Extraction

classes select: #isGod

McCabe = 21

LOC = 753,000
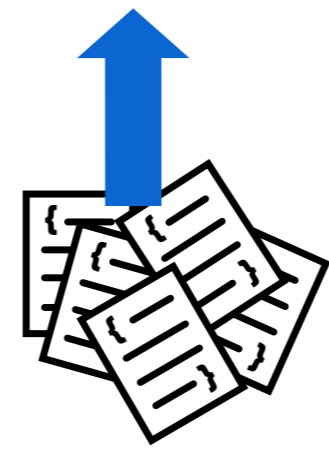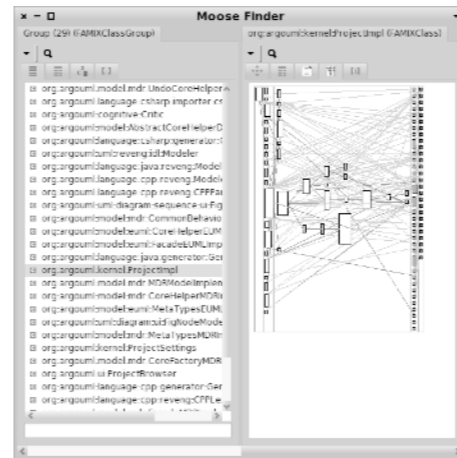
Example: assess and respond to threats

CPS network
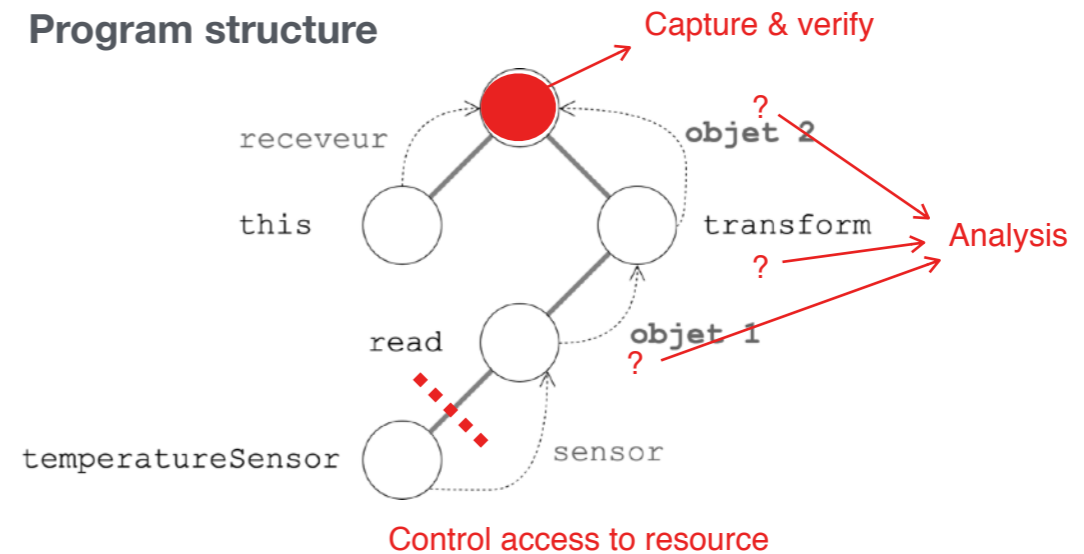

CPS: hardware + software

Data transfer/request

Example: assess and respond to threats
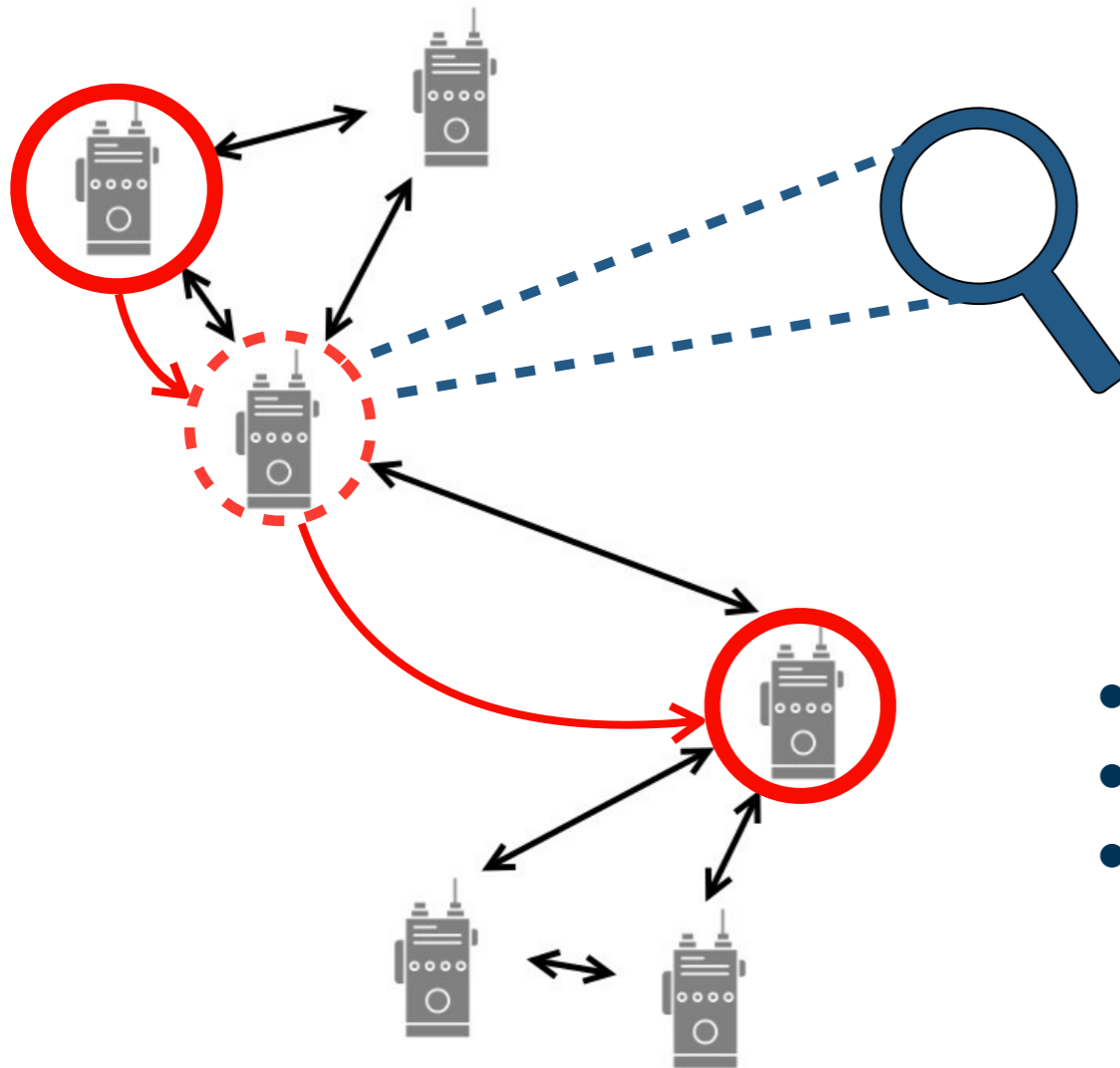
CPS network

Dynamic analysis of running software entities:

Program structure

Capture & verify

receveur
this
read
temperatureSensor
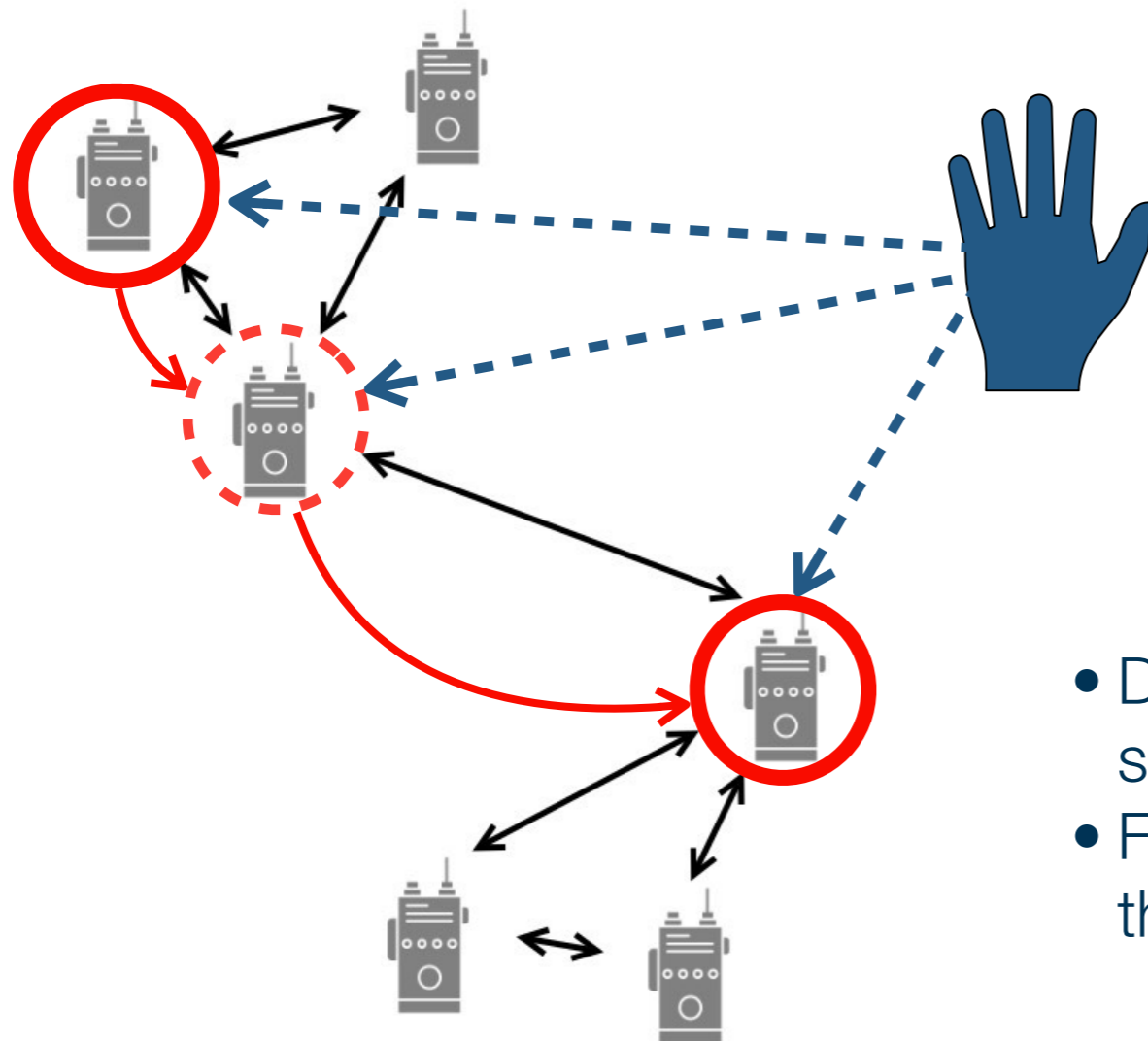sensor
objet 2
objet 1
transform
Analysis

Control access to resource

- Capture and verify data in the running system
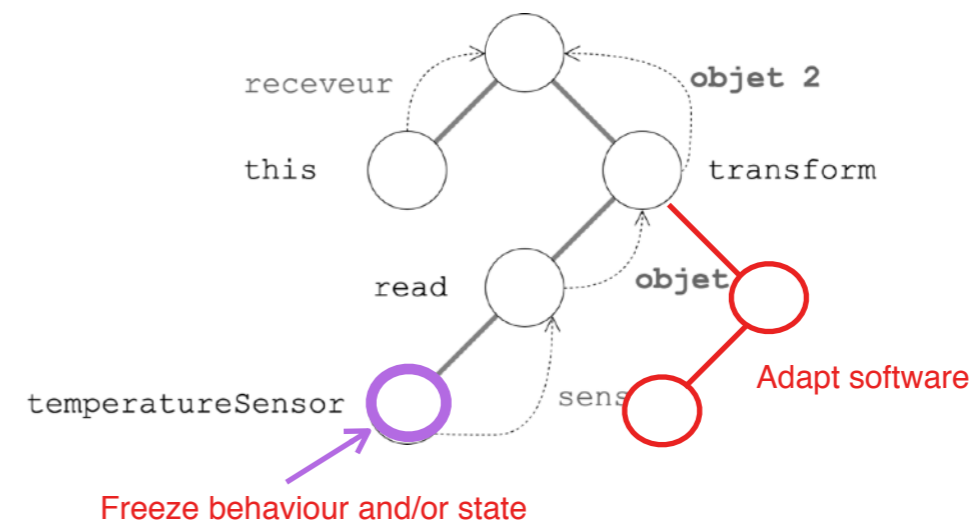- Control access to resources
- Analysis strategies

Example: assess and respond to threats

CPS network

Dynamic modification of the system's behaviour

Program structure

receveur — objet 2
this — transform
read — objet
temperatureSensor — sens — Adapt software

Freeze behaviour and/or state

- Dynamically react to threat by adapting software
- Freeze behaviour to regain control and secure the system
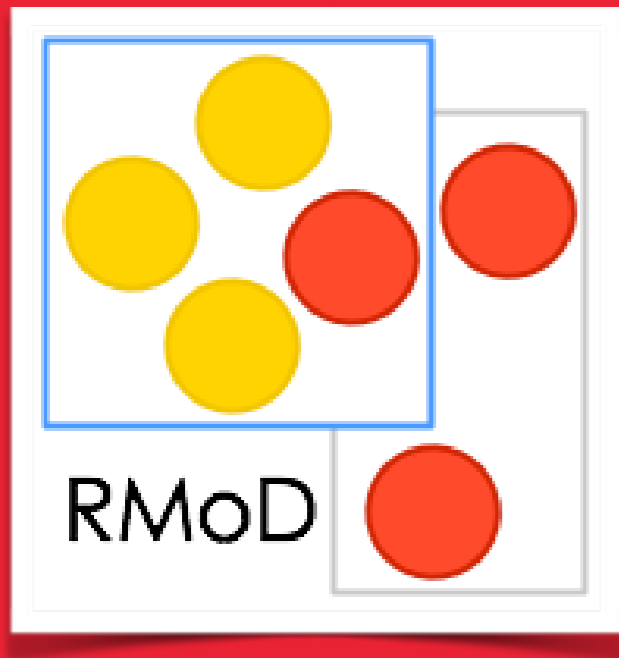
Dynamic Languages

Past

These DGA: M. Suen (abandon 2009)

Language: PhD of Jean-Baptiste Arnaud 2013

How to control references in OOP languages

-revocable references

-read-only

These DGA C. Teruel 2015

FUI SafePython avec Systematic

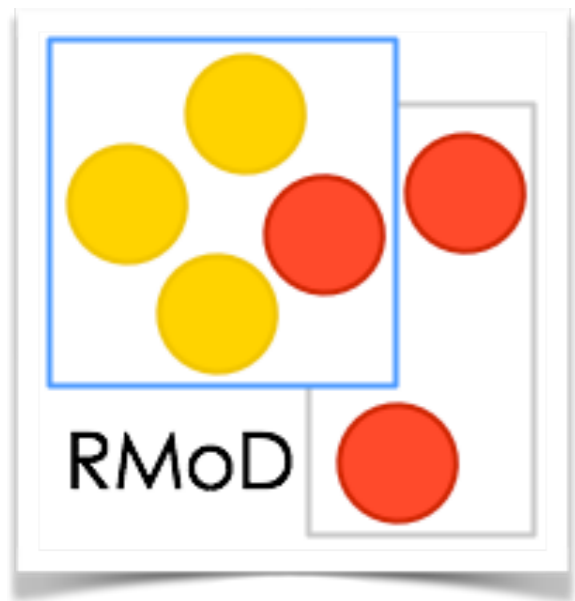FUI Resilient (Safe Javascript) avec Systematic

Where we would like to go

Secure VM

Planned a project with ENSTA Brest to have

hardware mix to see if we can

but internal fight on their side killed the projects.

CPER Data Smart data

How can we have revocable, traceable data?

Creating analyses to tame software

Interested by your challenges

- migration help
- assessment
- rule extraction
- software map
- security analyses and tools
- rearchitecturing
- service/micro service identification
- blockchainisation :)