



Bridging Representations of Laws, of Implementations and of Behaviours

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Law in action

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ex-ante

Research objective: a (partial)
realignment of representations of

Law

Implementations
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Social
Behaviours

legal system

legal-administrative
infrastructure

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*legal norms as
institutional
mechanisms*

*business
processes*

*intentional
characterizations
of behaviour*

Generalization

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- Similar contextualization processes exist to a certain extent in any agency (individual or organization), as requirement to be embedded in the social world.
- **how to operationalize their alignment?**

Humans implement this
function mostly via **narratives.**

Views available in narratives

	agents have behaved	agents usually behave	agents should behave
How	occurrence description	pattern description	normative specification
Why	occurrence explanation	behavioural mechanism	norm-creating mechanism

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- From occurrence to pattern: **generalization**

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- From pattern to occurrence: **instanciation**

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- A mechanism entails, via its execution path, an observable pattern → patterns are **abstractions** of mechanisms (cf. declarative vs procedural programming) .. but mechanisms are still patterns of primitive actions!

Views available in narratives

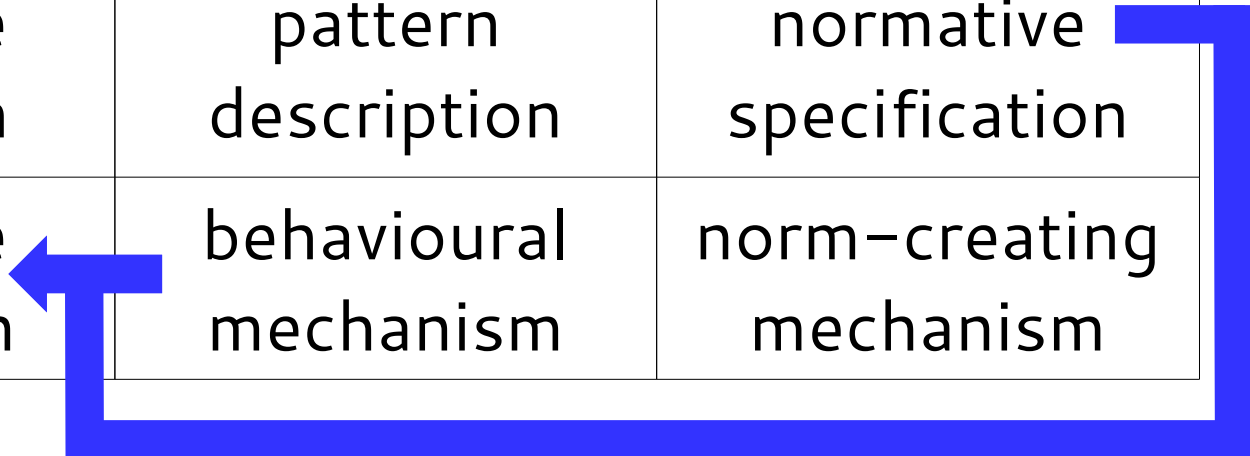
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- Similarly an explanation confirms, via its execution path, a description of an occurrence

Views available in narratives


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- Explanation of an occurrence is made in terms of behavioural mechanisms or normative mechanisms

Views available in narratives

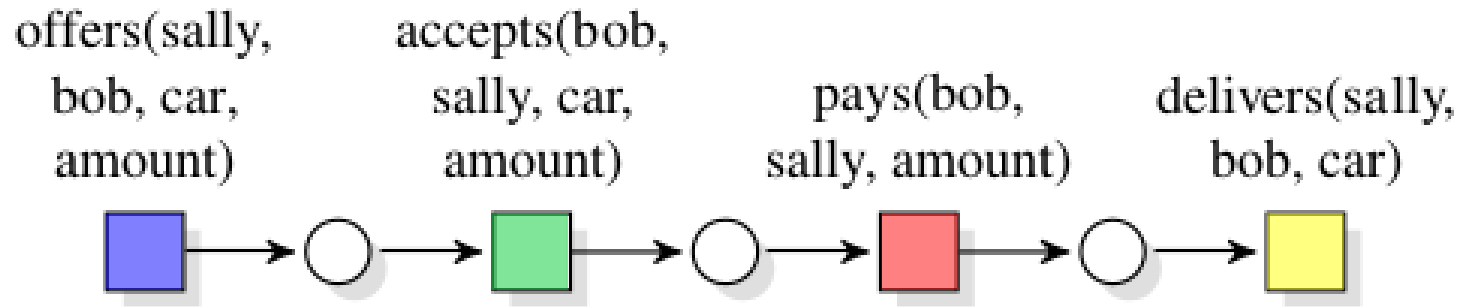
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- Norms **circumscribe** (with duties, prohibitions) or **enable** (with powers) certain behavioural mechanisms, defining what is correct/wrong, possible/impossible.

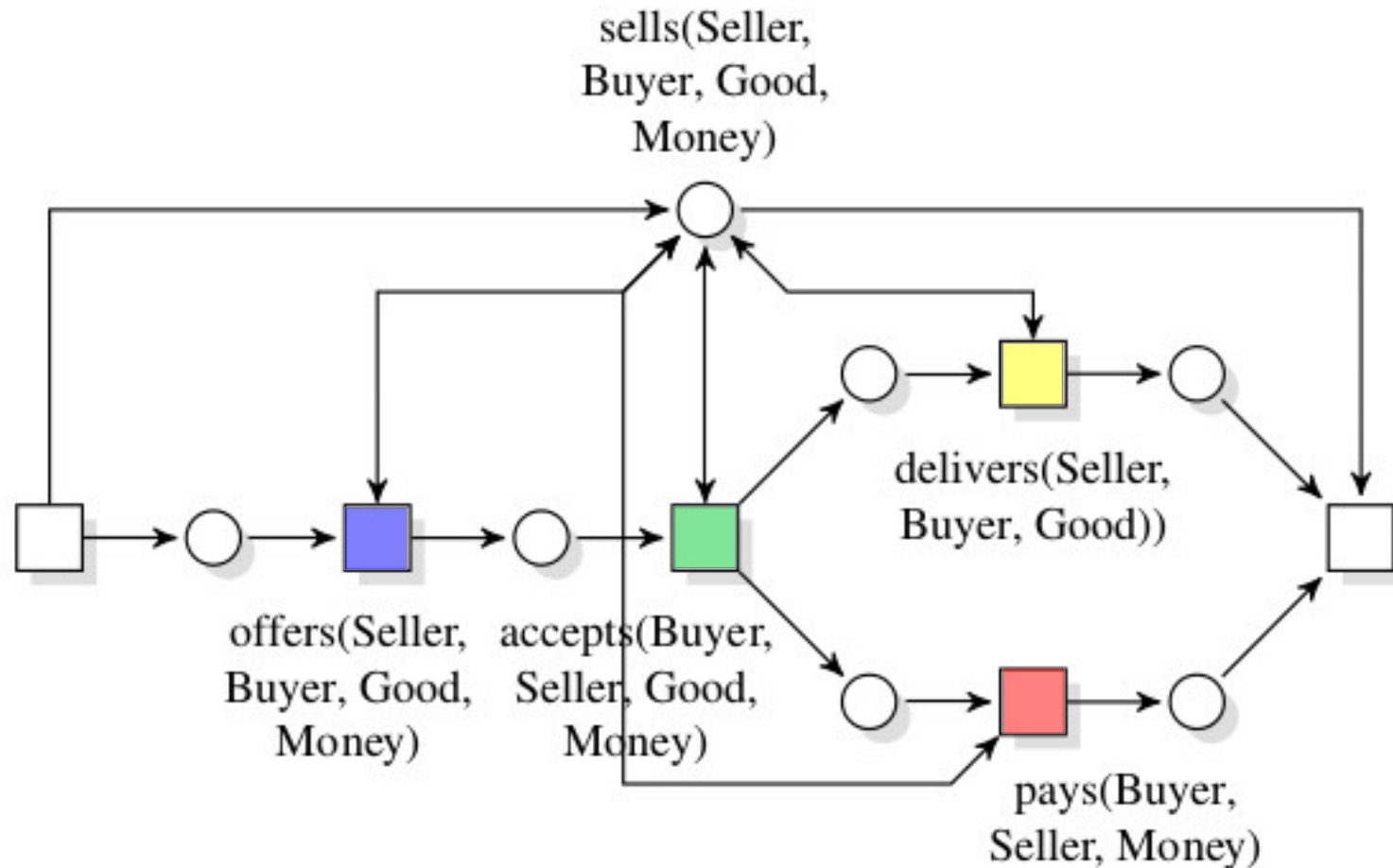
Some examples..

Occurrence description: a sale



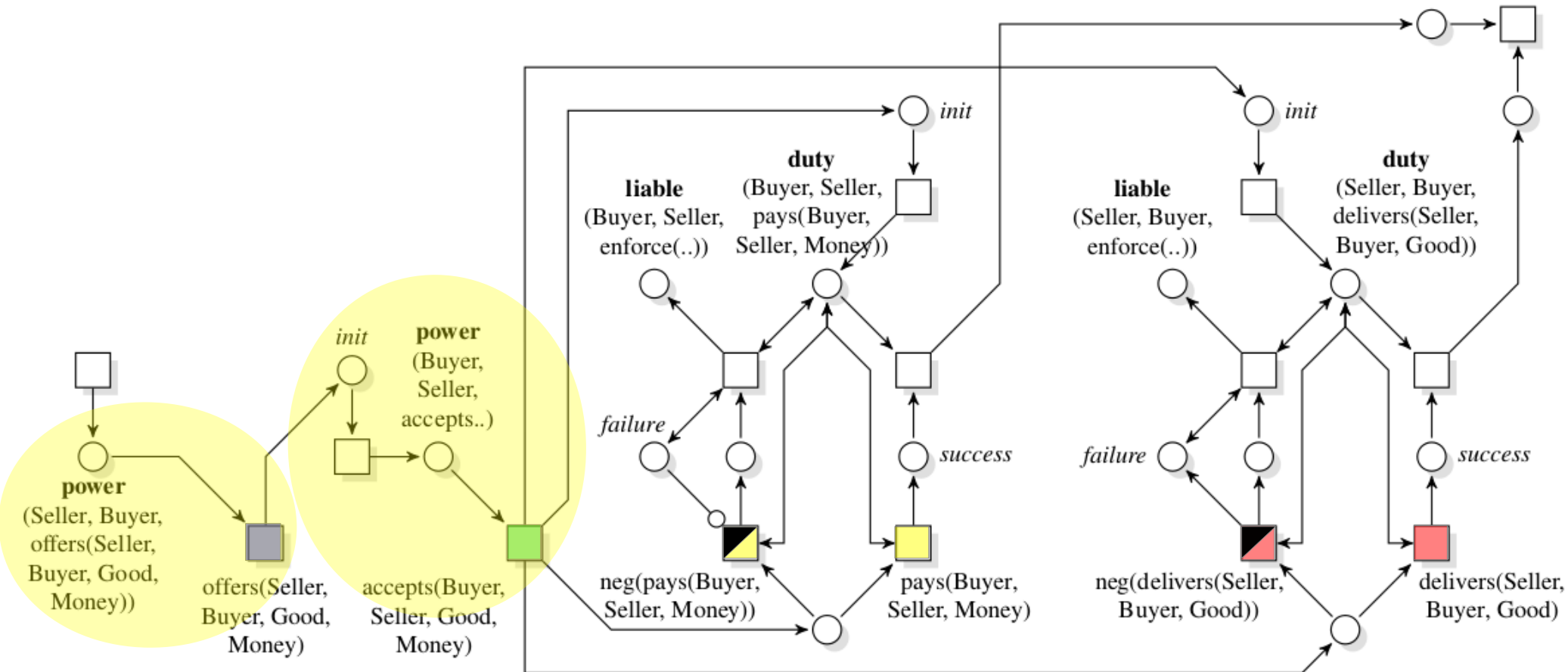
- Occurrences can be seen as *event logs*.

Pattern description: a sale



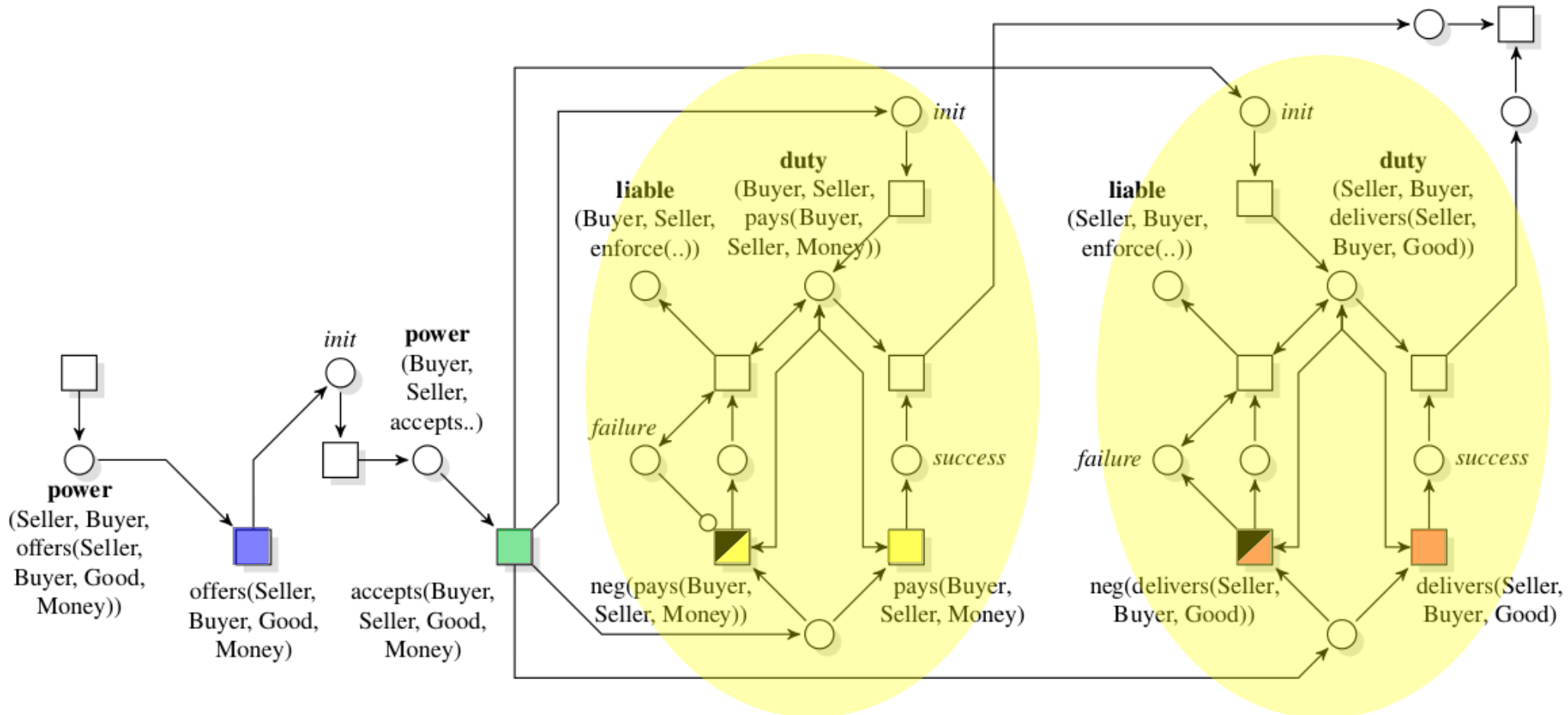
- In respect to occurrences, patterns introduce abstractions of references, and *partial ordering*.

Normative specification: a sale



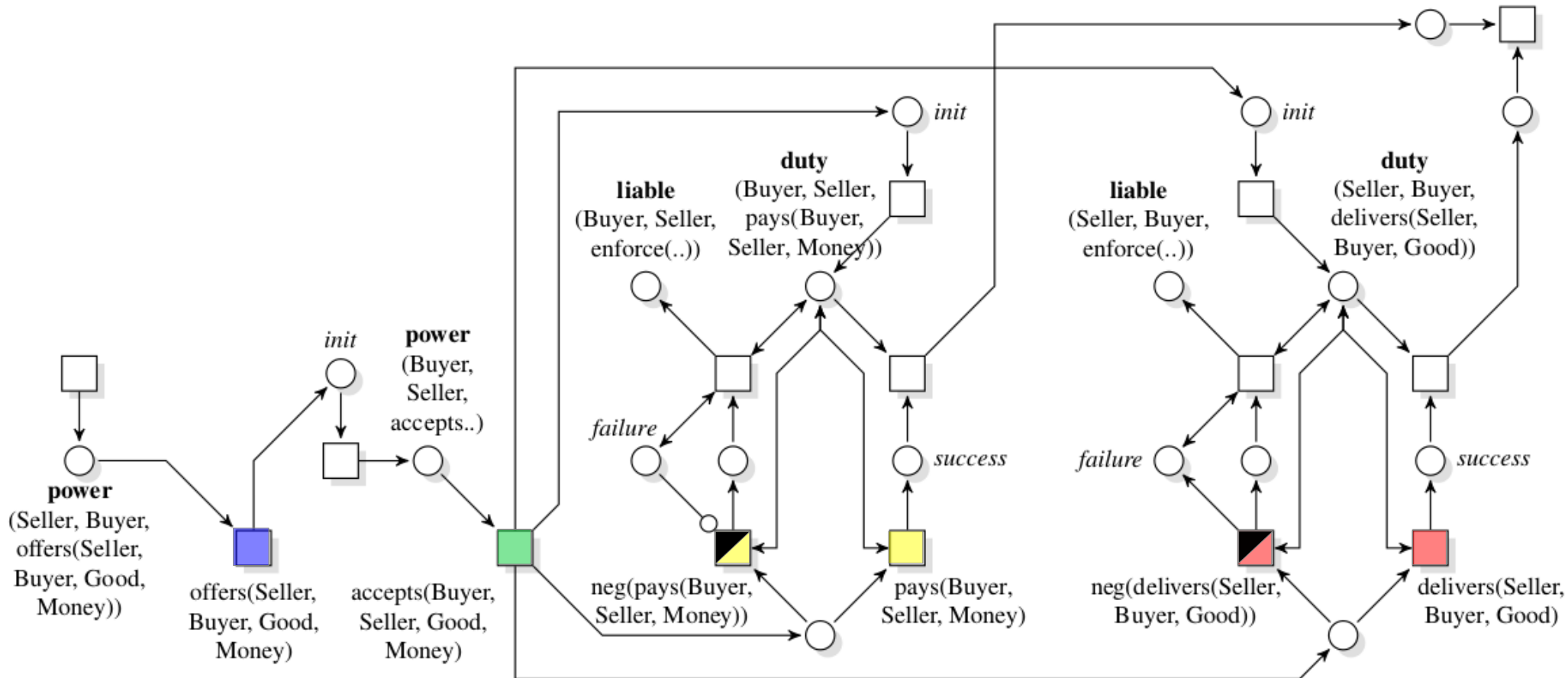
- A sale contract is issued after a *double promise*..

Normative specification: a sale



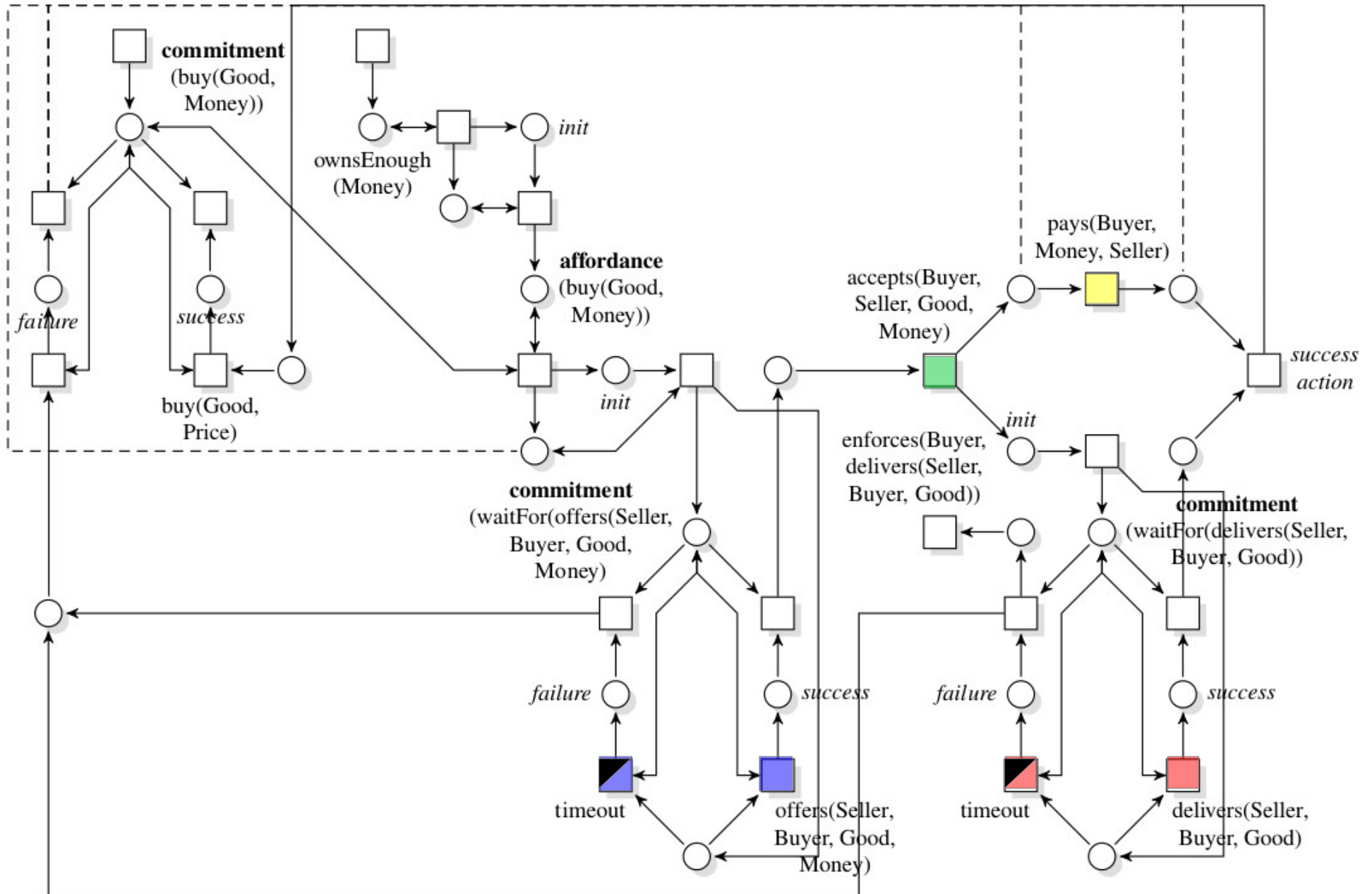
- A sale contract is issued after a *double promise* generating **duties**.

Normative specification: a sale

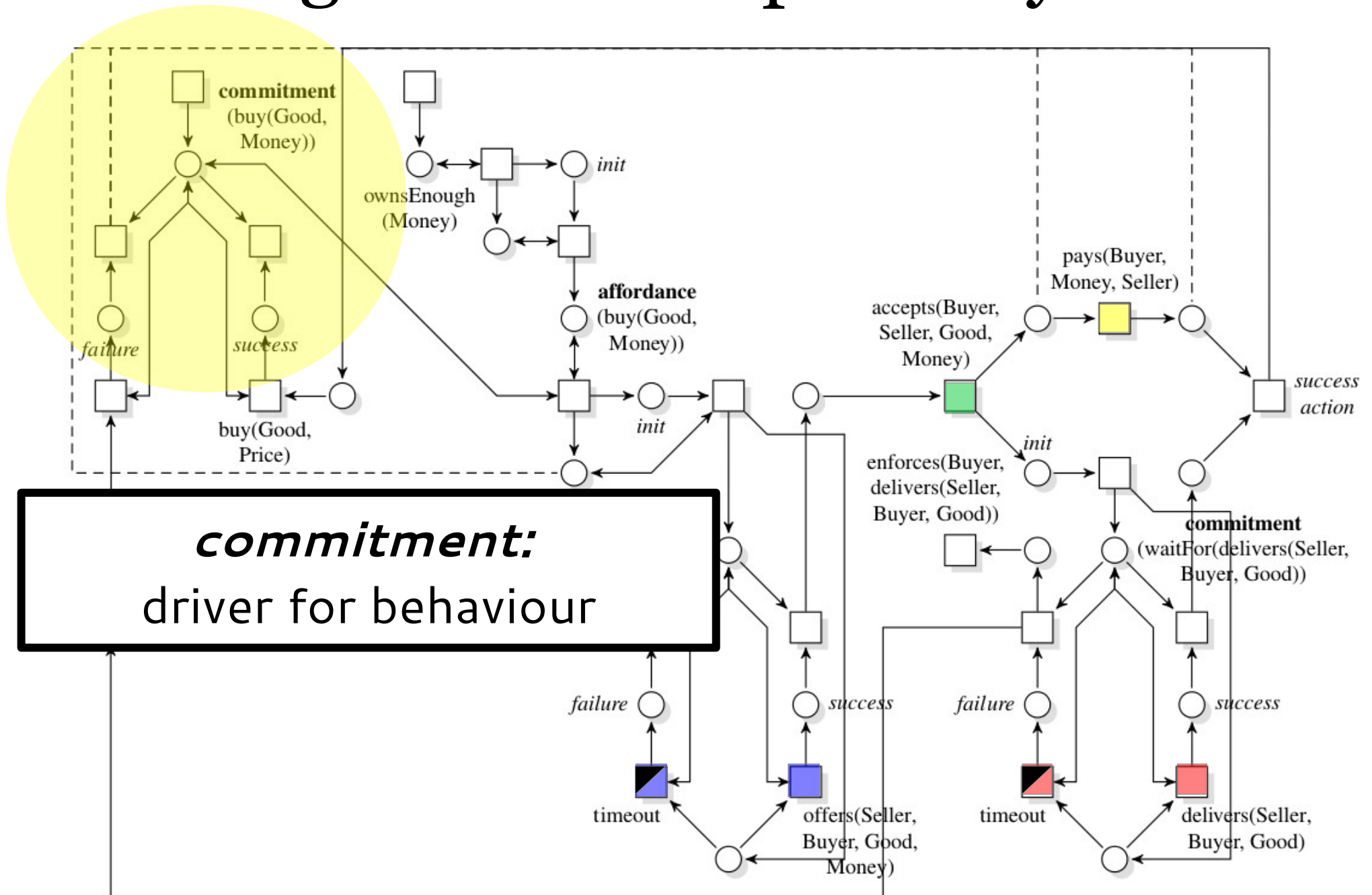


- Normative specifications accounting *duties* introduce *satisfaction* and *violation* branches.

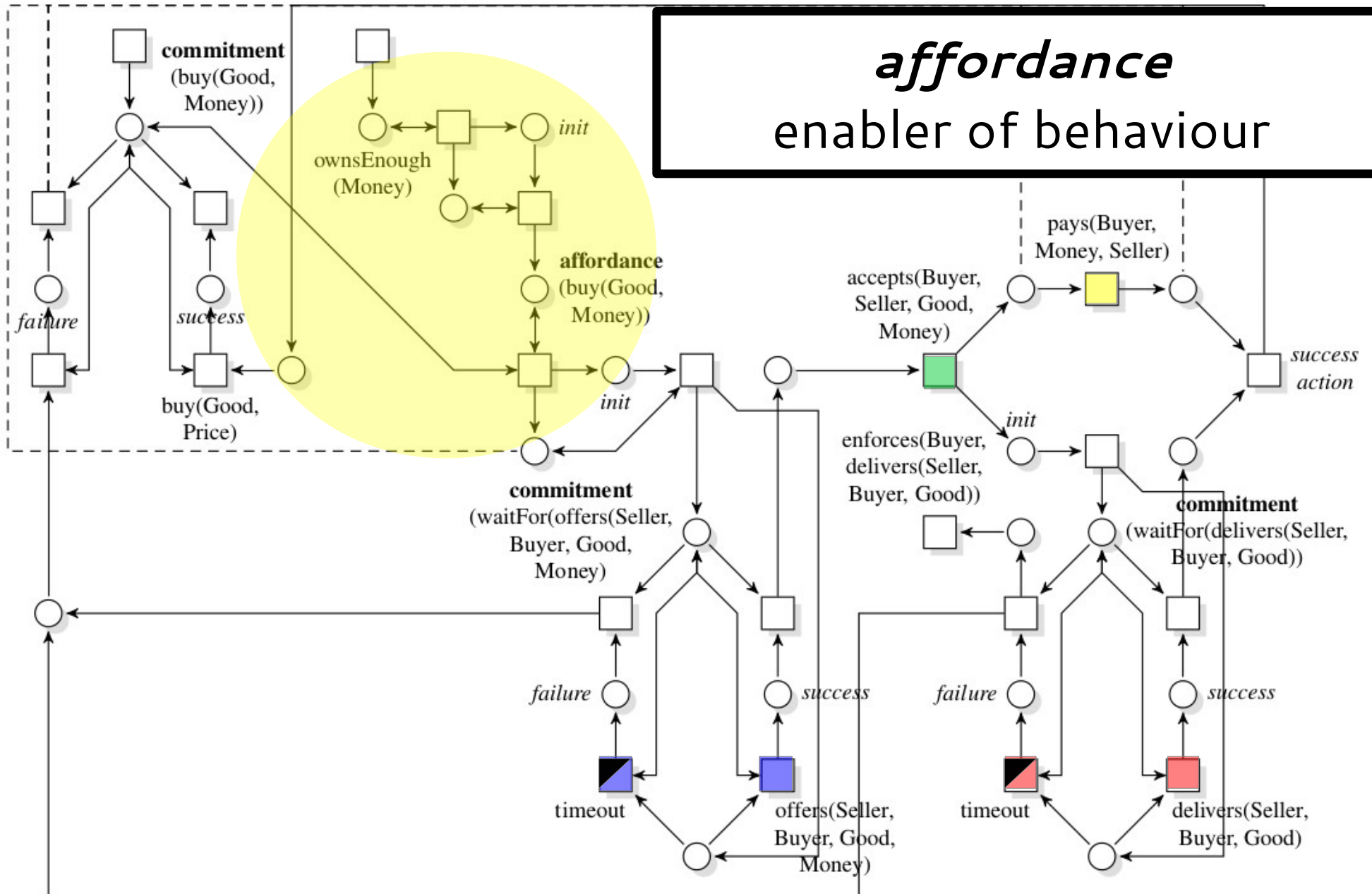
Agent-role script: a buyer



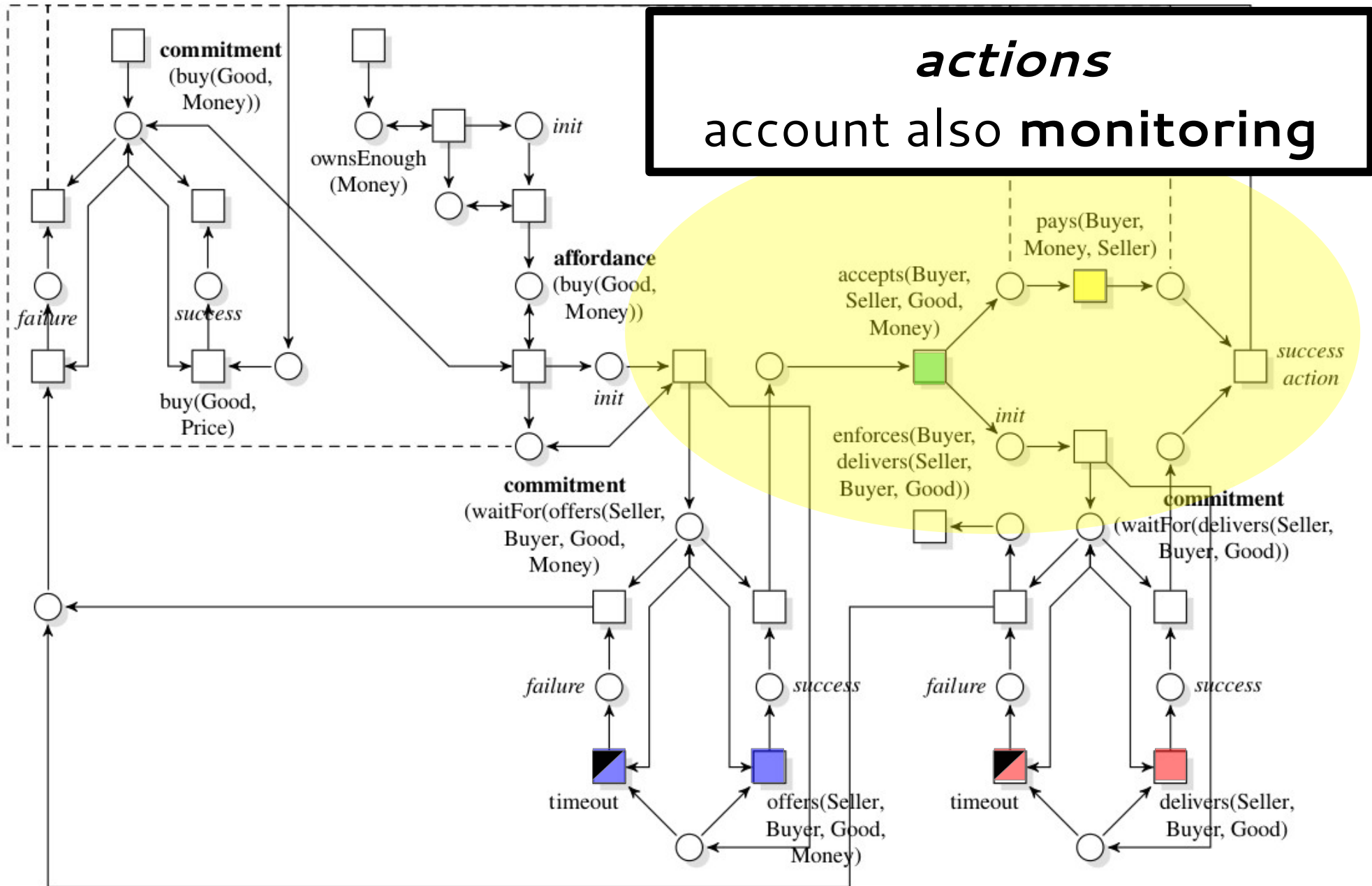
Agent-role script: a buyer



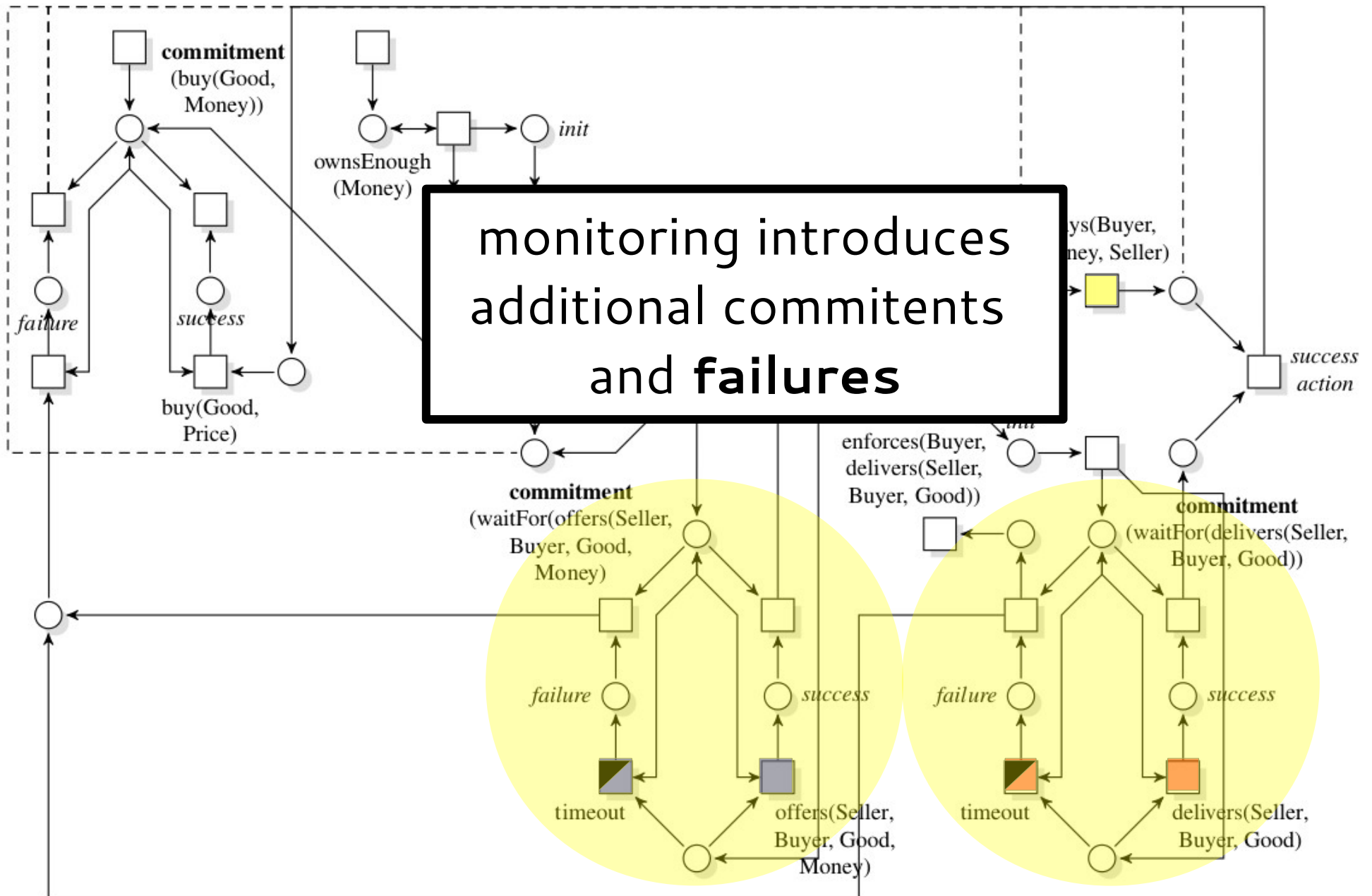
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Agent-role script: a buyer



Alignment problem

- **How to check whether two models are compatible?**
 - that a certain occurrence goes under a given pattern?
 - that a mechanism produces a certain pattern?
 - that a pattern complies with a normative specification?
 - that a mechanism complies with a normative specification?

Alignment?

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Alignment?

- The transformations of physical or abstract entities preserving (part of) the original structure are called **morphisms**.
- The most elementary form of morphism is **homomorphism**, which consists in embedding the source structure into the target one, in a way that all the relations holding in the source are present in the target as well. (~ *subsumption*)
- This is a too strong constraint when we can focus just on *system behaviour*.

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- This notion does not fit our problem, as one model presents events which are not in the other.

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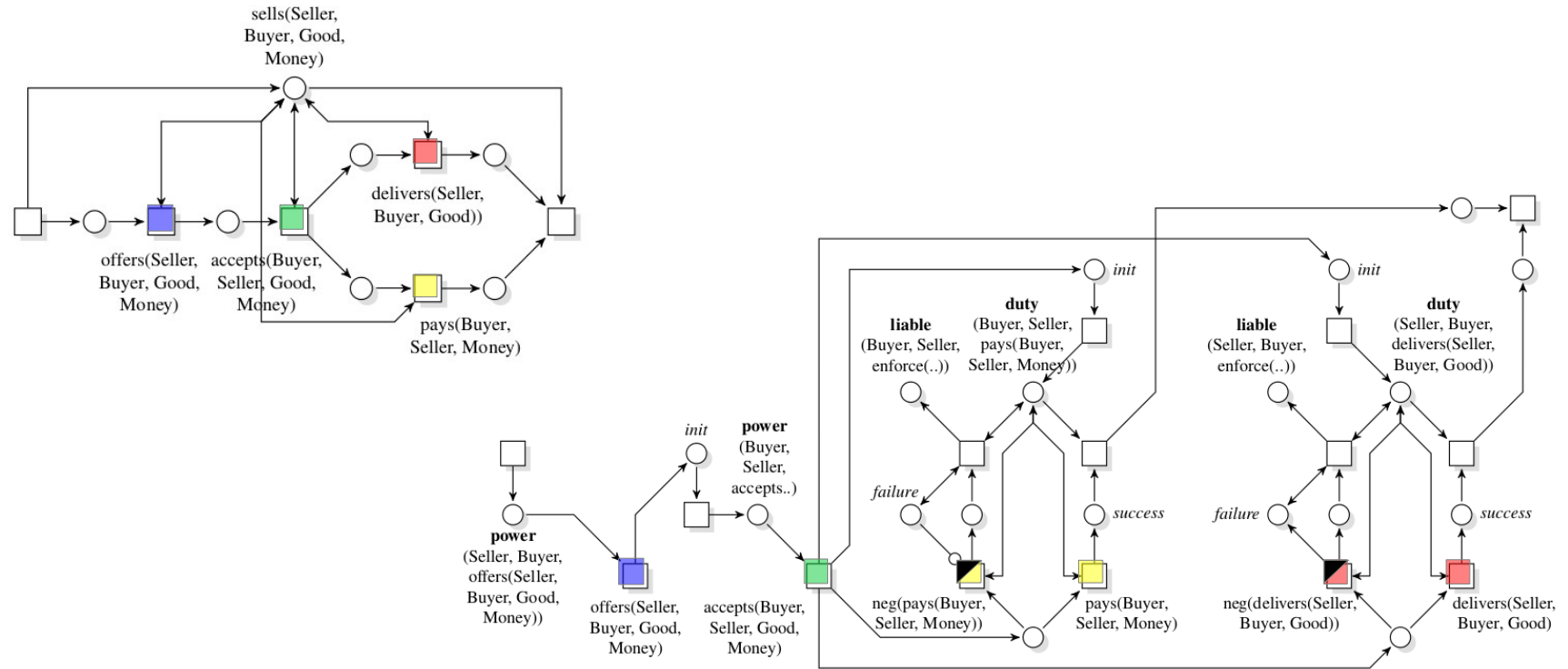
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- Recent works compute fitness in linear time, based on a hierarchy of *single-entry-single-exit* (SESE) components.

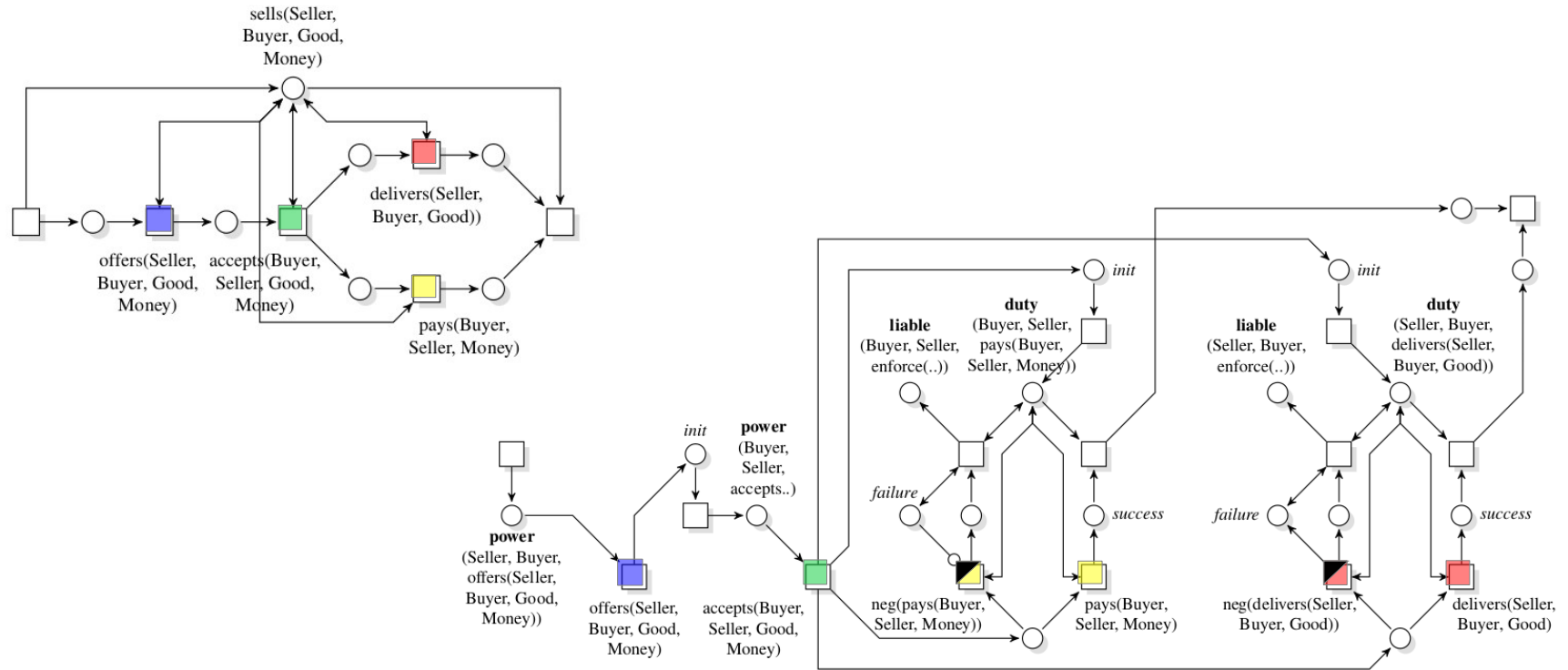
Preliminary solution



Hybrid approach

- extraction of all execution paths Σ_S, Σ_G

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- extraction of all execution paths Σ_S, Σ_G
- $\forall story_S \in \Sigma_S, \exists story_G \in \Sigma_G / subsumes(story_G, story_S)$

Conclusion

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- Today, this topic is tackled down differently according the discipline:
 - *semantic ontology alignment* typically overlooks the mechanism perspective, focusing on static structures.
 - *process alignment* neglects to deal with ontological commitments, and epistemic considerations.

Conclusion

- In practice, however, any ontology aiming to represent aspects of the real world will always require both.
- It is therefore crucial to find a **diplomatic truce** between the two views, at least for operational reasons.