

Wico Mulder

Logica

PhD UVA, Computer Science, HCS

wico.mulder@logica.com,
wico.mulder@science.uva.nl

Grid Management Support by Means of Collaborative Learning Agents

Agenda

1. Introduction of the problem and the area of application
2. Present our Information system, based on collaborative agents.
3. Our collaborative learning mechanism
4. Results of our experiments with data of two grid-sites.
5. DFA Learning; The agents use deterministic finite automata (DFA) models.

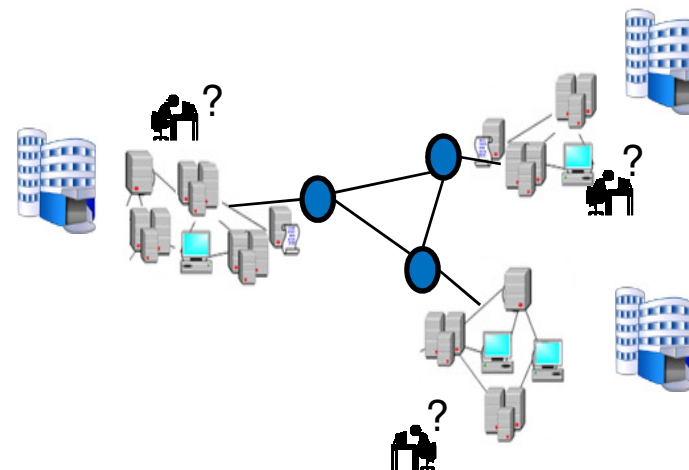
Experiences...

- The dynamics of grids → extra challenges operational maintenance.
- The growth of grids (size and usage) requires supporting systems to be of a more sophisticated level.
- Contemporary tools lack ability to relate events and infer information.
- Communication across organizational domains is insufficient embedded in existing monitoring tools.
- Log files contain a lot of information.

Problem

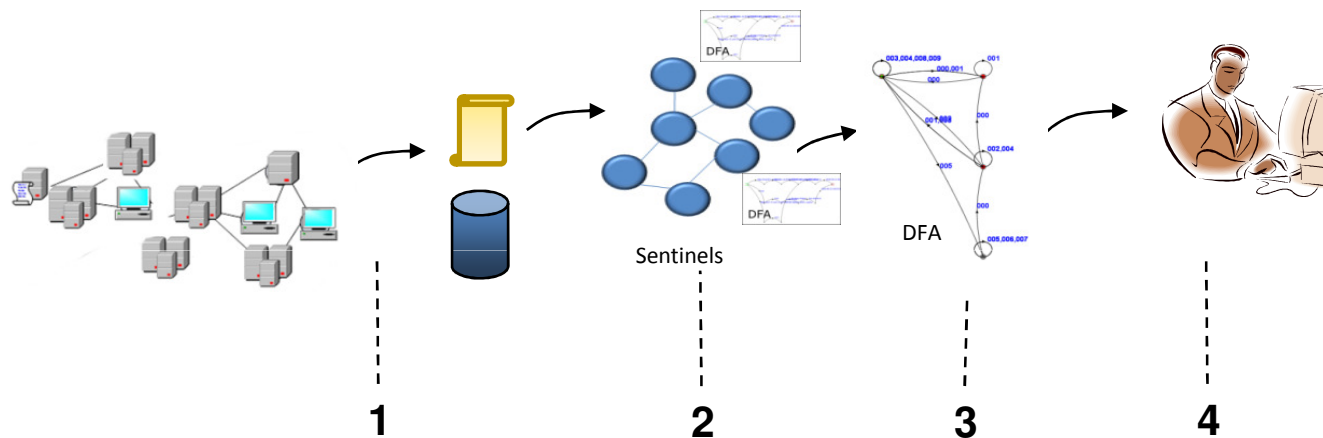
Problem: Maintenance of grid environments. (Stability, Reliability)

- There is no single system administrator
- The environment is dynamic
- There are multiple organizational domains
- We don't have access to all the data of all domains



Our approach

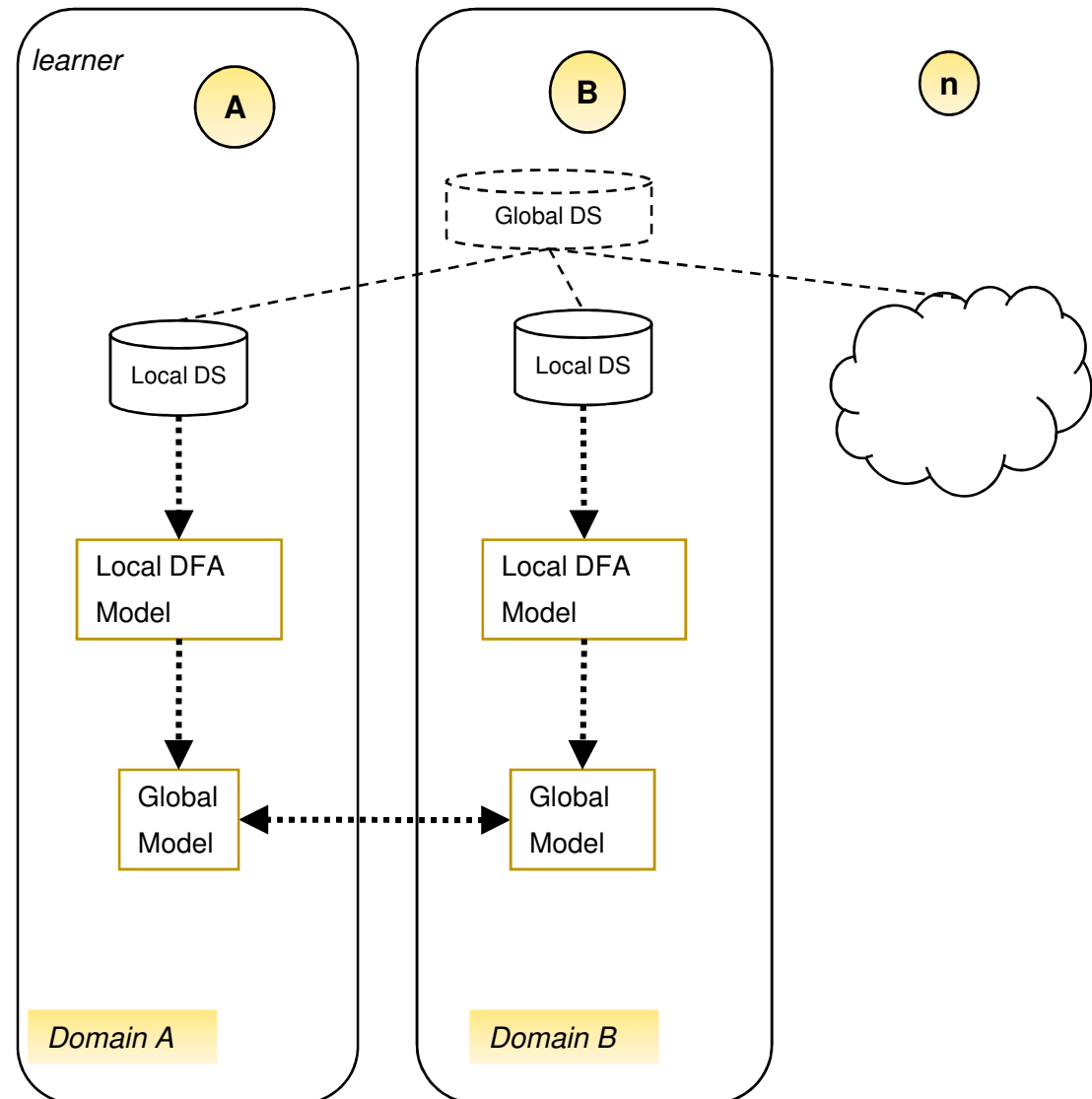
Approach: Our system consists of a group of individual learners that infer multiple local models and share their models in order to obtain a global model.



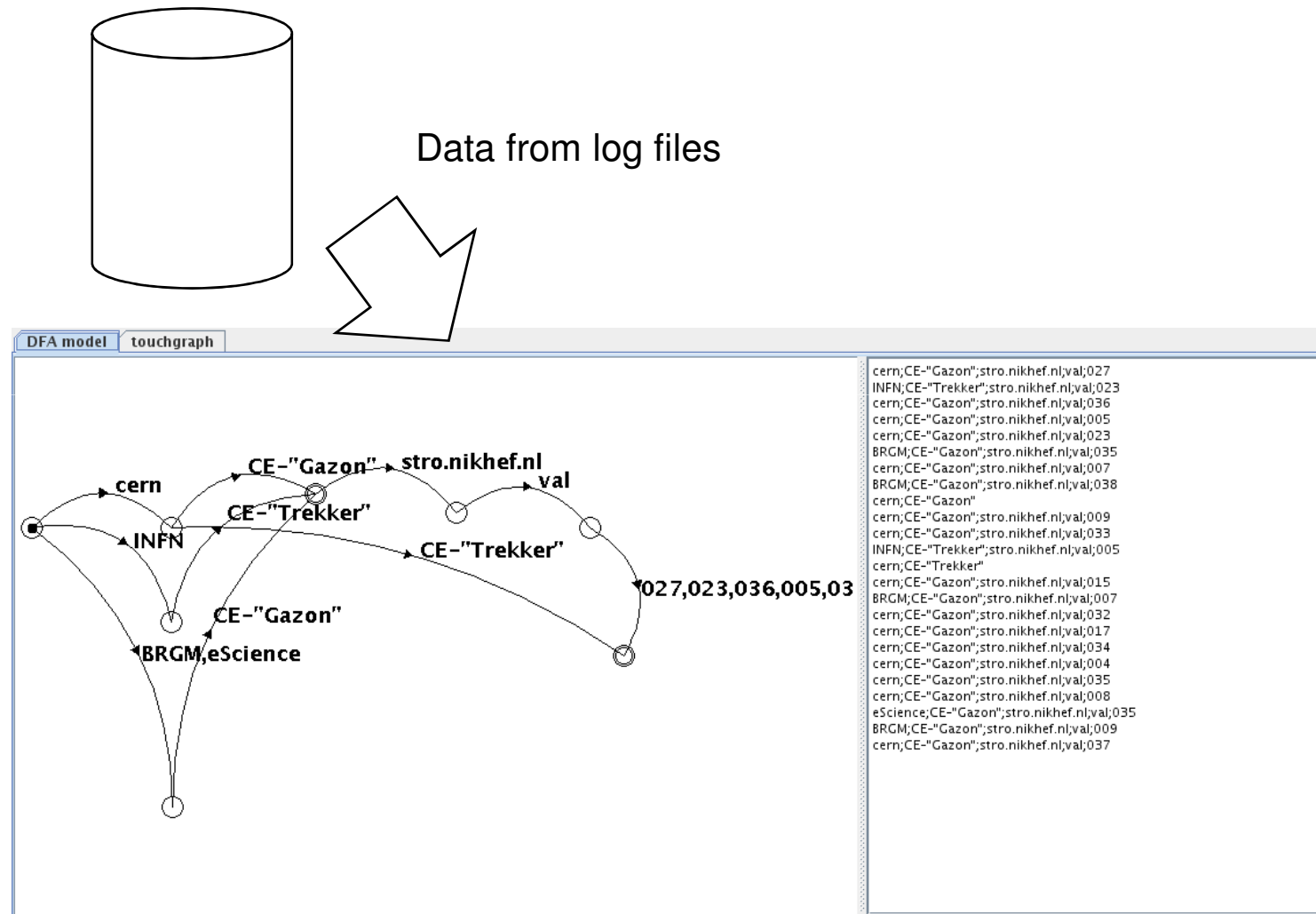
1. Grid components produce meta data and log files
2. Agents find structures (*DFA models of traffic patterns*) in local domains of the grid
3. Local structure models are merged into a global model
4. The models are used by system administrators (overviews, decisions) (applications in the form of anomaly-detection and predictions)

Collaborative Modelling

The task of finding patterns in network event data over multiple domains is regarded as a collaborative learning task carried out by a set of learners.



Individual DFA Modelling

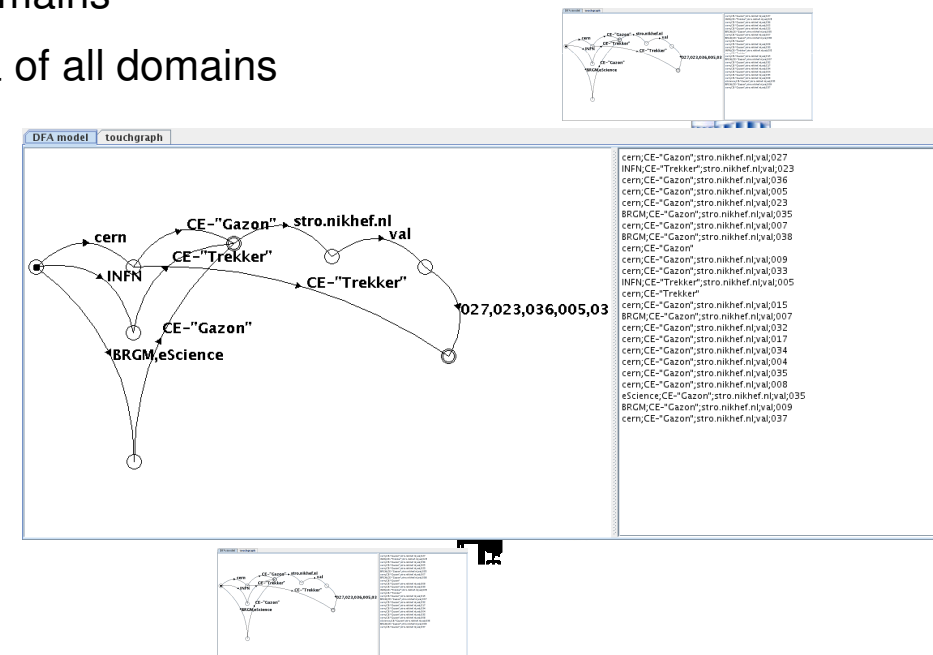


Problem

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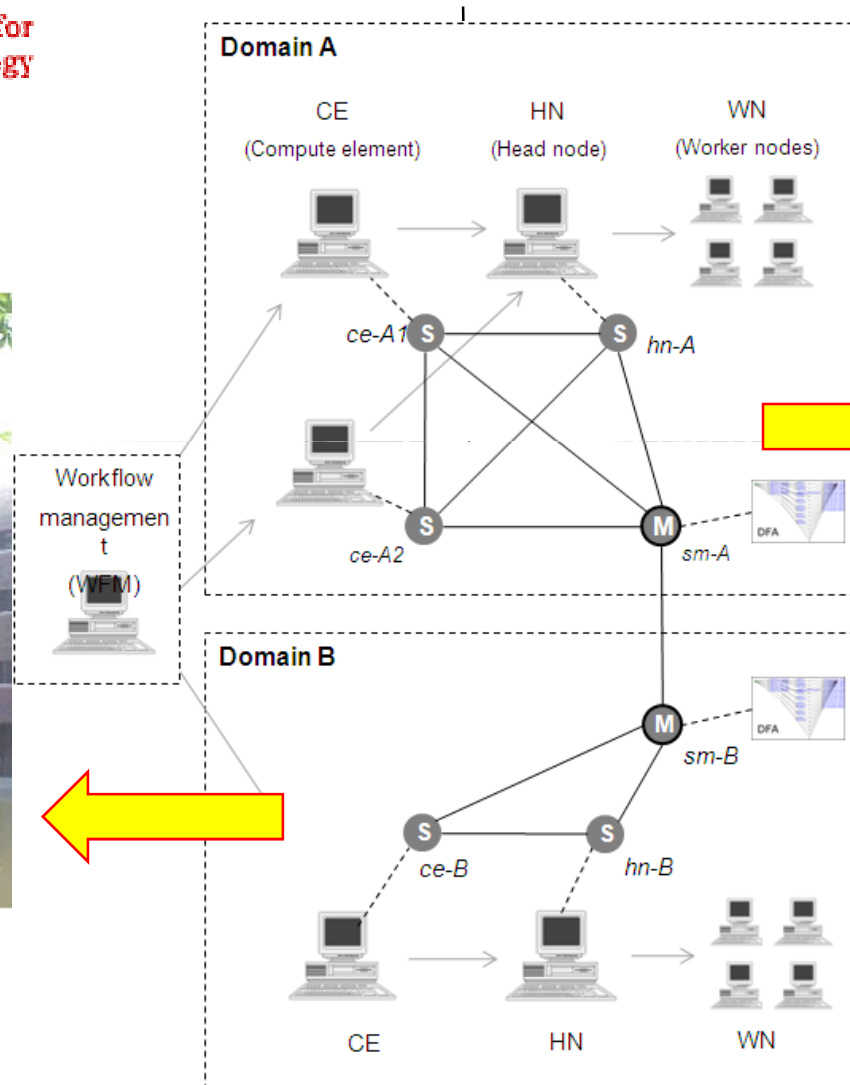
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→ Combine Models!



EXAMPLE X-DOMAIN OVERVIEW

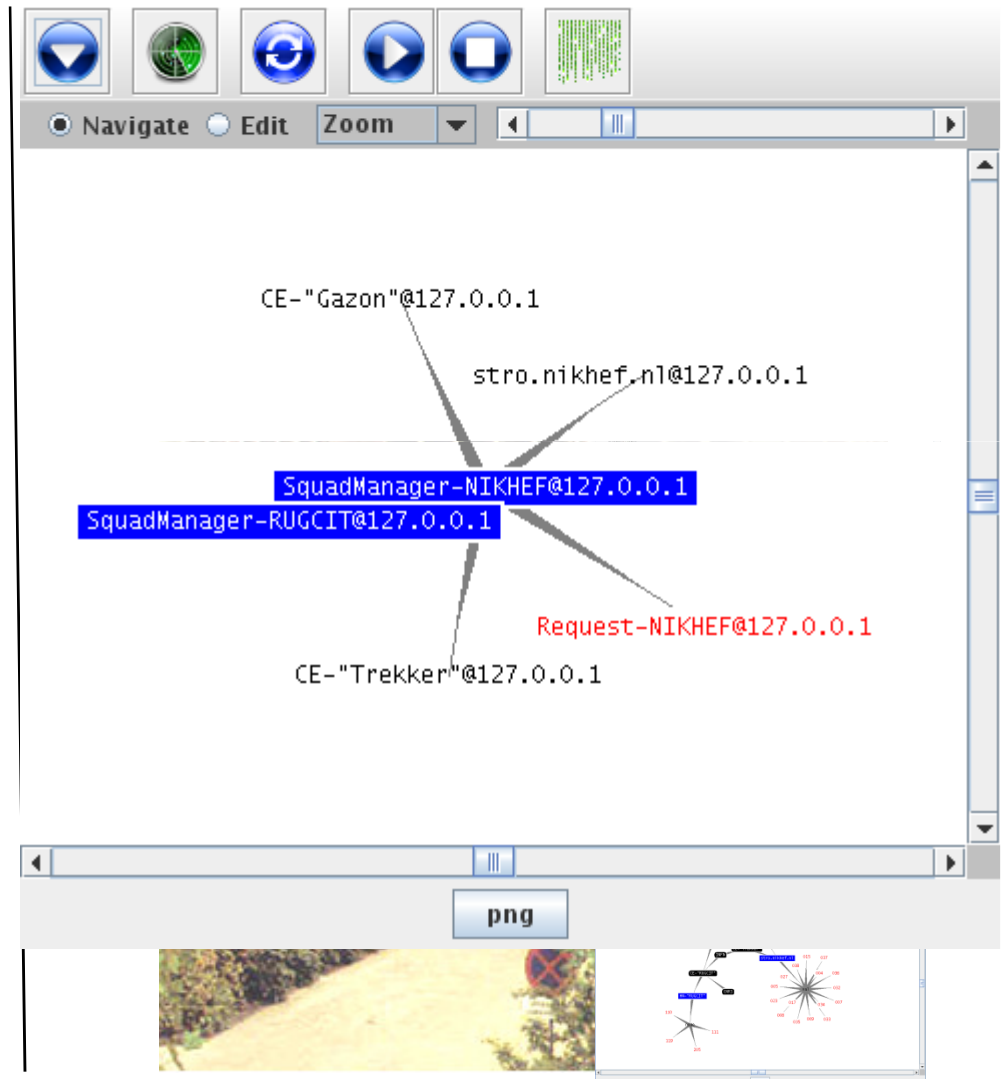
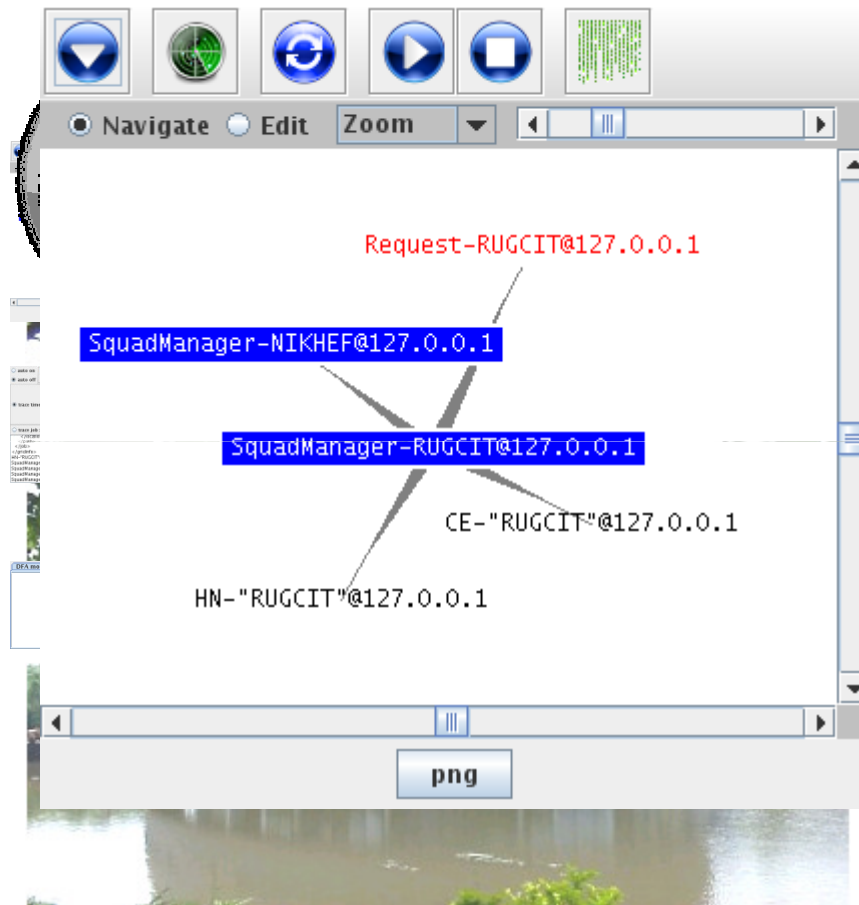
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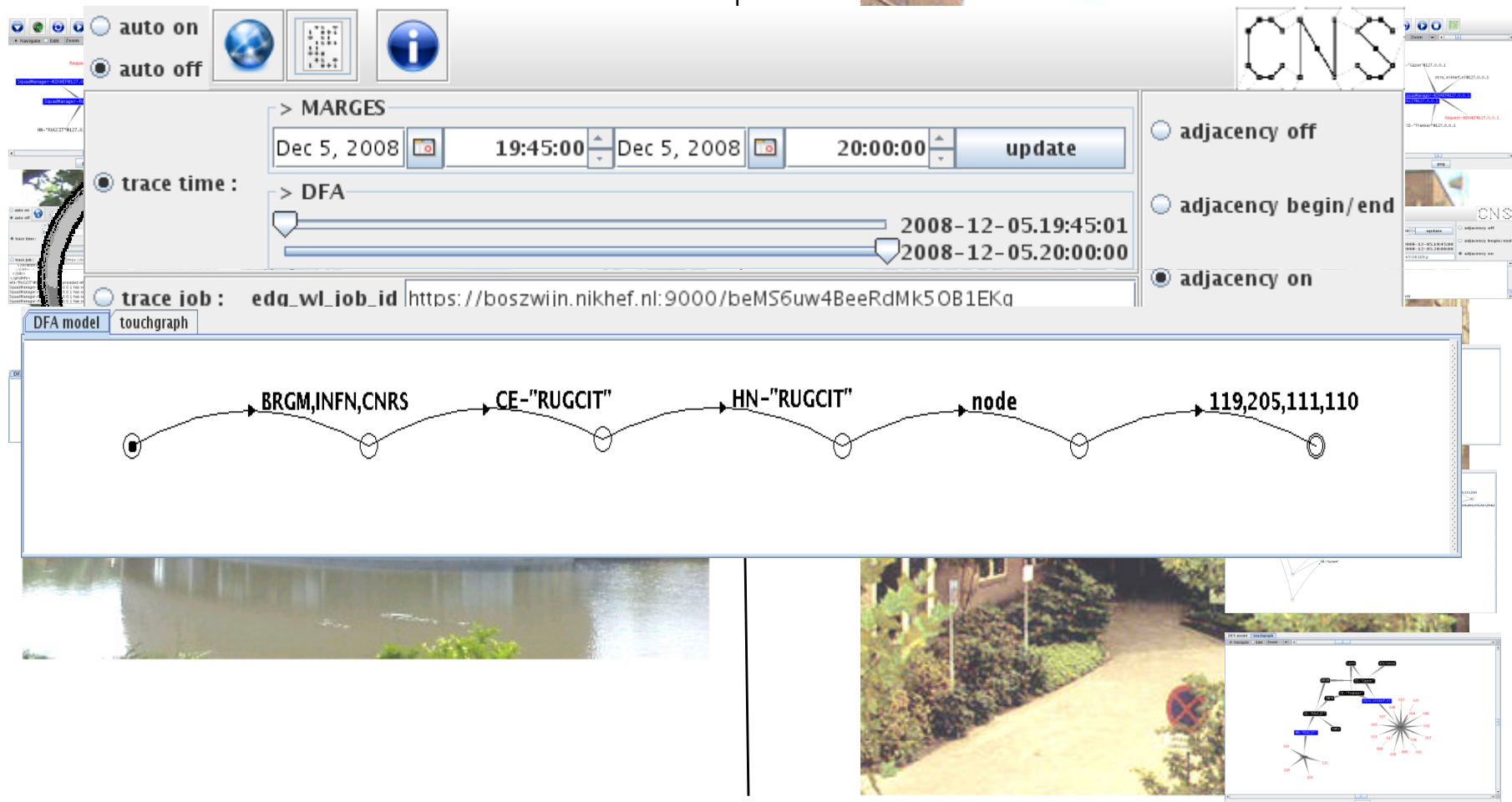
EXAMPLE X-DOMAIN OVERVIEW



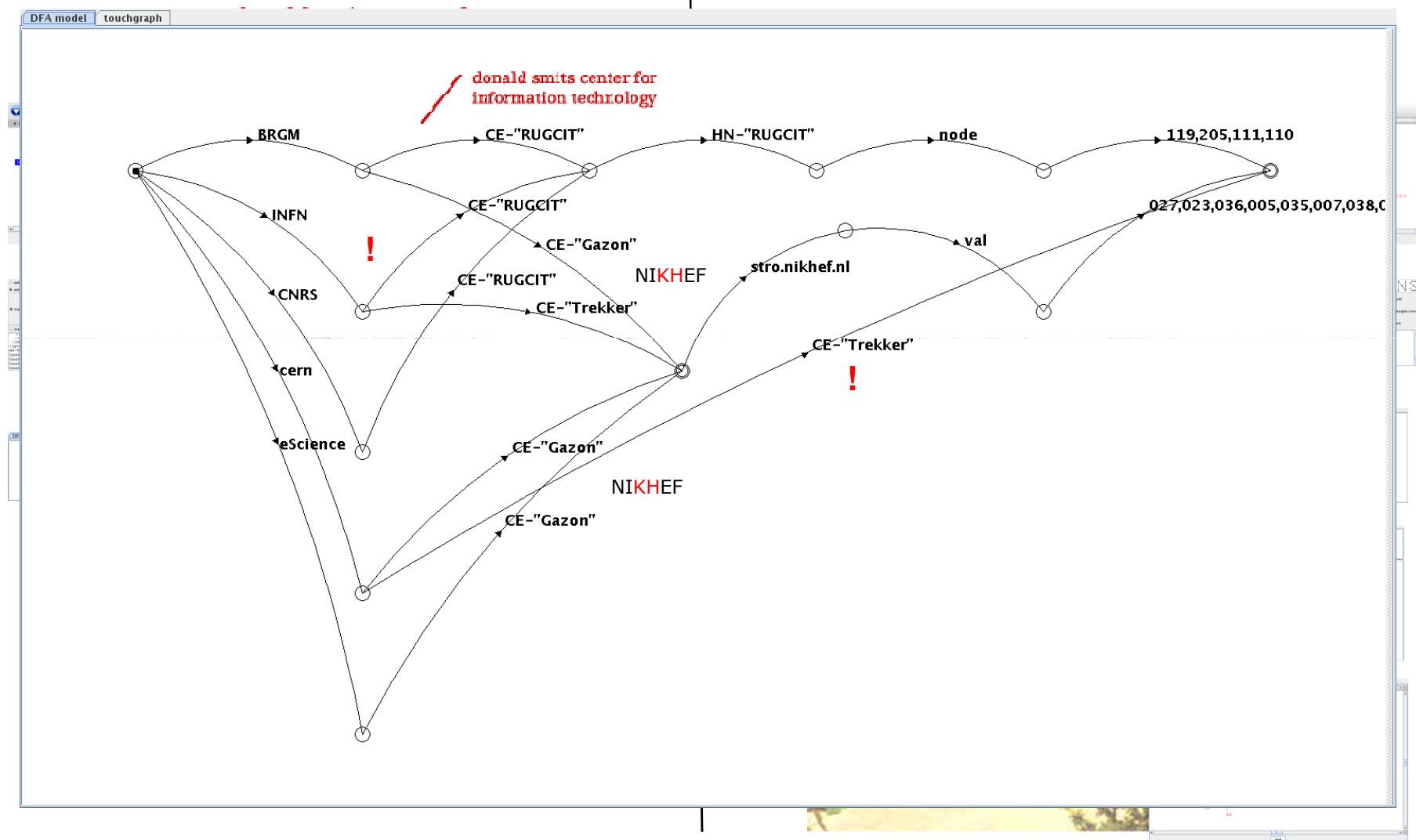
EXAMPLE X-DOMAIN OVERVIEW

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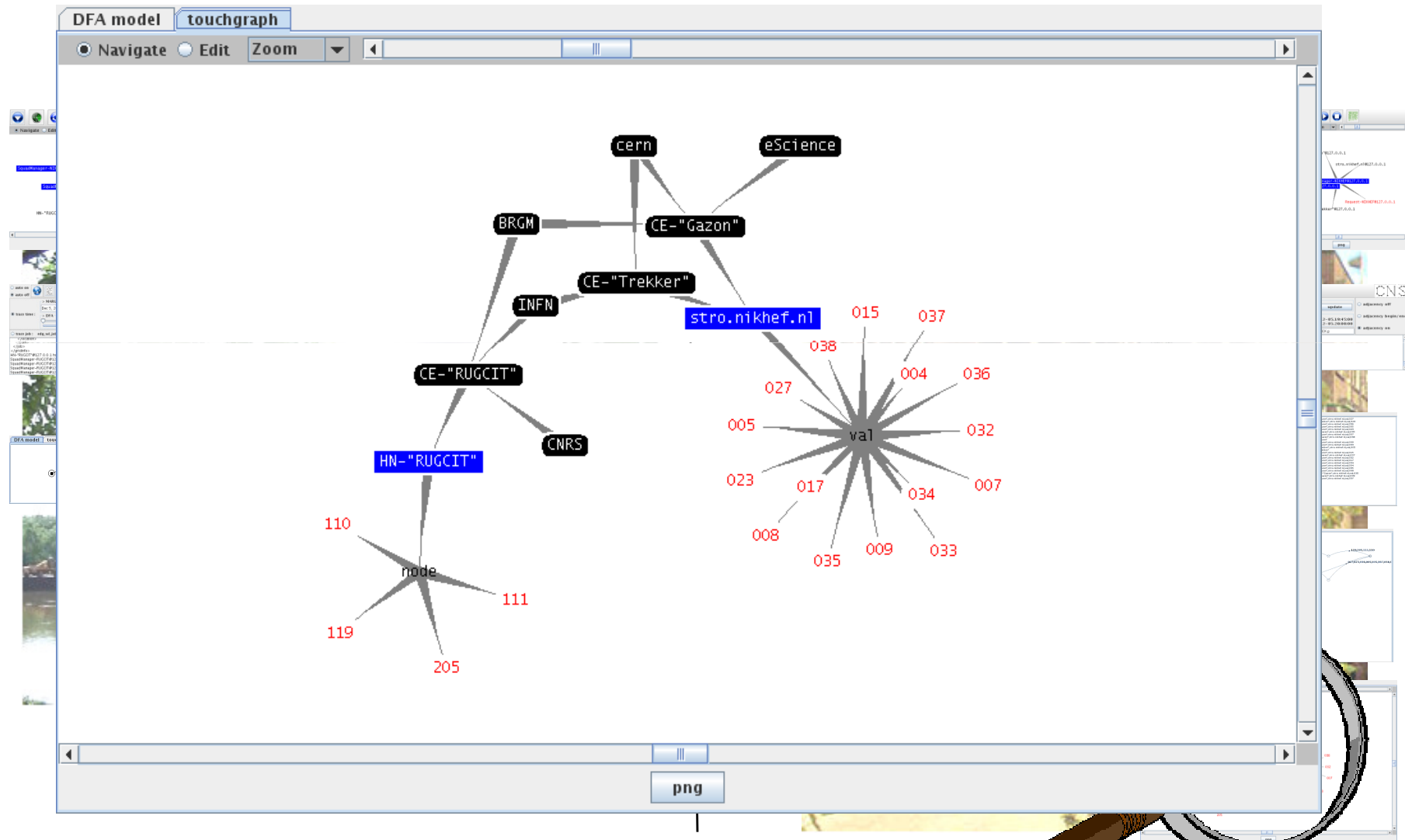
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EXAMPLE X-DOMAIN OVERVIEW



EXAMPLE X-DOMAIN OVERVIEW



Wico.Mulder(Logica) @Logica.com

Eduard Drenth (Logica)

Arjan Stoter (Logica)

Oscar Koeroo (Nikhef)

Dennis van Dok (Nikhef)

Ceriel Jacobs (VU)

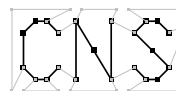
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Collaborative Network Solutions

Control, Collaborate, Correlate