A Component-Minded Route from CIM to Real Implementations

And What Tools Can Do for It

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First Steps (Buyer – Seller Example)

First, develop / discover the Requirements

- Buyer wants to acquire something from Seller
- Seller agrees to provide this something to Buyer
- ➔ Buyer needs an Interface to interact with the Seller
- ➔ Seller needs an Interface to interact with the Buyer
- ➔ An orderly interaction (Protocol) between Buyer and Seller needs to be defined

Use Case Diagrams help to clarify this

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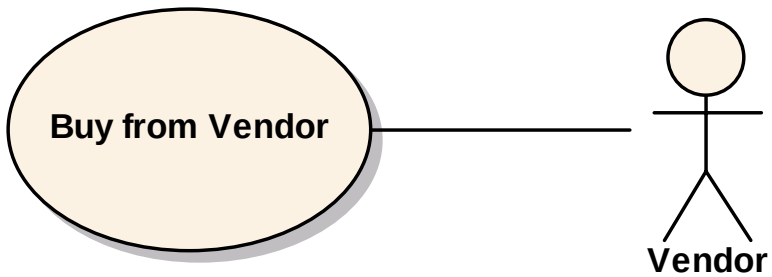
Buyer – Seller Example



Buyer – Seller Relationship from the Customer's viewpoint

➔The Use Case defines the interface to the Vendor
➔The Vendor is an external entity

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Buyer – Seller Example

Buyer – Seller Relationship from the Vendor's viewpoint

- ➔The Use Case defines the interface to the Customer
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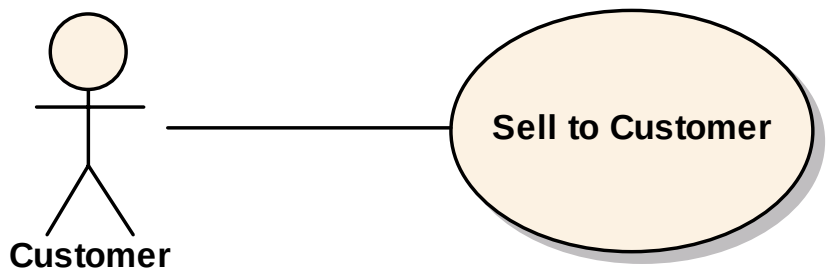

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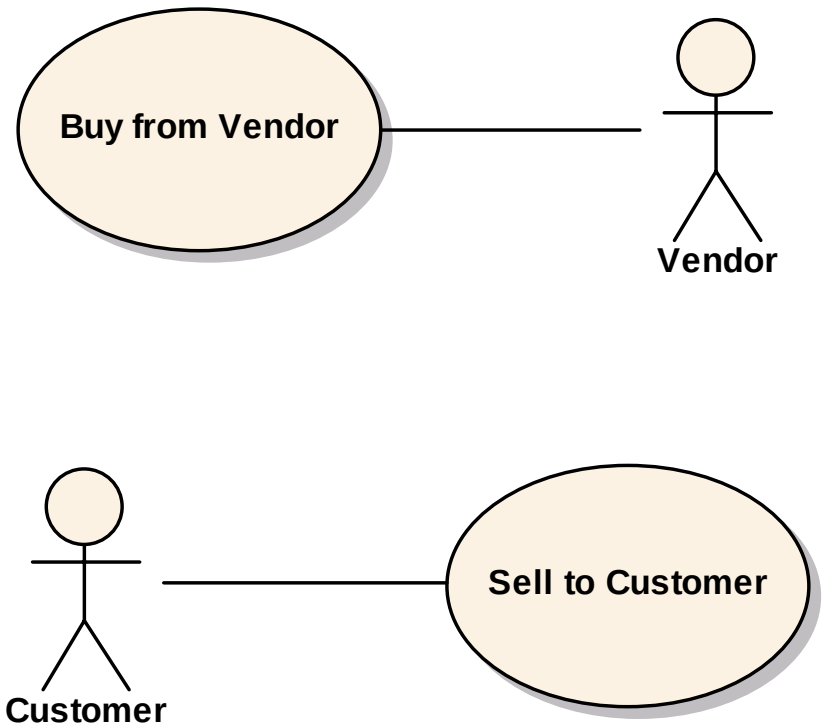
Combined View



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Computational Independent Model

- Nothing so far implied any use of computers
- This is independent from the fact we use UML diagrams to express the model

- It is very important for good modeling results to stay on a high level of abstraction as long as possible
- Therefore, the next step is Discovery of Roles

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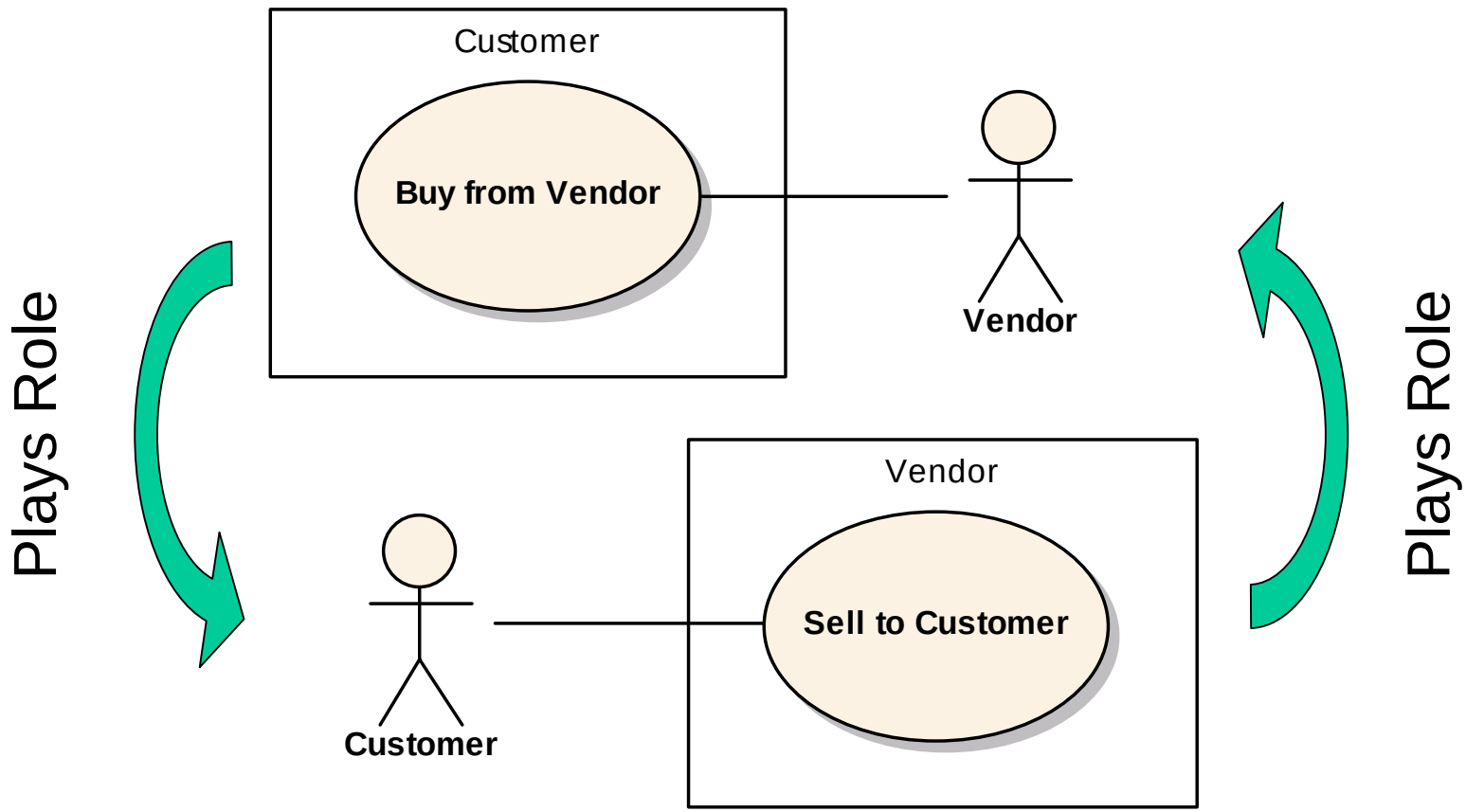
Discovery of Roles



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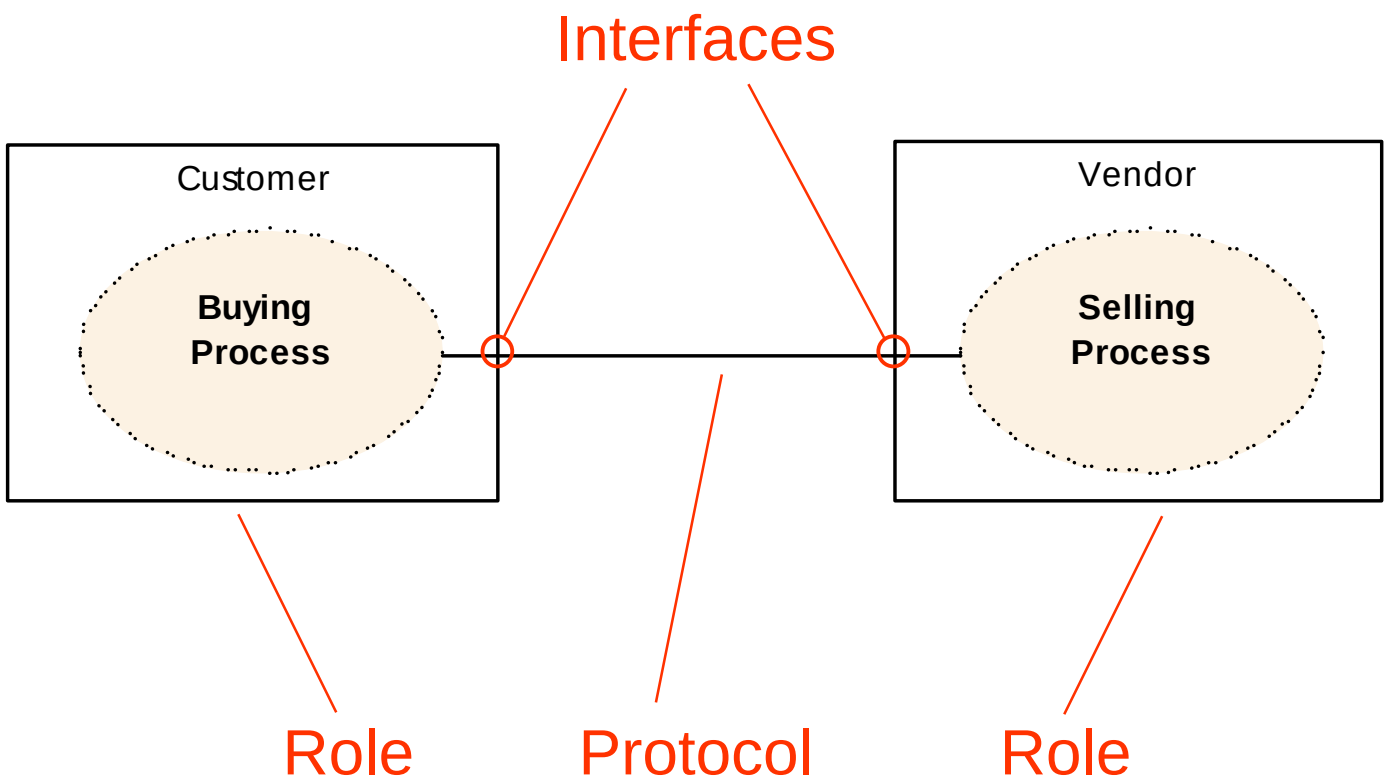
Buyer – Seller Collaboration



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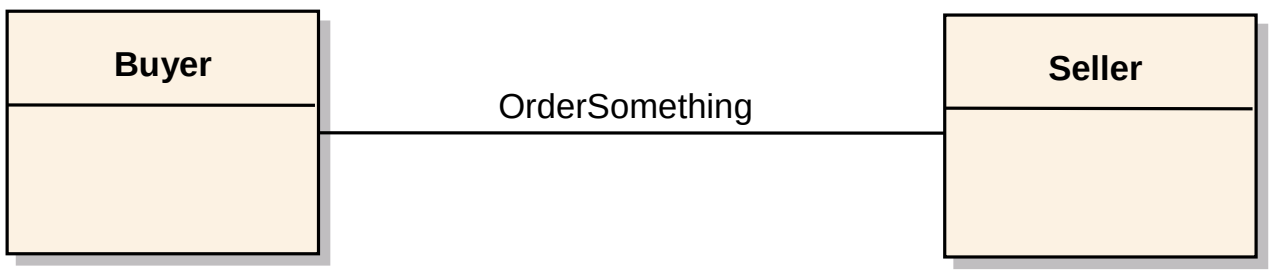
How to model this efficiently?

- Plain UML (even UML-2) is not expressive enough to represent the full Buyer – Seller Relationship without excessive extra modeling
- No direct support to refine each role
- No support to express the full semantic of the Buyer – Seller interaction



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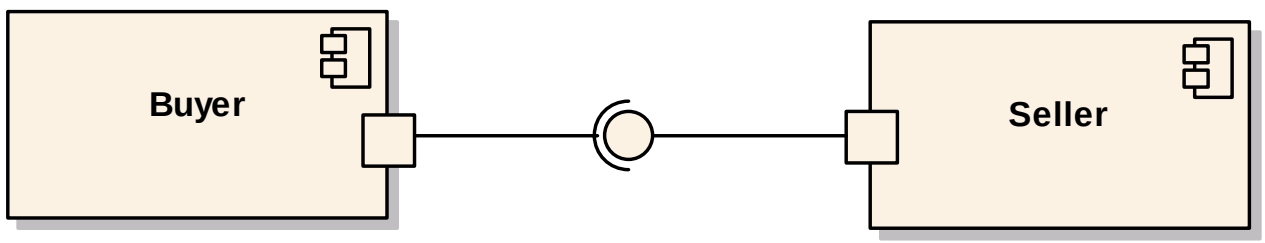
How to model this efficiently?

- UML-2 Components add the ability of refinement
- Top level components can be considered as roles
- However, the available mechanisms to specify the Buyer – Seller interaction are still not sufficient



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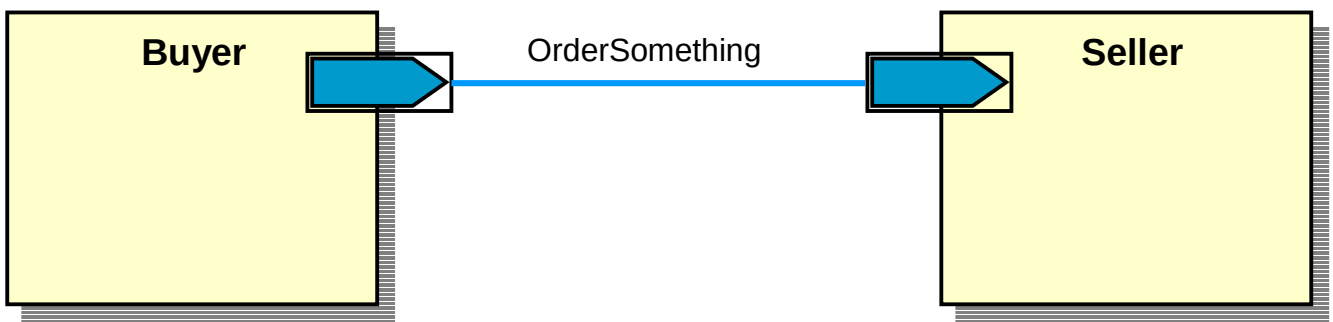
More Component Power: CCA

- The component Collaboration Architecture (CCA) as defined in the EDOC specification provides sufficient semantic
- The CCA model applies to any component interaction, not only to business components



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CCA Port Architecture

- **OperationPort** Simple control flow-like invocations, information transfer via signatures (synchronous and asynchronous)
- **FlowPort** Pure Dataflow interactions, no invocation semantic
- **ProtocolPort** Container for a more complex port architecture, defining a protocol which is realized through embedded ports of any kind
- **MultiPort** Container for the construction of arbitrarily complex ports

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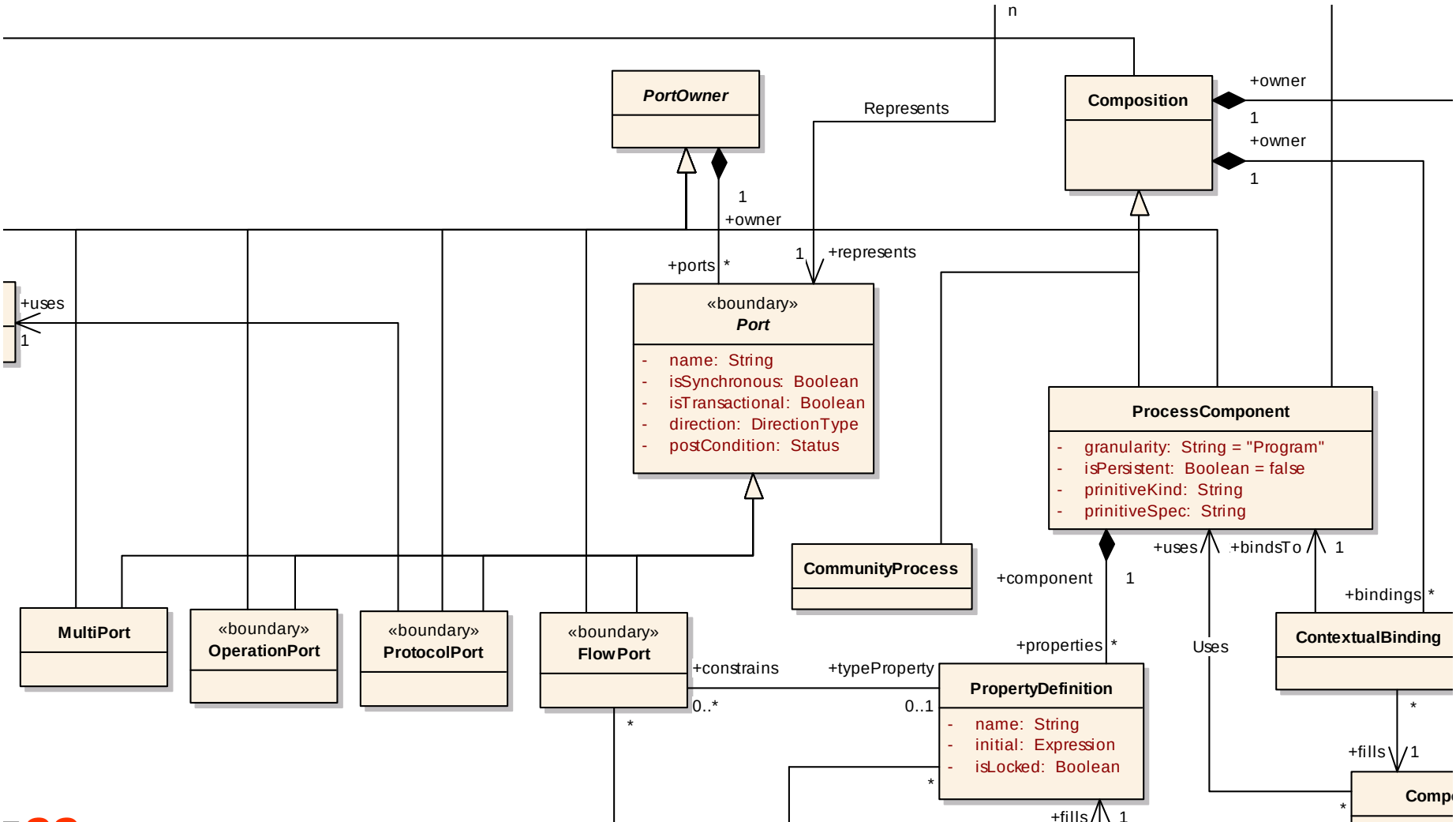
EDOC / CCA Component Model



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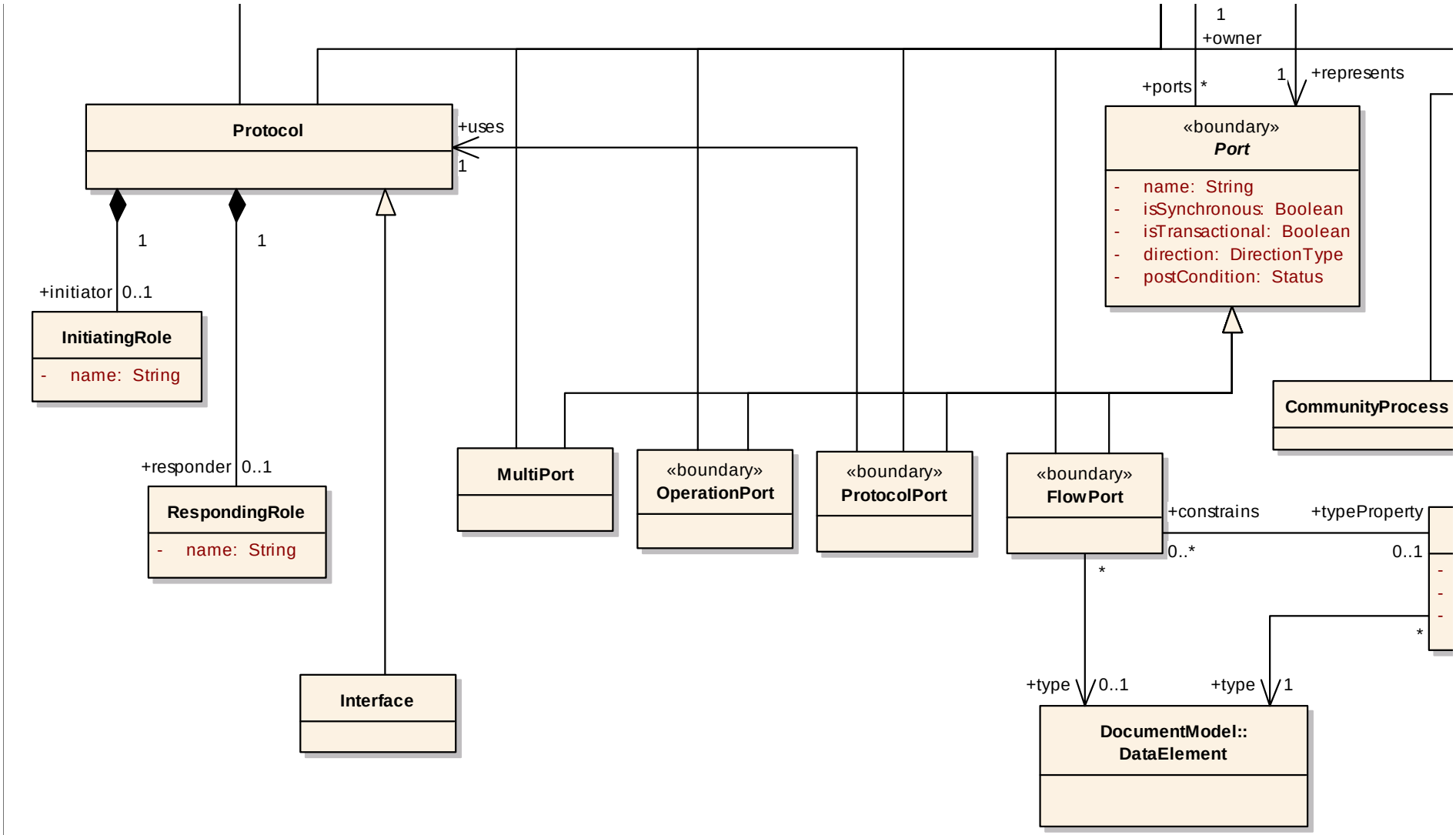
CCA Component Port Structure



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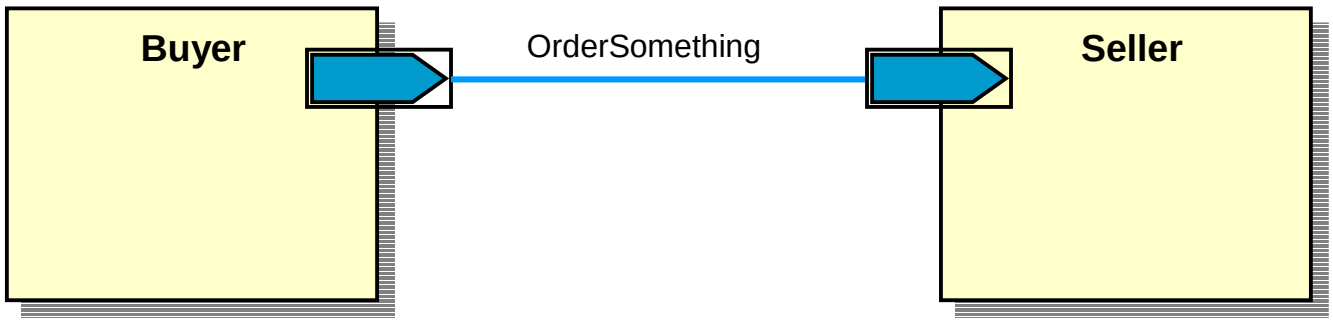
CCA Component Modeling



Protocol Ports opened:

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One Model – Multiple Views

- EDOC specifies already multiple views to the underlying component collaboration model
  - Role Collaboration View
  - Process and Activity View
  - Entity Relationship View
- A combination with the Ontology Definition Metamodel adds one or more Ontology Views
- As a result, very powerful modeling tools can be built, allowing the user to work in multiple views concurrently

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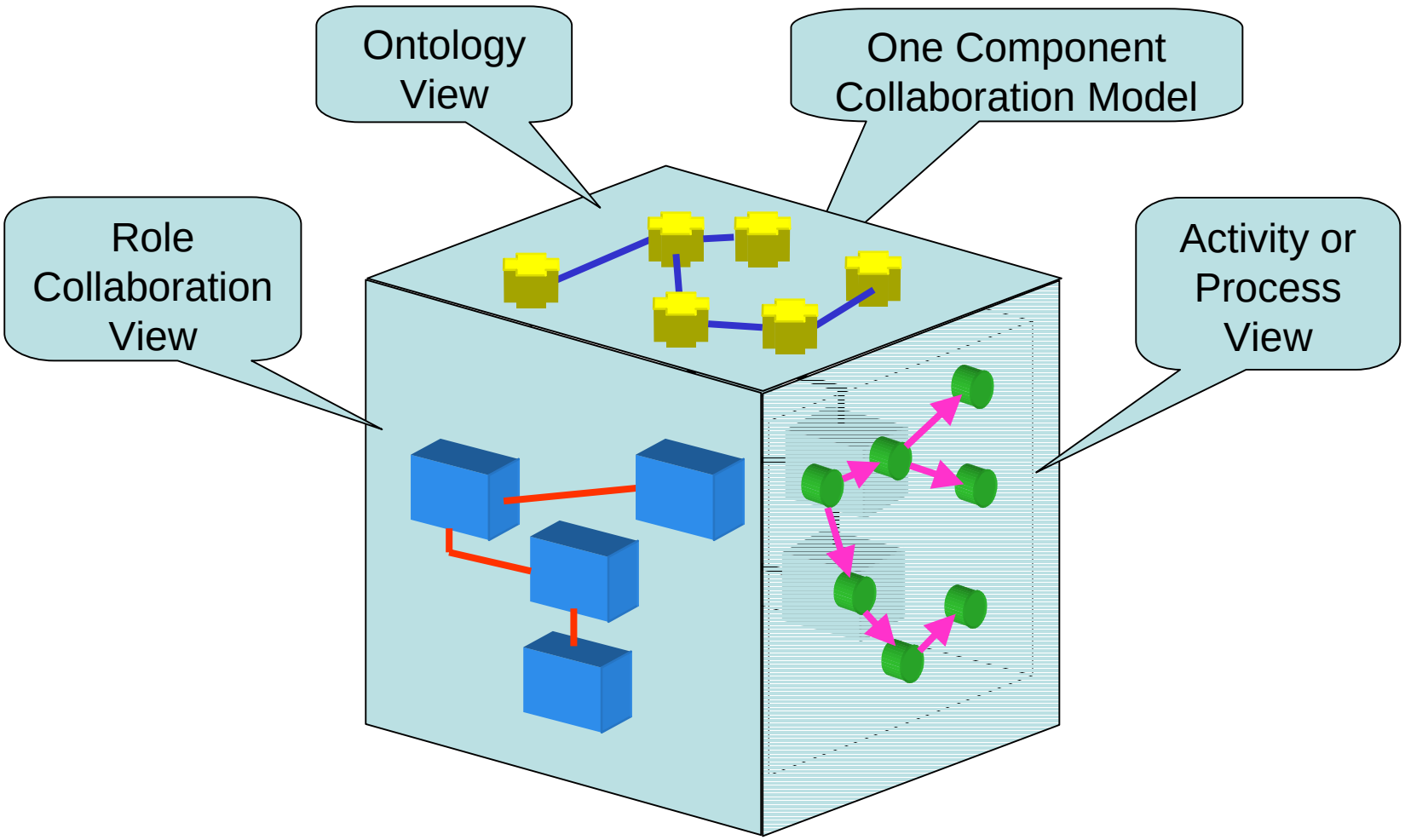
Role and Business Process View



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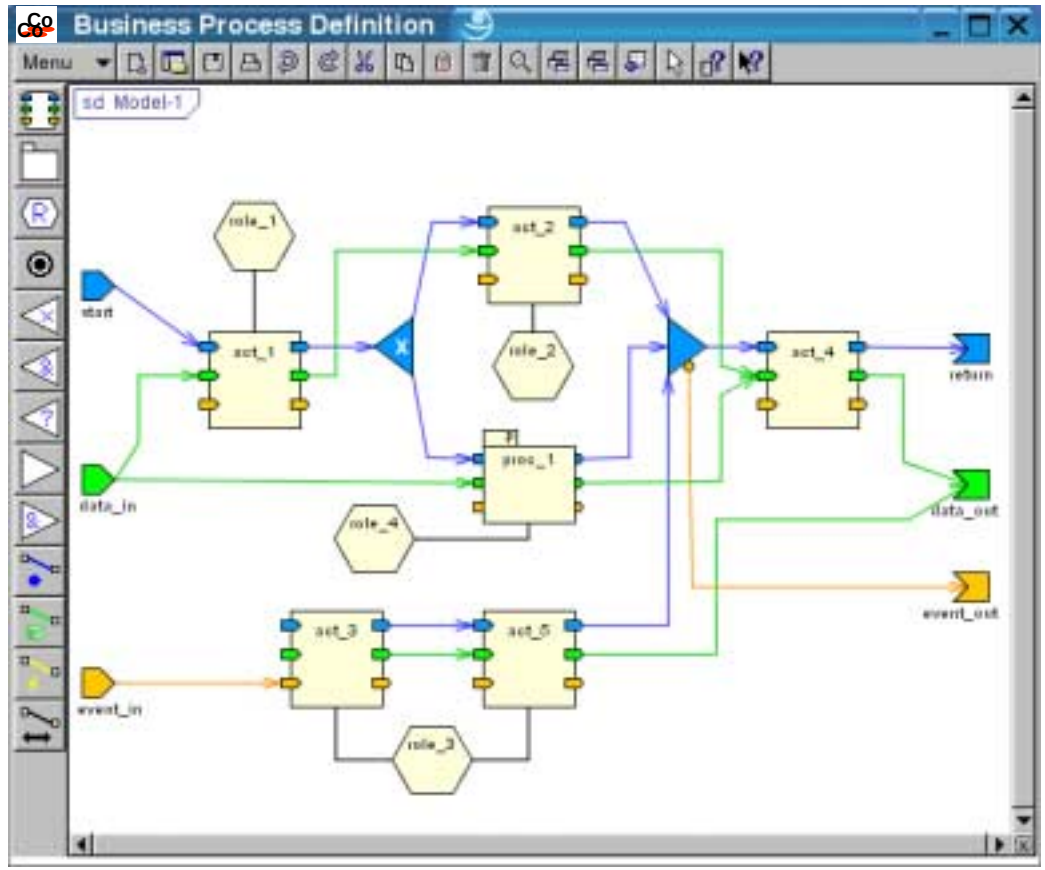
Tool Example: Process View

- Processes are composed from Activities
- Activities are provided by Components
- Roles provide abstract representations for Components
- Color helps to distinguish Choreography, Data and Events



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To become real: Deployment

- Components are implemented by Artifacts
- Artifacts are performed by Performers
- Performers finally map to an execution Domain, composed from a network of execution Nodes
- Required deployment information can be derived from the component descriptions
- The “Deployment and Configuration” specification defines the full mechanism

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To become real: Map to the PSM

- With increasing component refinement, the CIM becomes a PIM
- After selection of the target platform and technology, we are ready to map to the PSM
  - J2EE
  - CORBA Components
  - ...
- The mapping is typically straight forward and can be handled during the Deployment and Configuration process

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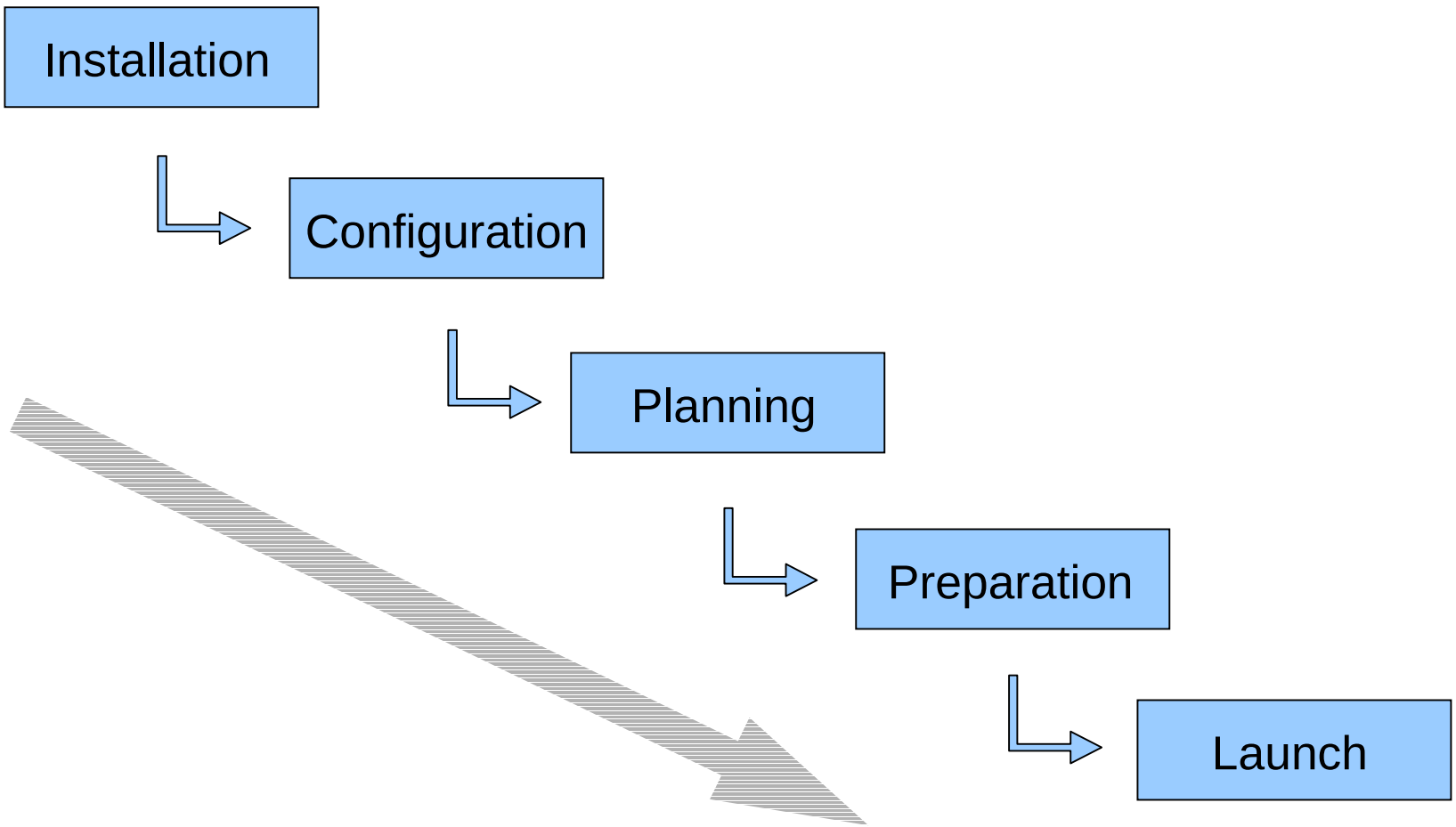
Deployment & Configuration



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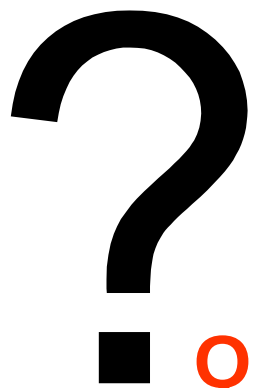
Thank You ...



Questions?

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