



SCONTO: A Modular Ontology for Supply Chain Representation

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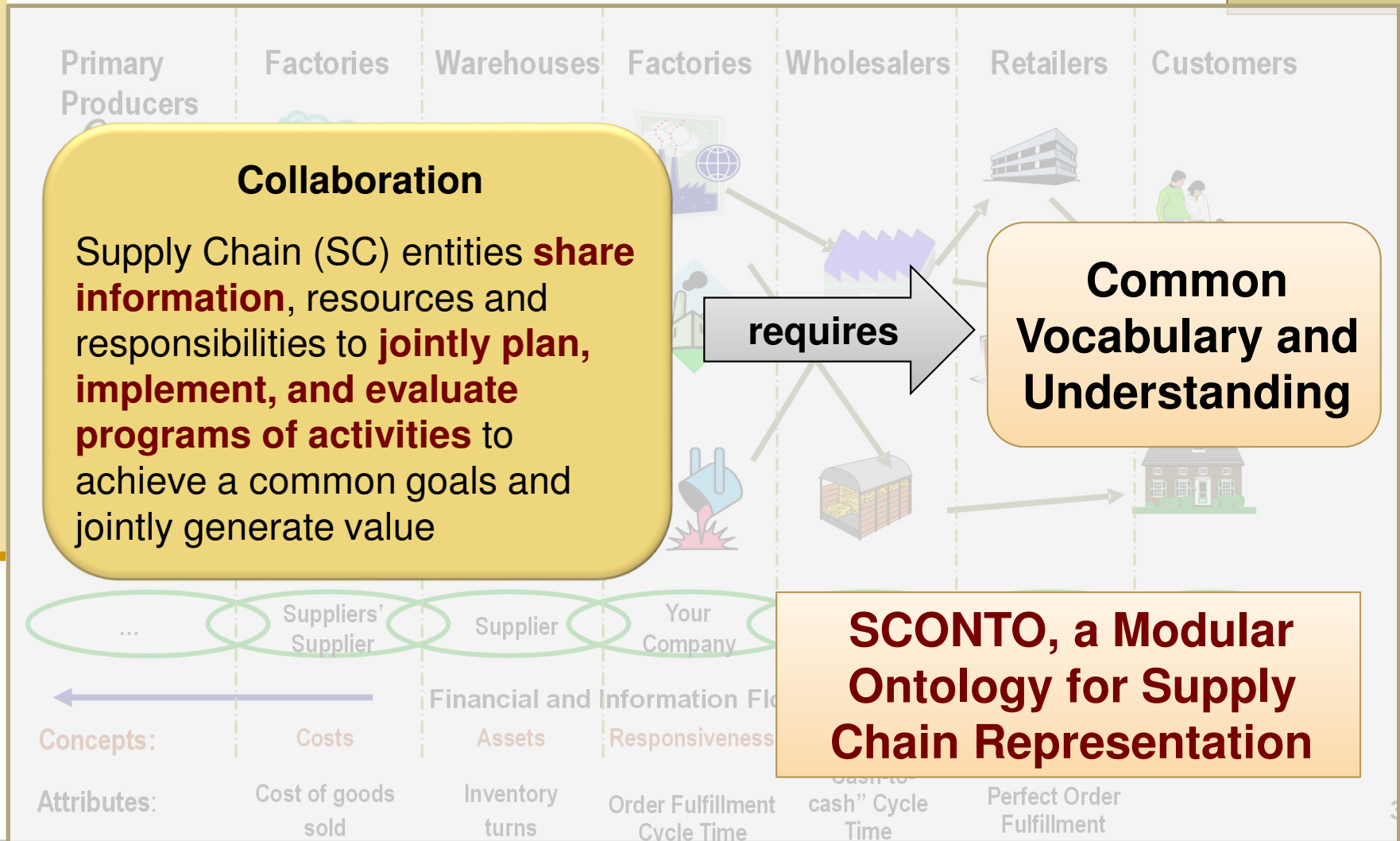
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Presentation Outline



- Motivation
- **S**upply **C**hain **ONTO**logy - **SCONTO**
 - Structure Dimension
 - Process Dimension
 - Resources Dimension
- Case Study
- Conclusions

Supply Chain Management and Performance Evaluation



Motivation: SC Common Vocabulary and Understanding



■ Challenges:

- Achieving a common understanding of:
 - Information exchanged among organizations and/or information system applications.
 - Business processes and their associated resources.
- Developing a comprehensive evaluation system that includes the SC and its components. Need to reach:
 - Consensus about which properties to measure and how to assess them, the meaning of the obtained results, and how analyze results.
 - A uniform metrics interpretation and implementation, as well as a common understanding of the SC performance system.

Current situation



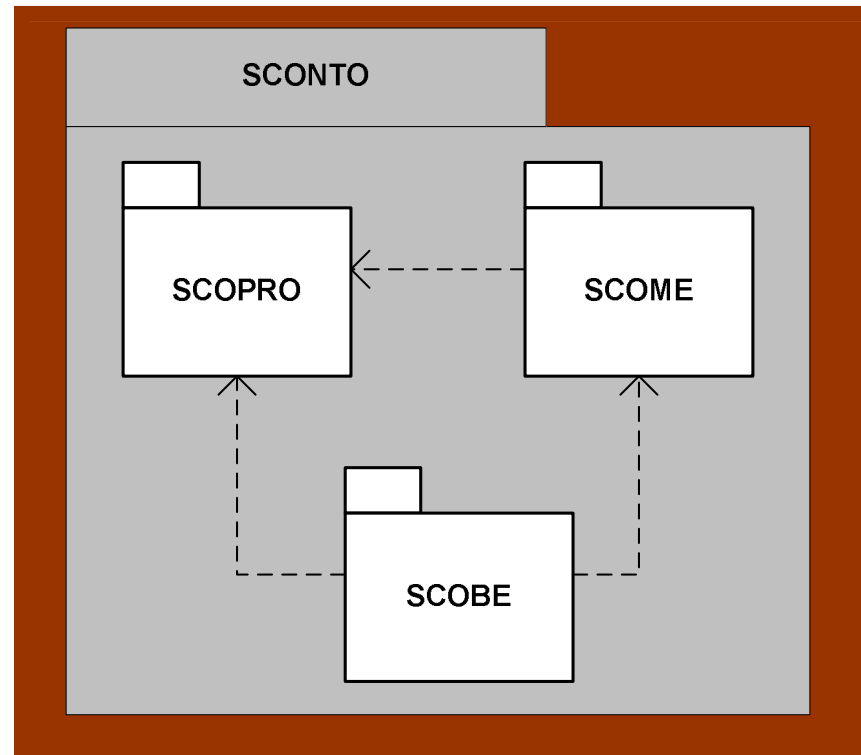
- There are **several contributions** which have the objective to represent the supply chain domain, but **none is complete to be able to capture the various SC perspectives and their associated concepts:**



Need to provide a more comprehensive and formal representation of the SC domain that captures

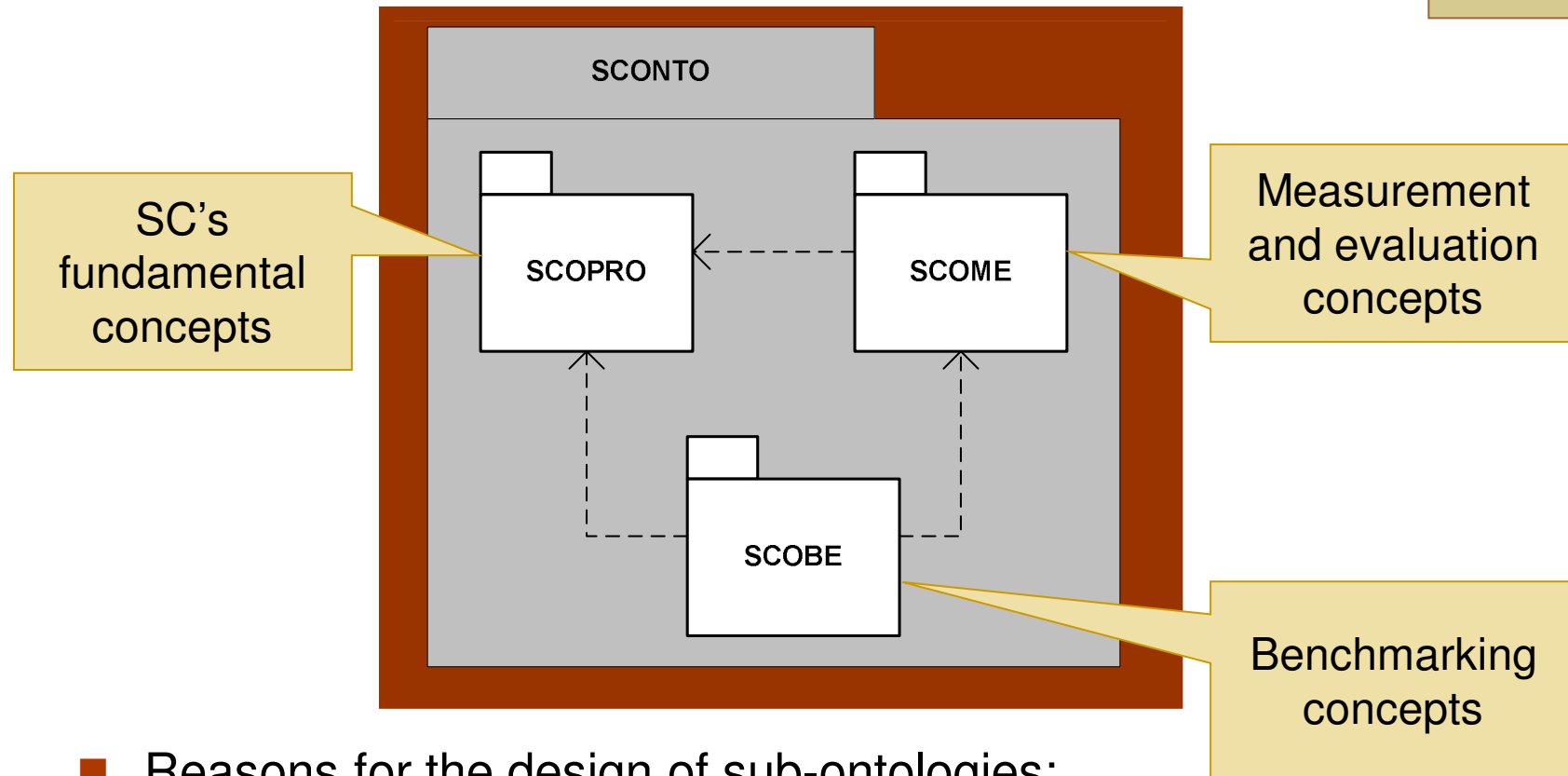
- Structure
- Organizations and their roles
- Business processes
- Resources and the roles they play in each process
- SC performance measurement and benchmarking notions

SCONTO: Organization



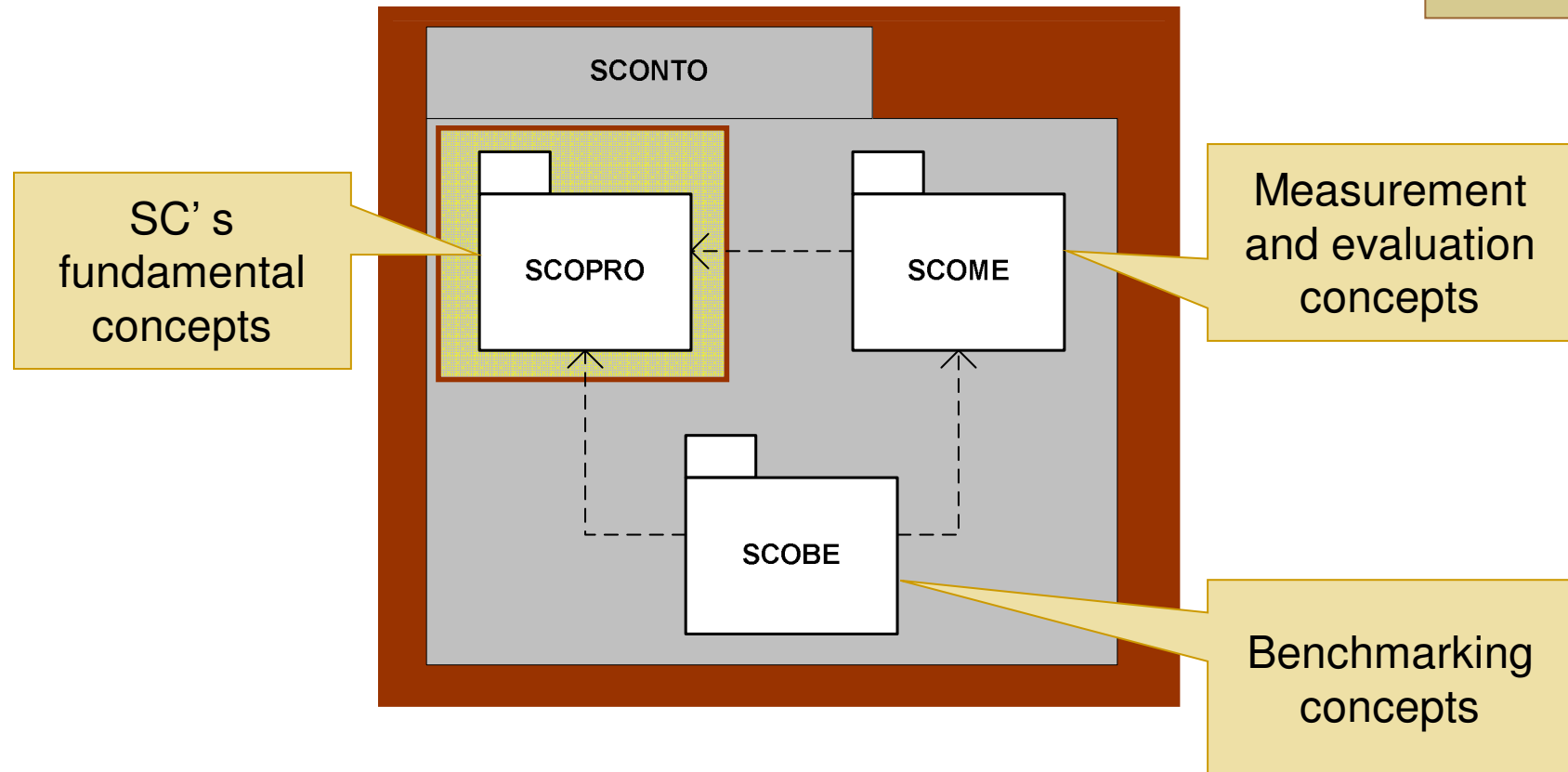
- Semi-formal conceptual model (UML + OCL)
 - Valid for SCs from different industries and sizes
 - Extensible
- Formal OWL implementation

SCONTO: Organization



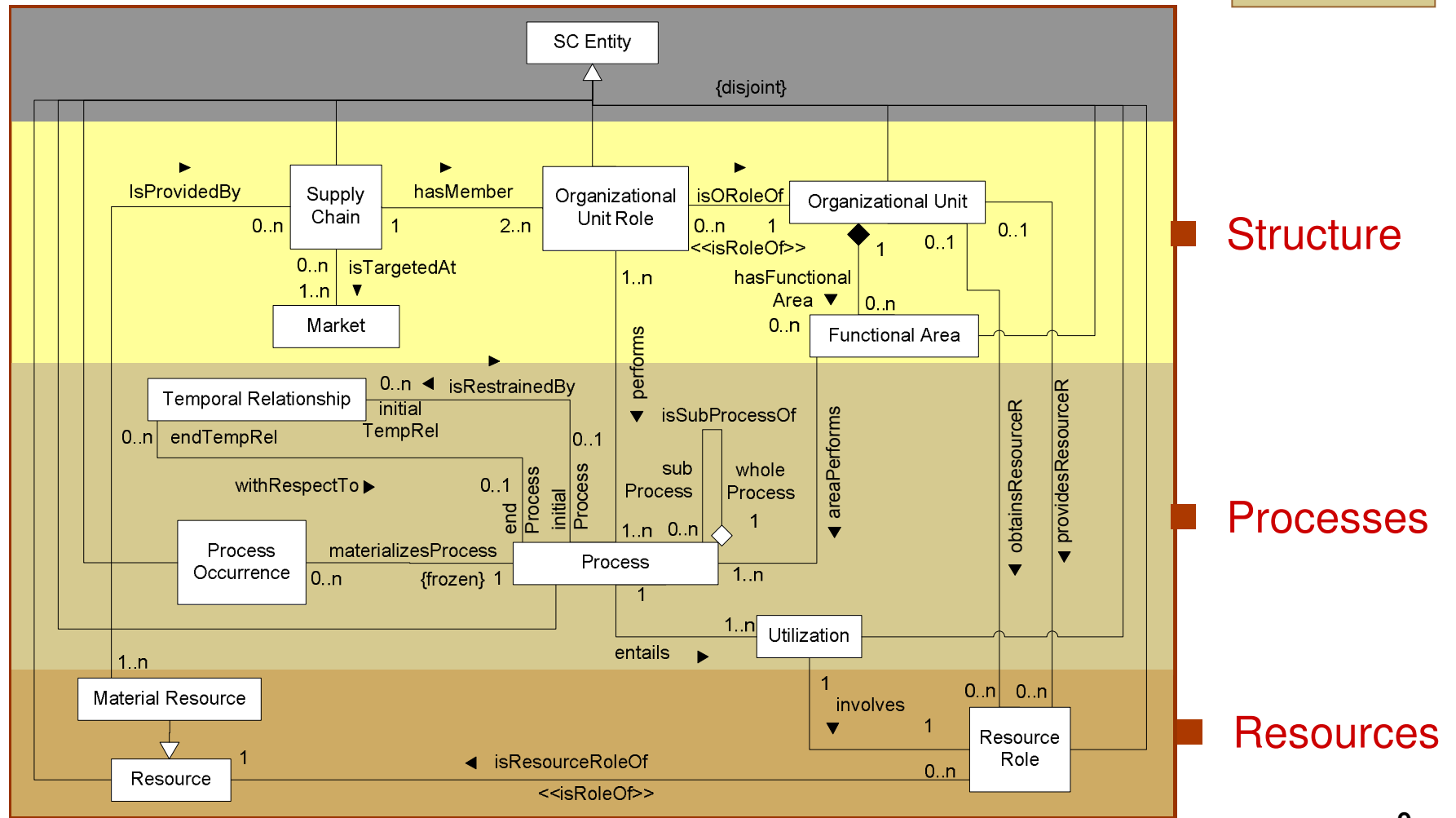
- Reasons for the design of sub-ontologies:
 - Usability increase
 - Extensibility enhancement
 - Minimization of ontological commitments

SCONTO: Organization



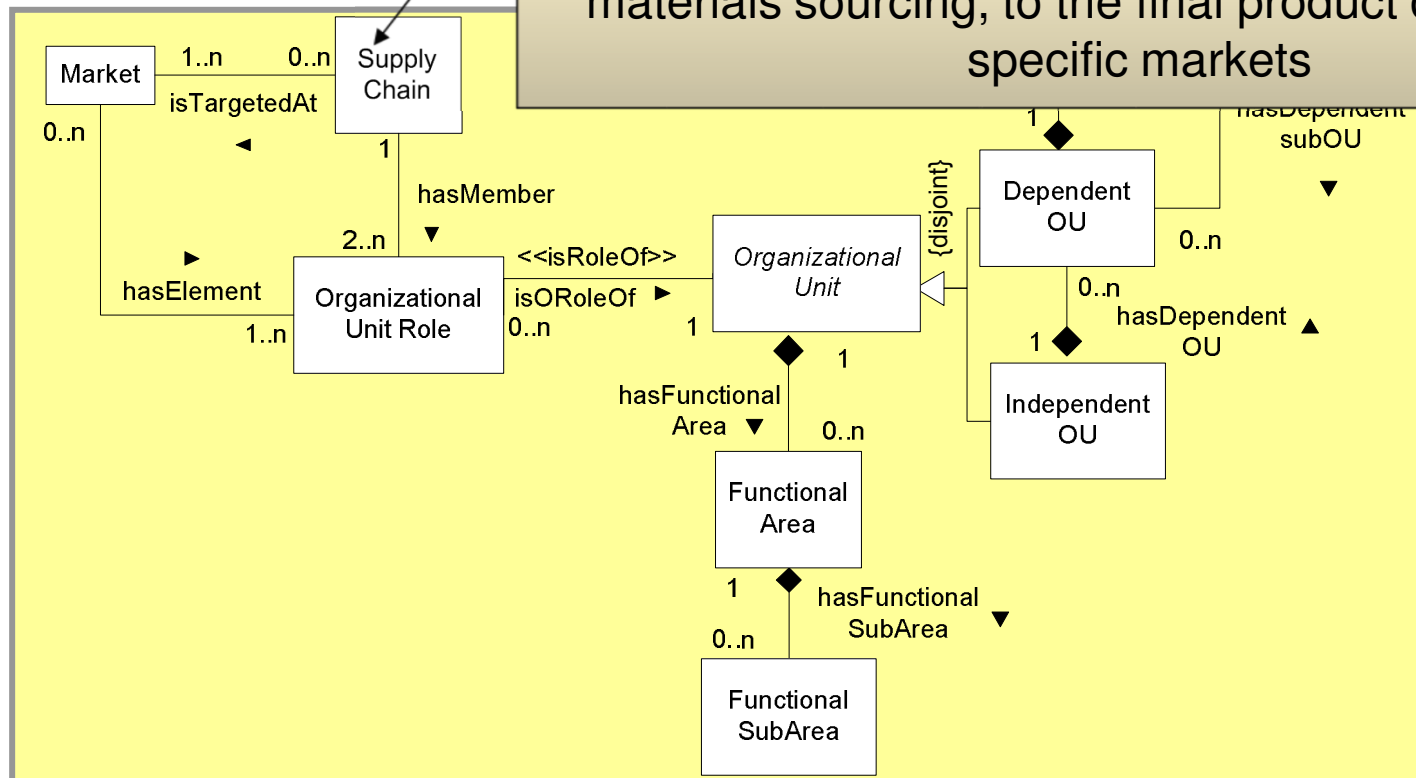
- SCOPRO OWL implementation:
<https://industrialonto.github.io/SCOPRO/OnToology/SCOPRO.owl/documentation/index-en.html>

SCOPRO: SCs Dimensions



SCOPRO: Structure Dimension

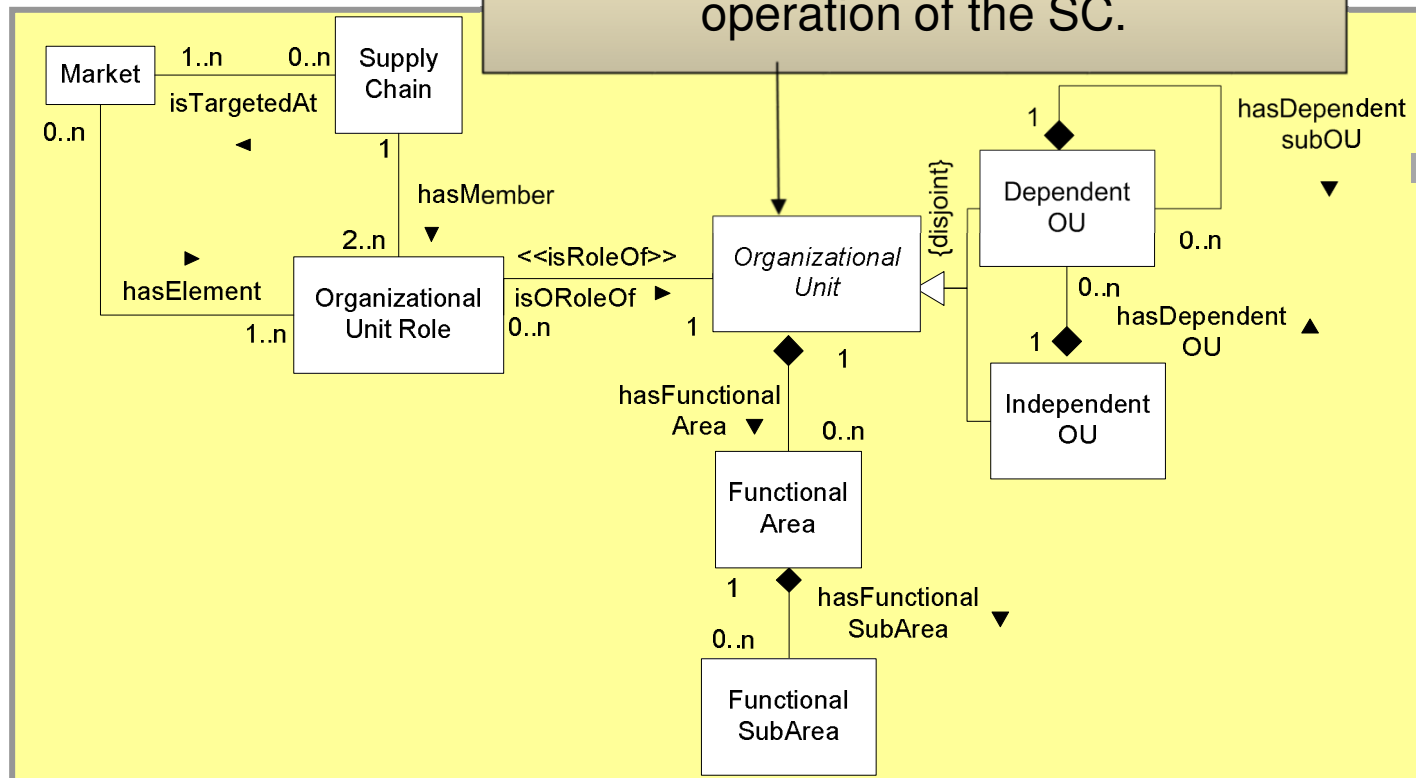
Represents a network of *Organizational Units (OU)* that transforms or adds value to materials, ranging from raw materials sourcing, to the final product distribution in specific markets



Main
concepts and
relationships

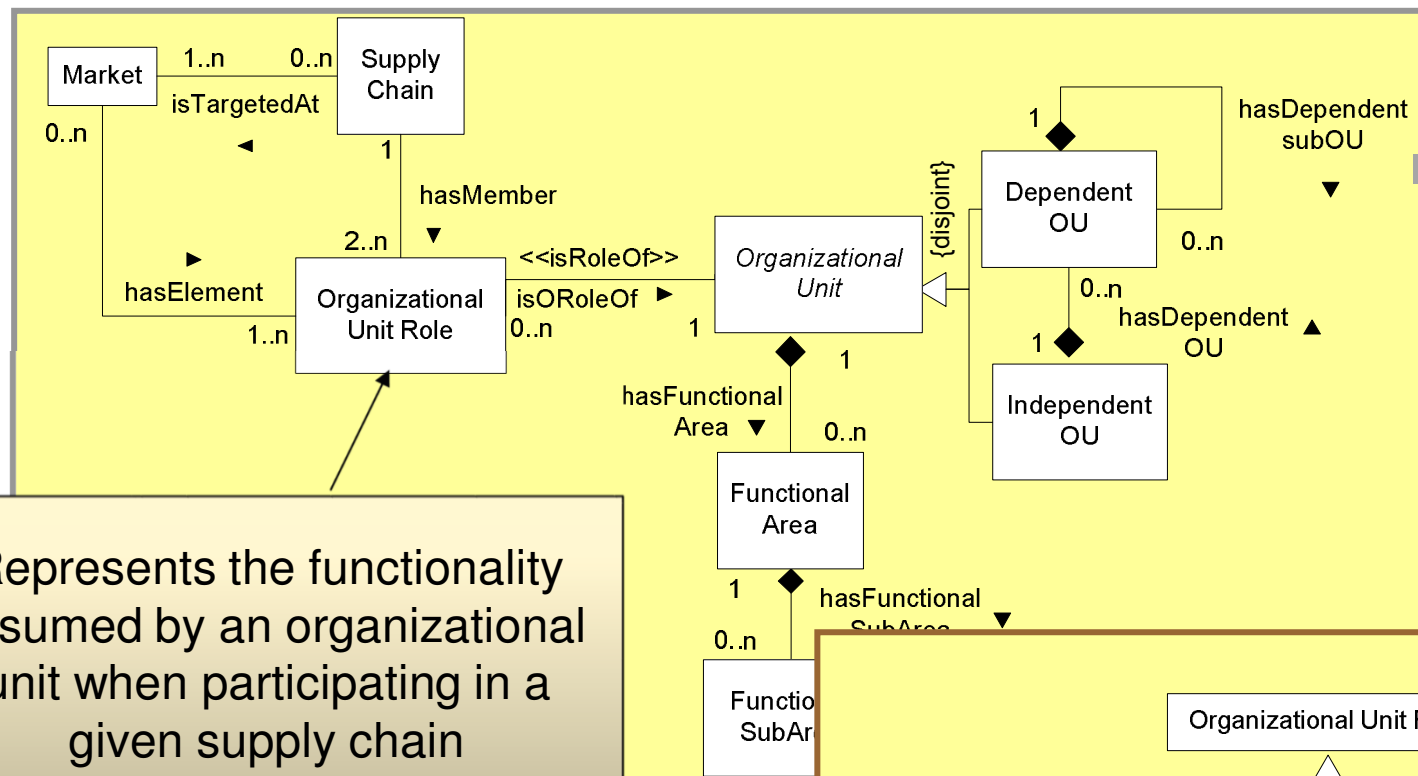
SCOPRO: Structure Dimension

Captures the enterprises or enterprise components that participate in the operation of the SC.



Main
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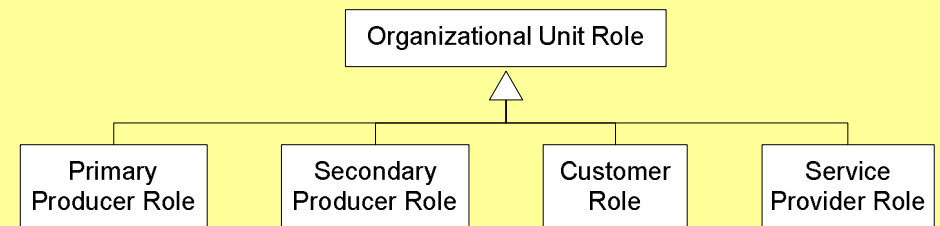
SCOPRO: Structure Dimension



Main
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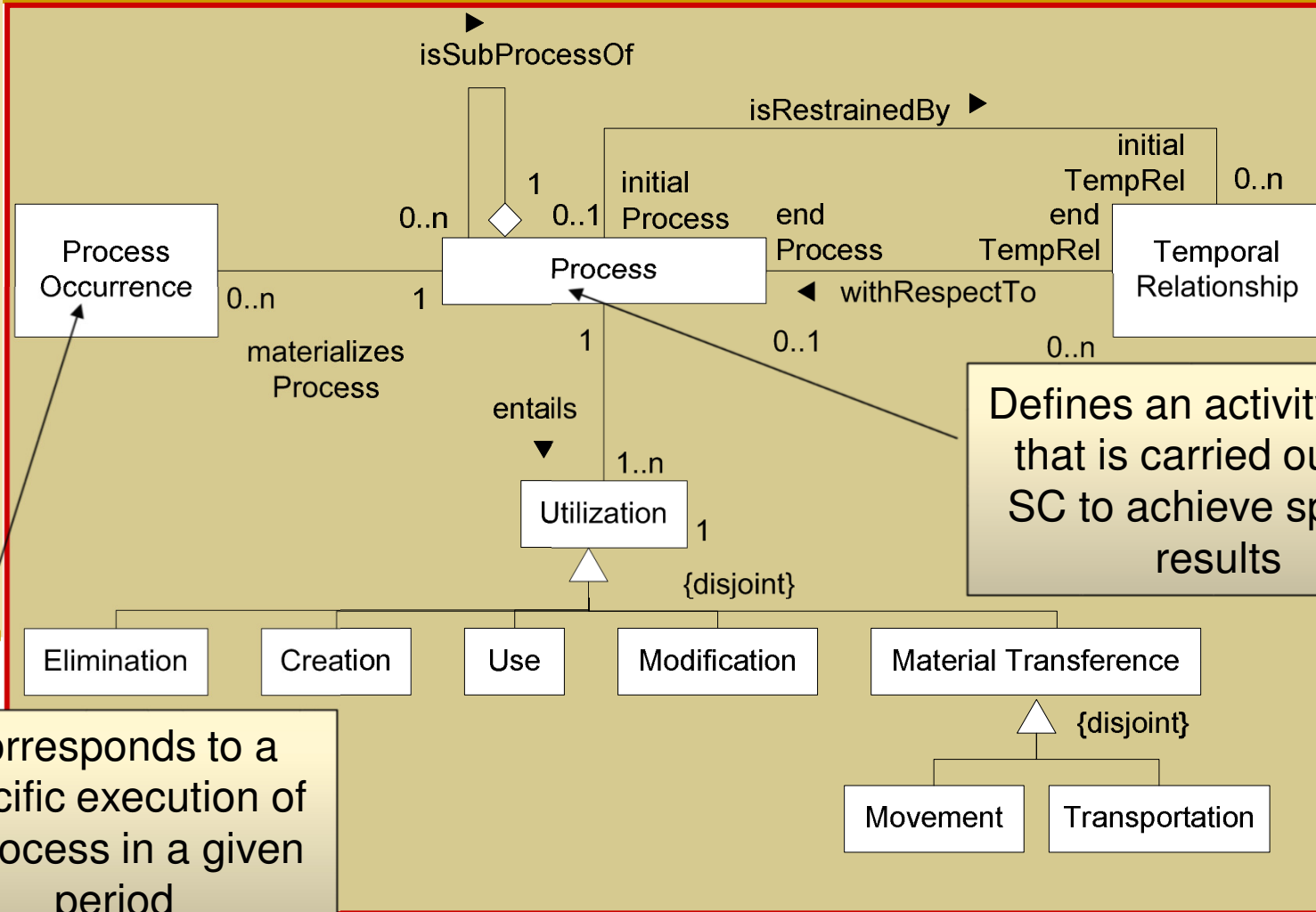
Represents the functionality
assumed by an organizational
unit when participating in a
given supply chain

Organizational unit role specialization



SCOPRO: Processes Dimension

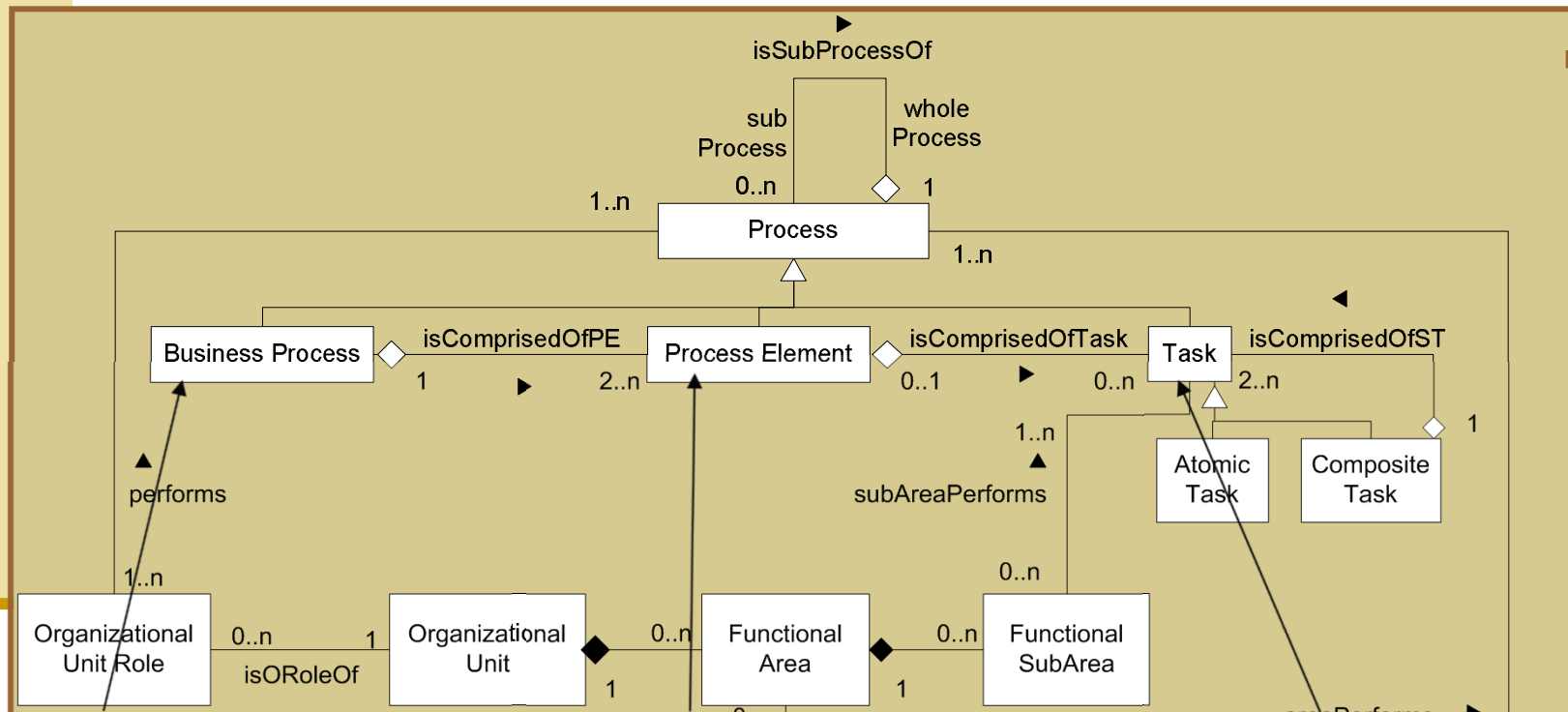
■ Main concepts and relationships



Defines an activity chain that is carried out in a SC to achieve specific results

Corresponds to a specific execution of a process in a given period

SCOPRO: Processes Dimension



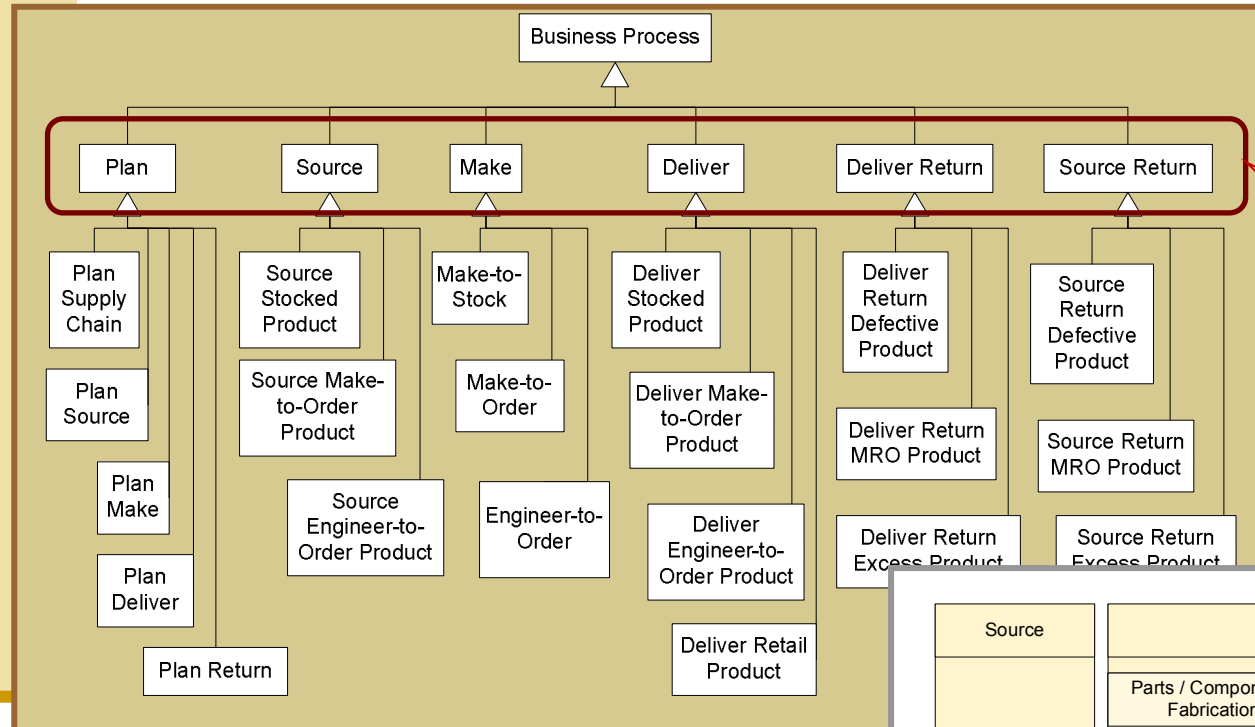
Process detailed levels and connections with structure

Type of process that is composed of value-added activities

Corresponds to an activity or a logical structure of activities that is part of a *Business Process*

Corresponds to an activity or a logical structure of activities that is part of a *Process Element* in certain SC

SCOPRO: Business processes' specialization



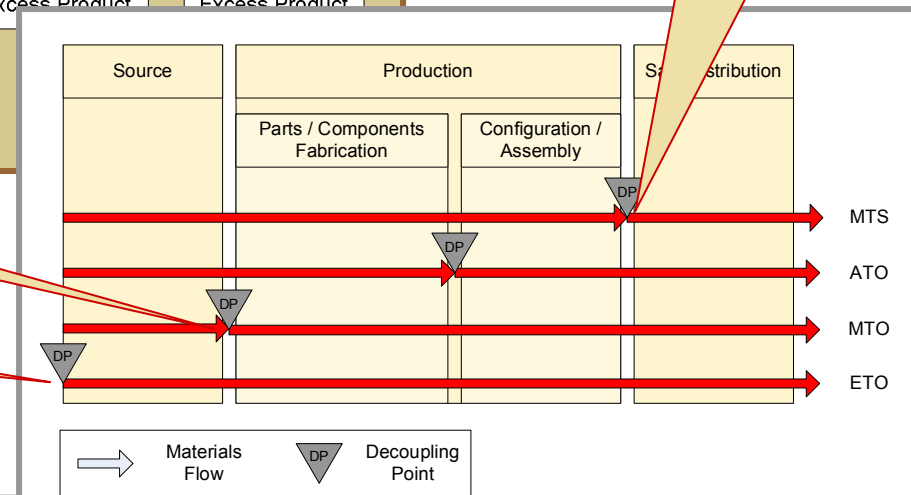
Business Processes' specialization

SCOR's main business processes

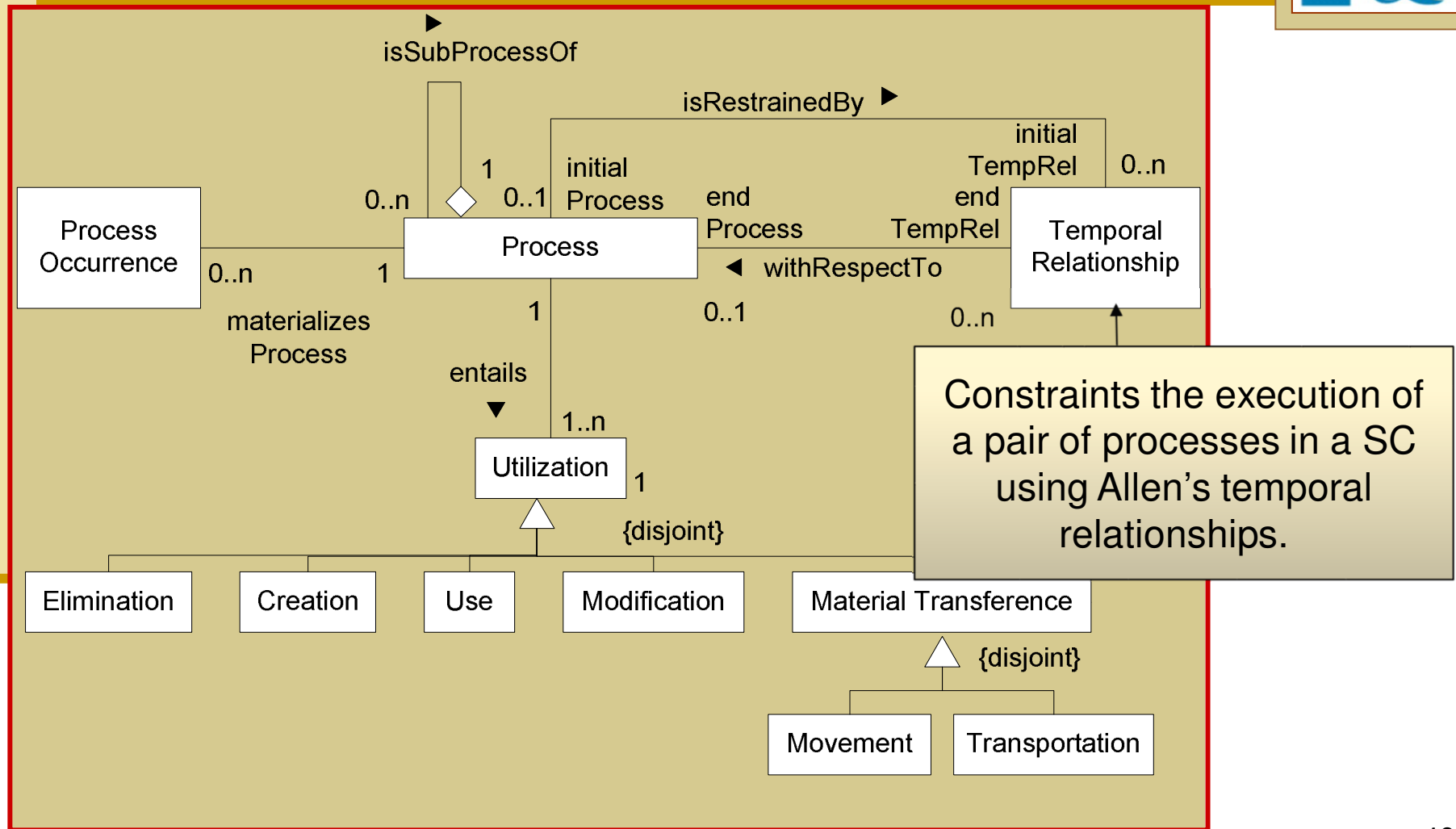
"Make-to-stock"

"Make-to-order"

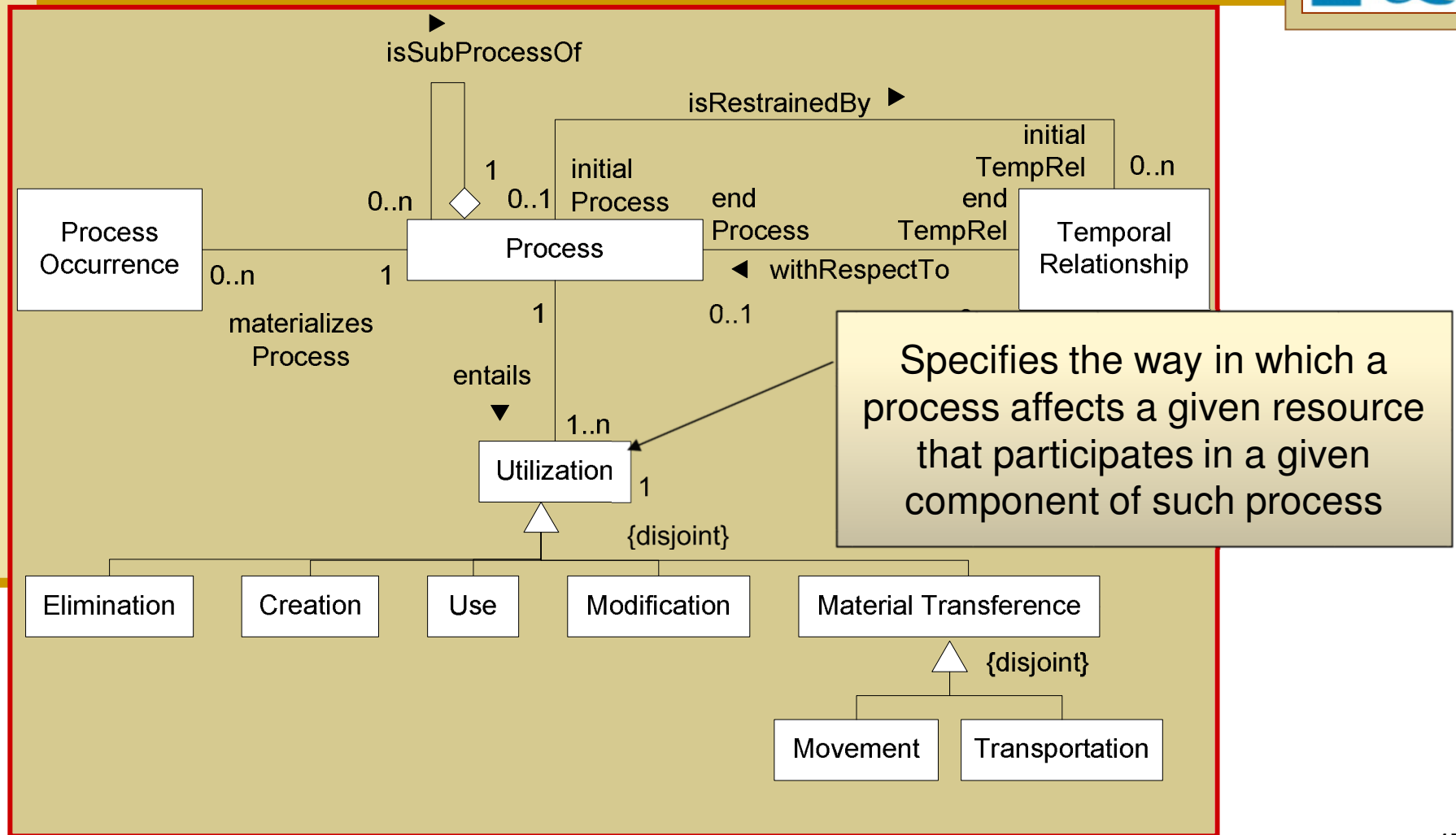
"Engineer-to-order"



SCOPRO: Processes Dimension



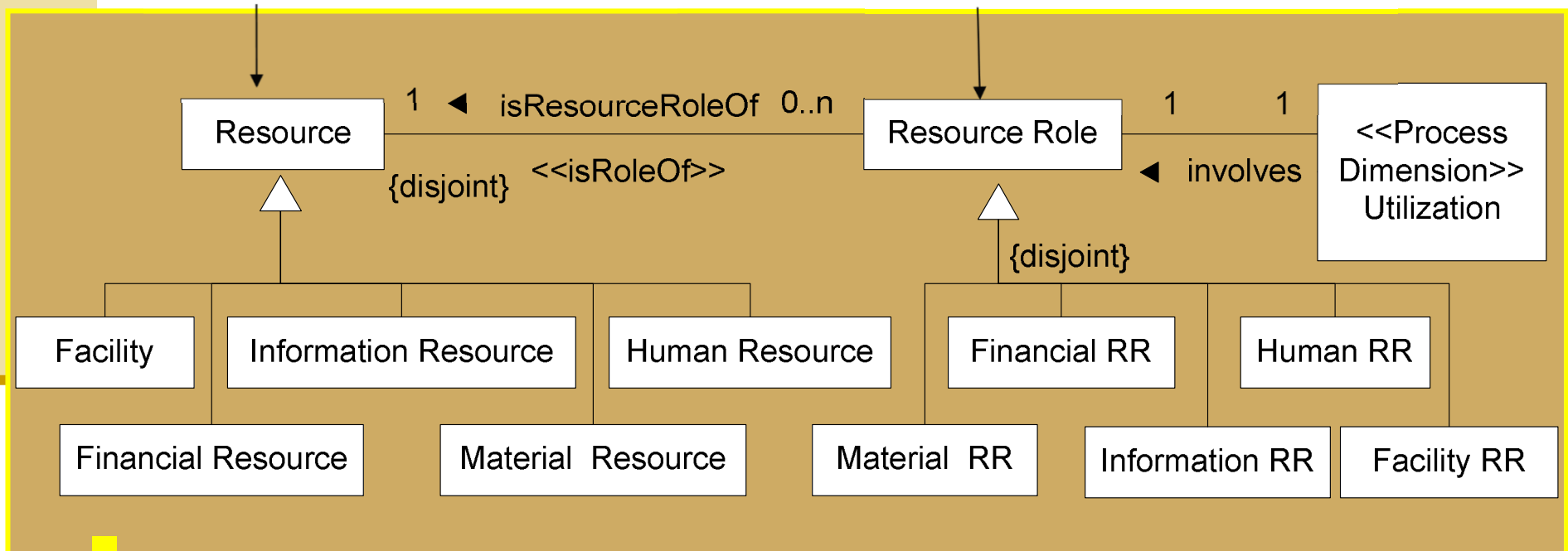
SCOPRO: Processes Dimension



SCOPRO: Resources Dimension

Any type of physical or conceptual medium that participates in a process via one of its roles.

Type of participation that a resource has in a given process

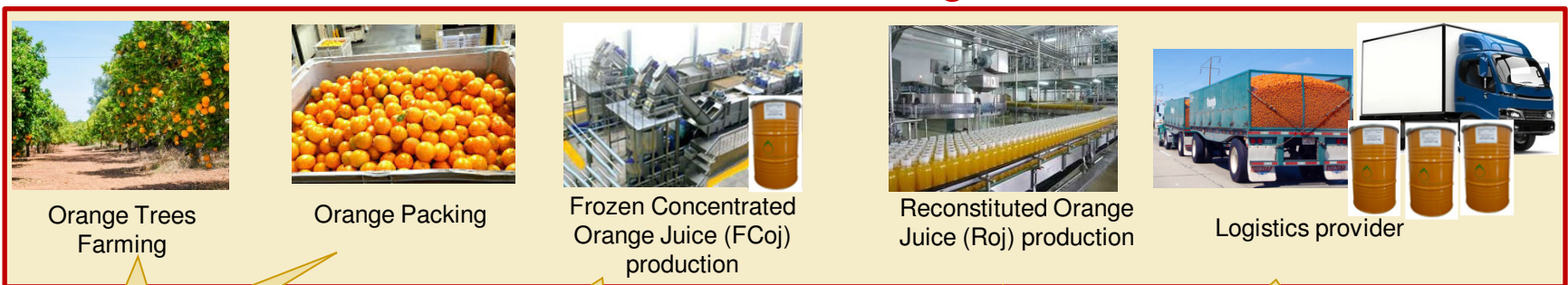


Main concepts
and relations

Case Study



Orange Juice value chain



Farms located in Corrientes producing oranges: Citrus tree farming

CITRIX Company Bella Vista Plant (FCojPlant):
Frozen Concentrated Orange Juice manufacturing plant

CITRIX Company NaranUp Plant (RojPlant):
Reconstituted orange juice production and bottling plant

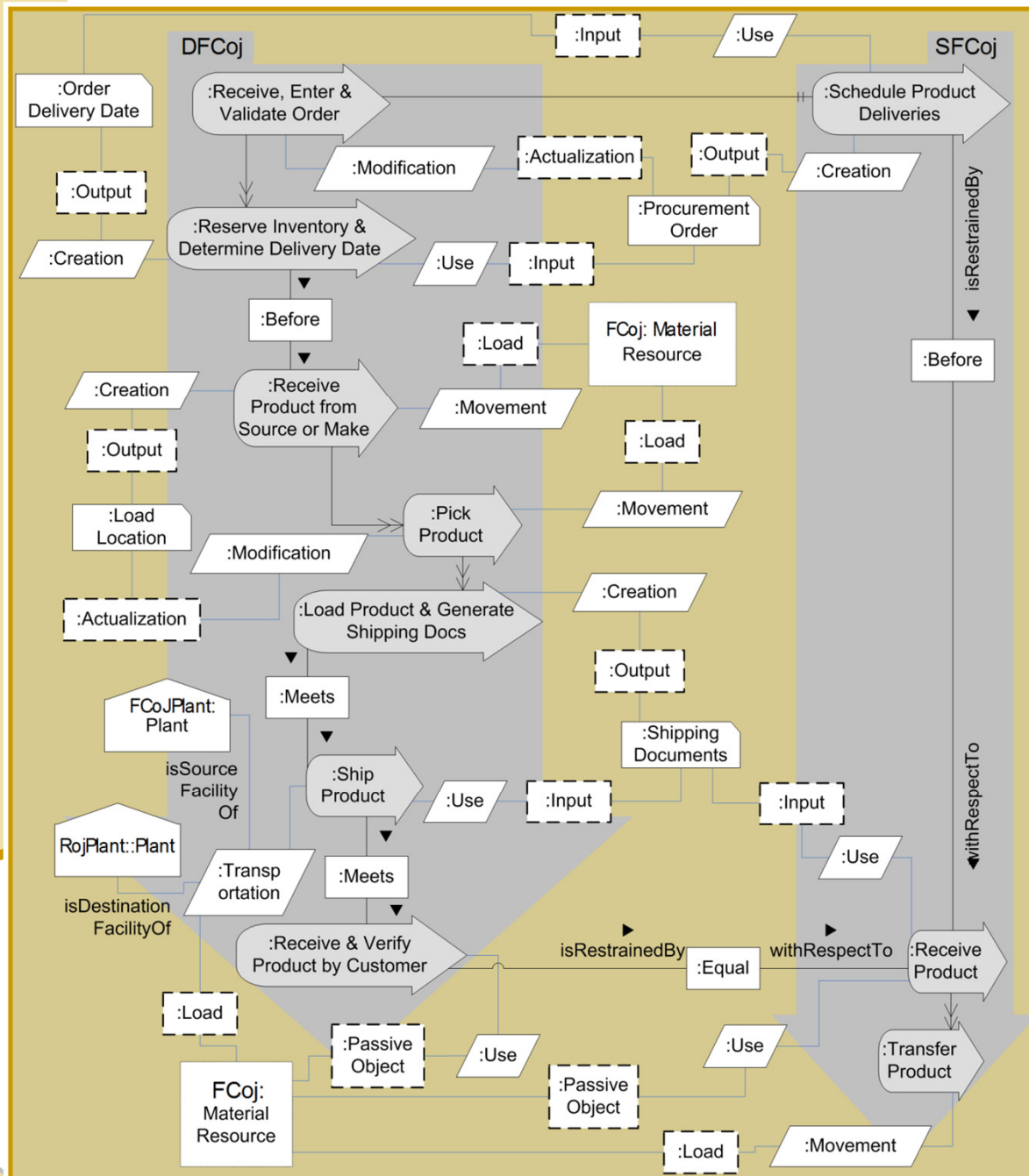
ArgenTruck:
Transportation to and from the various farms, plants, resellers and retail stores

Case Study: Supply chain

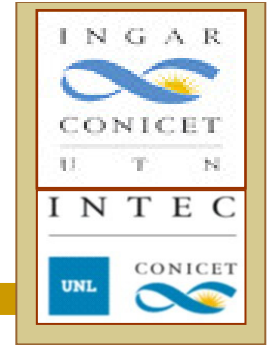
DFCoj (Distribution of Frozen Concentrated orange juice) and *SFCoj (Sourcing of Frozen Concentrated orange juice)* business processes:

- decomposition
- temporal relationships between process elements
- resource flows

Explicit Interactions
between business
processes executed by
different organizations



Conclusions



- SCOPRO has the following capabilities:
 - Describes supply chains that are composed of several enterprises.
 - Represents the SC structure and the organizations that participate in it.
 - Allows specifying organizational processes and their decomposition into interrelated subprocesses.
 - Defines atomic and composite temporal relations between processes and process elements.
 - Describes resources, the effects that activities have on them, and the multiple functions they can fulfill in the SC processes.

Thanks for your attention

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