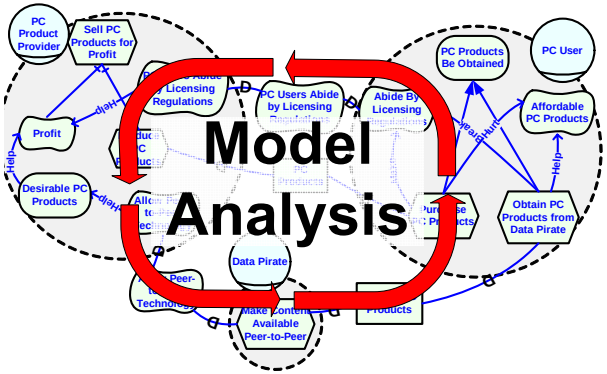
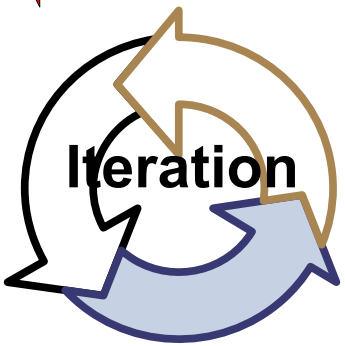
Why Use Domain Models in Software Engineering?





Abstraction

Socio-Technical System

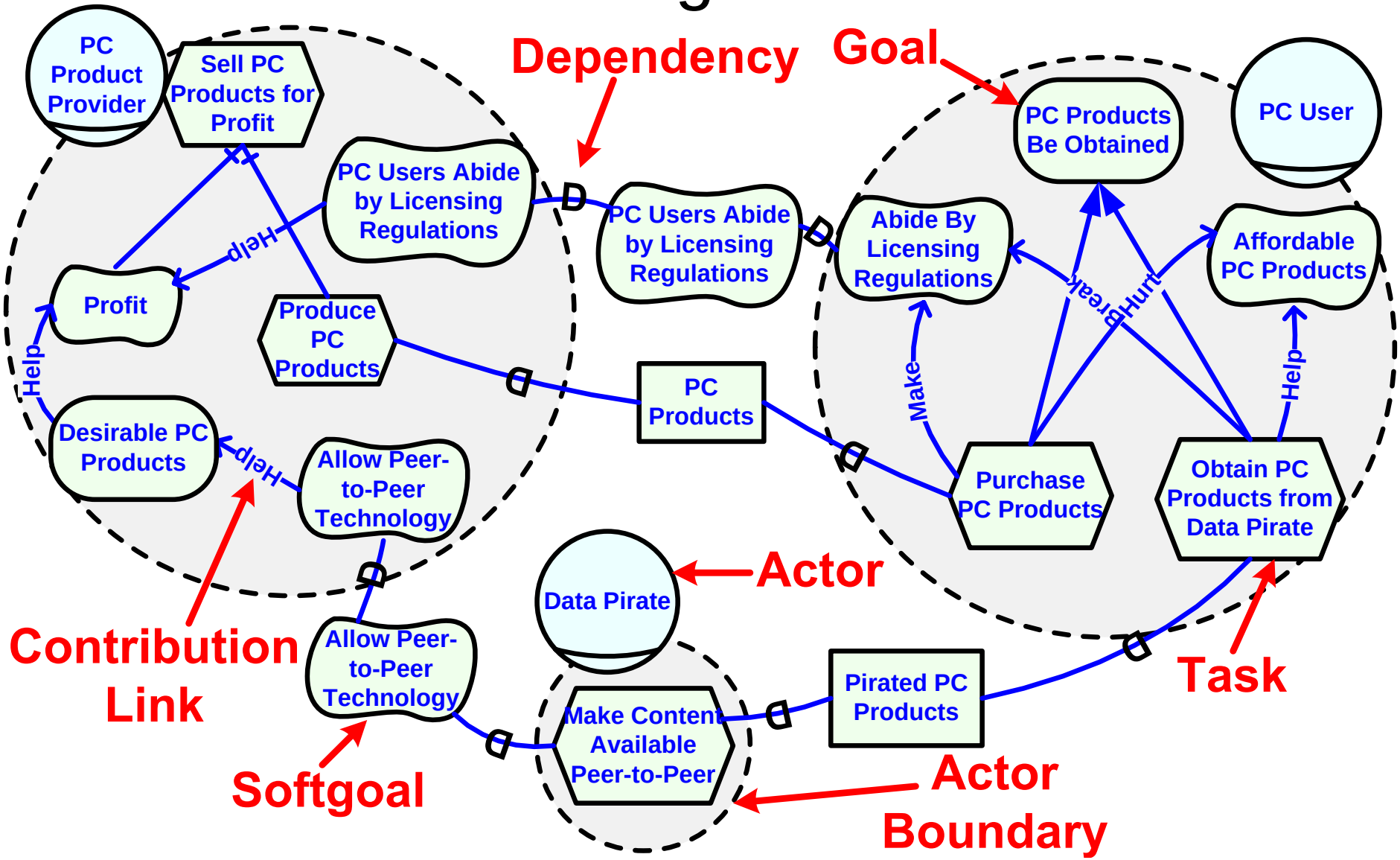
Elicitation

High Level Design Requirements

- Abstracts reality
- Facilitates communication and understanding
- Reveals gaps in knowledge

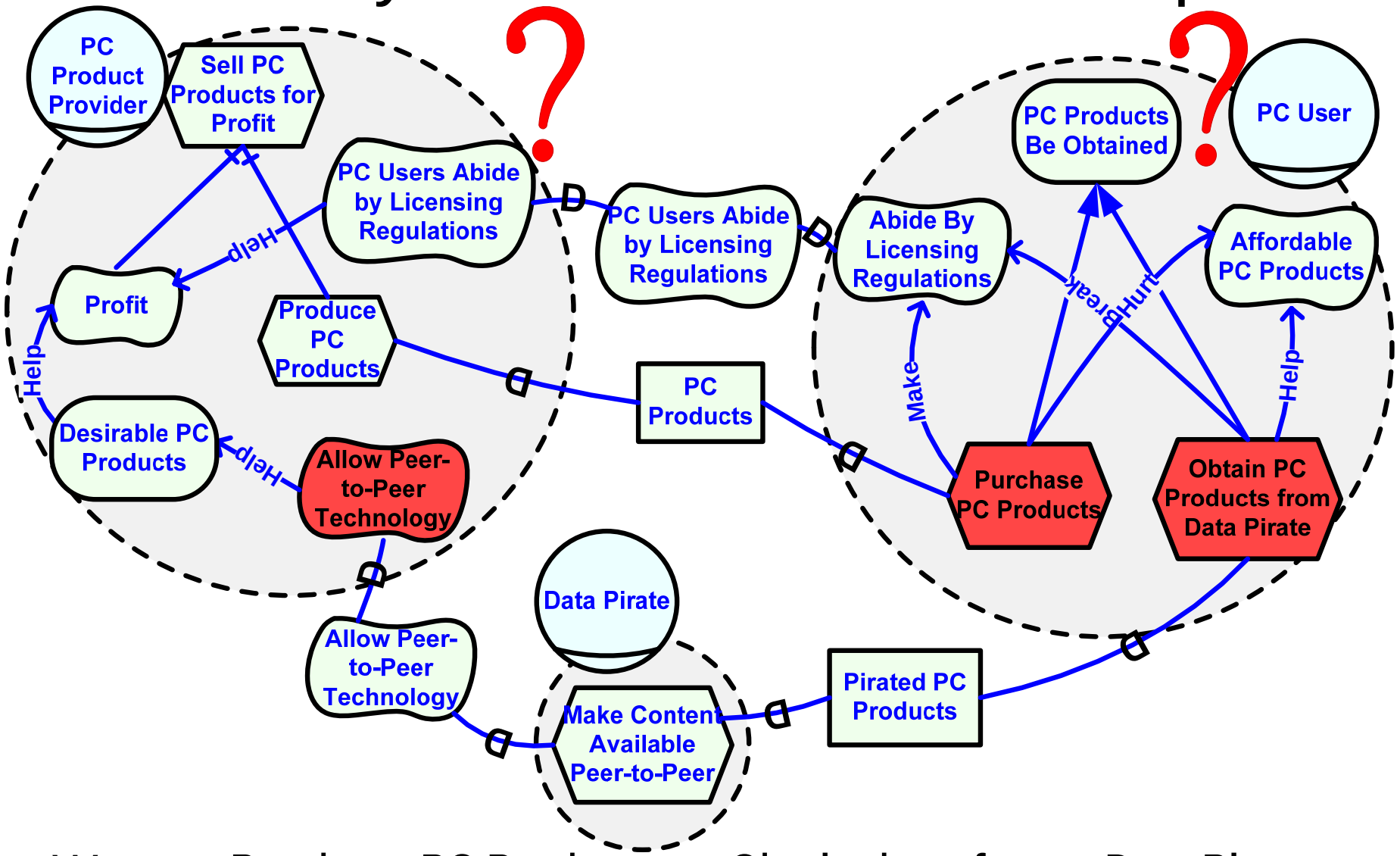
- Promotes domain analysis, “what if…?”
- Helps elicit requirements
- Facilitates high-level design and redesign

i* Modeling Framework



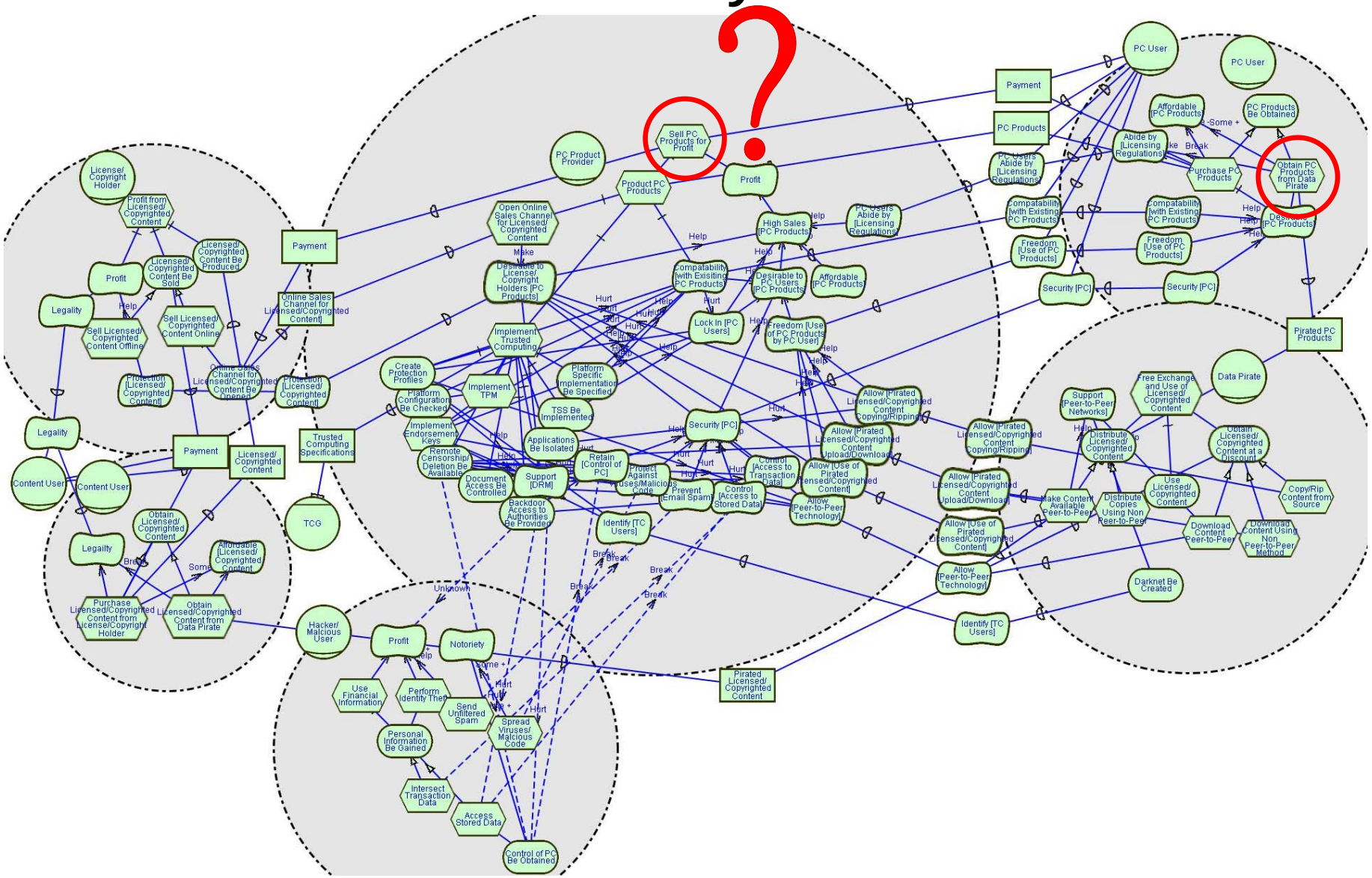
Uses Goals, Softgoals, Tasks, Contributions, Actors, Actor Boundaries and Dependencies to explain the motivations and intentions behind socio-technical systems.

i* Analysis: PC Products Example



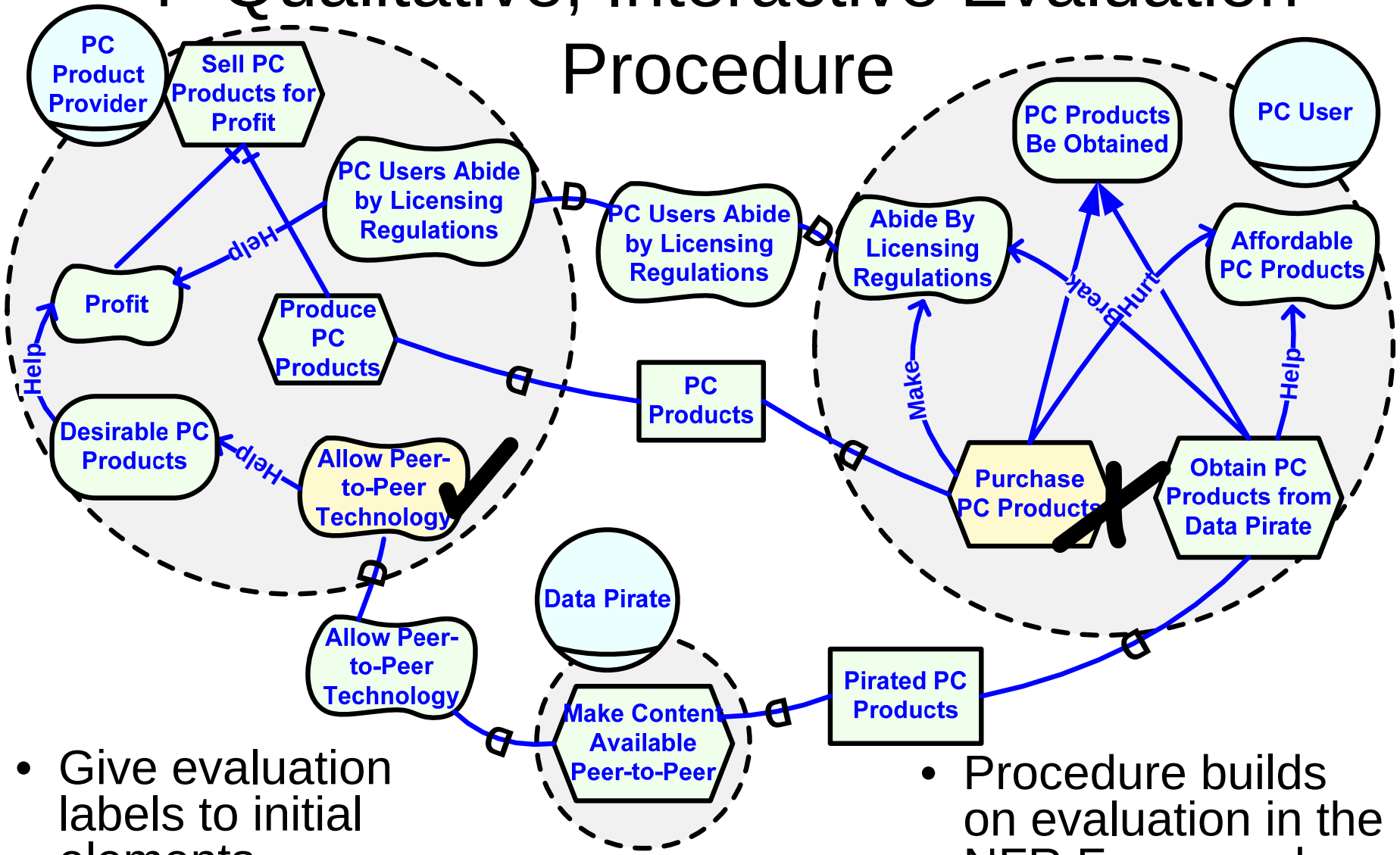
- We can Purchase PC Products or Obtain them from a Data Pirate.
- Should the PC Product Provider Allow Peer-to-Peer Technology?
- How can we analyze the effects of these decisions?

i* Analysis



- i* models can be extremely complex.
- Analysis without a methodology or tools is difficult.

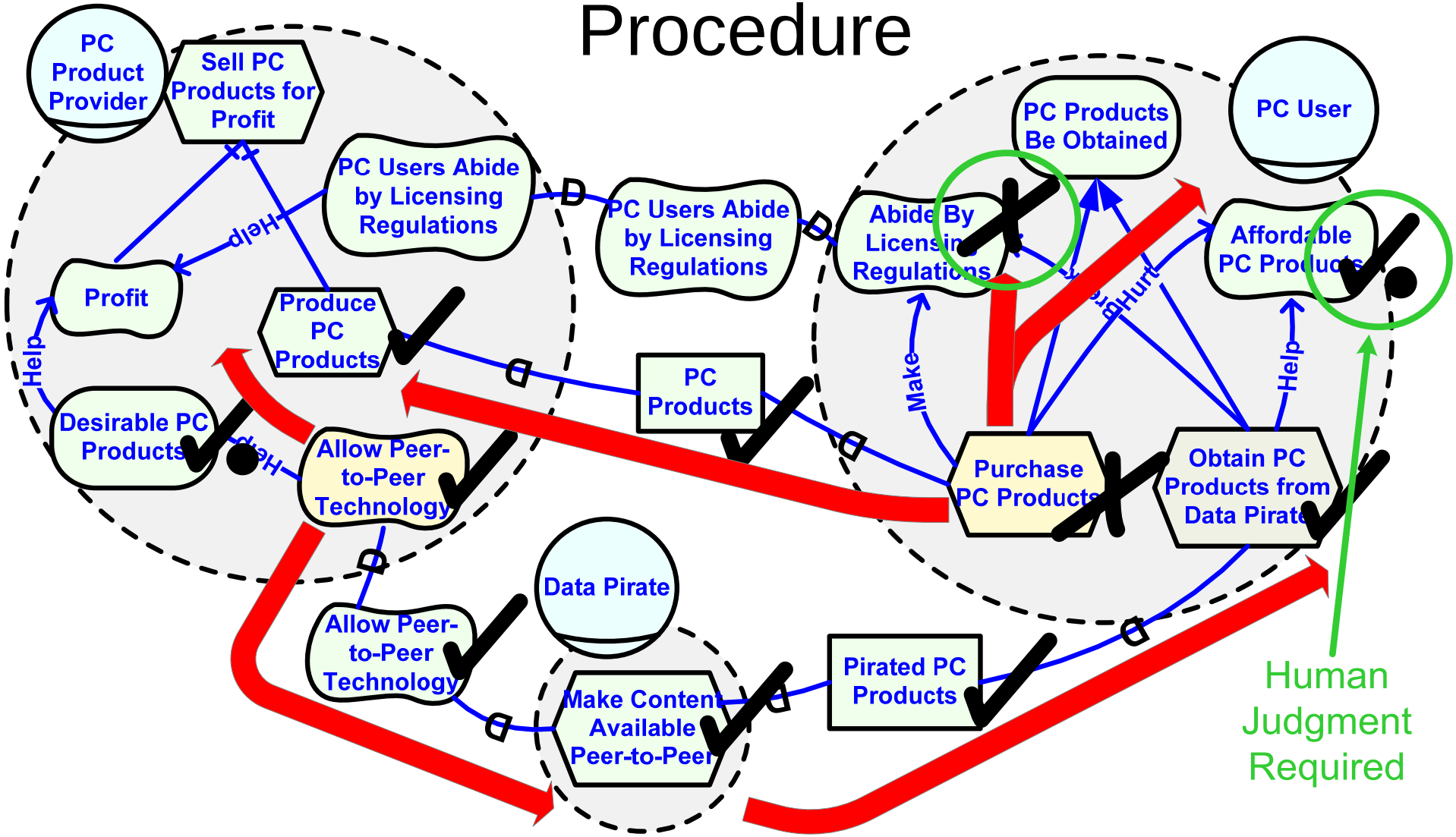
i* Qualitative, Interactive Evaluation Procedure



- Give evaluation labels to initial elements.
- Procedure builds on evaluation in the NFR Framework.

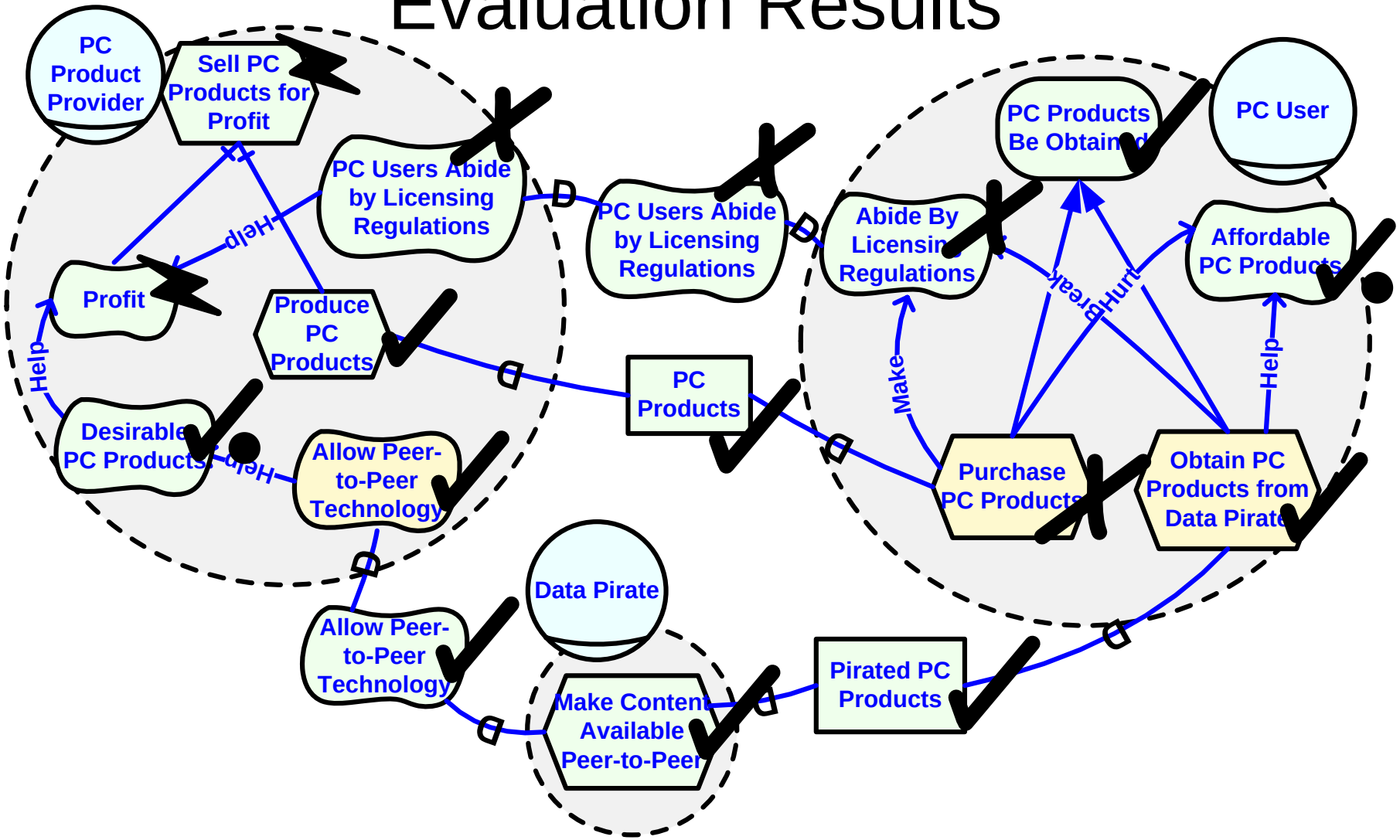
Full Satisfaction ✓ ✓ ✗ ✗ ✗ **Full Denial**

i* Qualitative, Interactive Evaluation Procedure



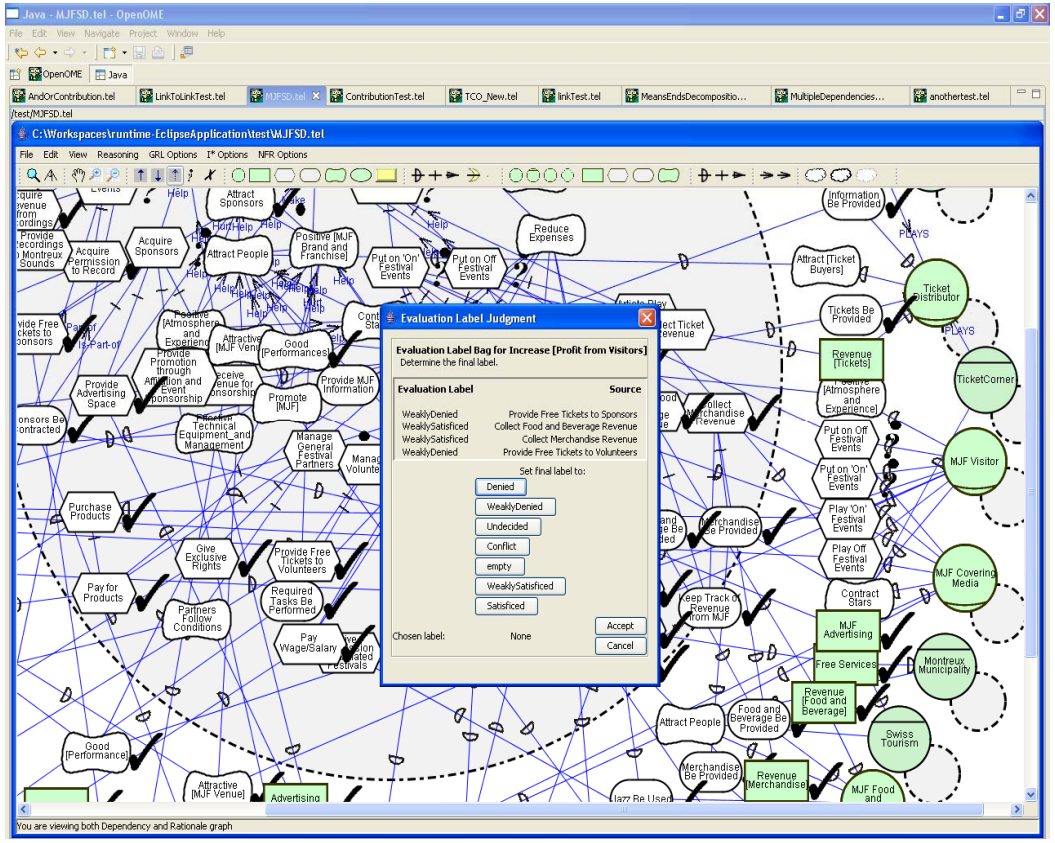
Propagate labels using a combination of predefined rules and human judgment.

Evaluation Results



- The PC User Obtains PC Products somewhat Affordably, but the PC Product Provider has a conflict value for Sell PC Products for Profit.
- Is the model accurate? Is there a better alternative?
- Further iterations of modeling and analysis are needed.

Evaluation Implementation: OpenOME



Eclipse-based modeling tool, built on EMF and GMF

Trial Domain: Kids Help Phone

- Applied in a large case study involving Trusted Computing.
- Applied in a strategic requirements analysis project for the Canadian Youth Counseling Organization, Kids Help Phone.

Future Directions

- Inspired by Maiden et al.'s use of Satisfaction Arguments, systematically capture the rationale for evaluation decisions, including domain assumptions, in textual arguments attached to the model.
- Incorporating aspects of formal model checking in ways which are near "invisible" to the user, keeping the simplicity and usability of i* modeling constructs.

References

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- OpenOME, an open-source requirements engineering tool, http://www.cs.toronto.edu/km/openome/OpenOME.html, Retrieved April 2007
- Maiden, N., Lockerbie, J., Randall, D., Jones, S., Bush, D., "Using Satisfaction Arguments to Enhance i* Modelling of an Air Traffic Management System", to appear in the Proceedings of RE07.