

# Mind Your P's: Processes, Policies, and **Protocols**

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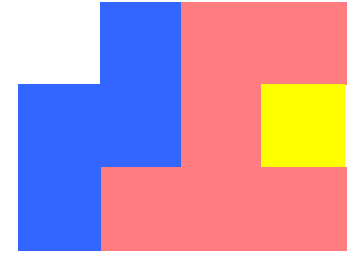
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# Processes

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- n Ultimate goal: Design processes
- n How:
  - I Design from scratch
  - I Process integration
- n Composing distributed processes
  - I Process-process interaction



# Policies and Protocols

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- n Policies: Constraints on process interactions based on factors such as business considerations, optimization, etc.
- n Exceptions may be okay, with or without a penalty
- n Protocols: Constraints on process interactions based on execution model
- n Violations may result in execution failure

# Process Interactions

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- n Communication through messages

- n Synchronous messaging

- l Sender knows that the receiver gets it

- l Typical in process algebras:  $\dots c!a \dots \parallel \dots c?x \dots$

- n Asynchronous messaging

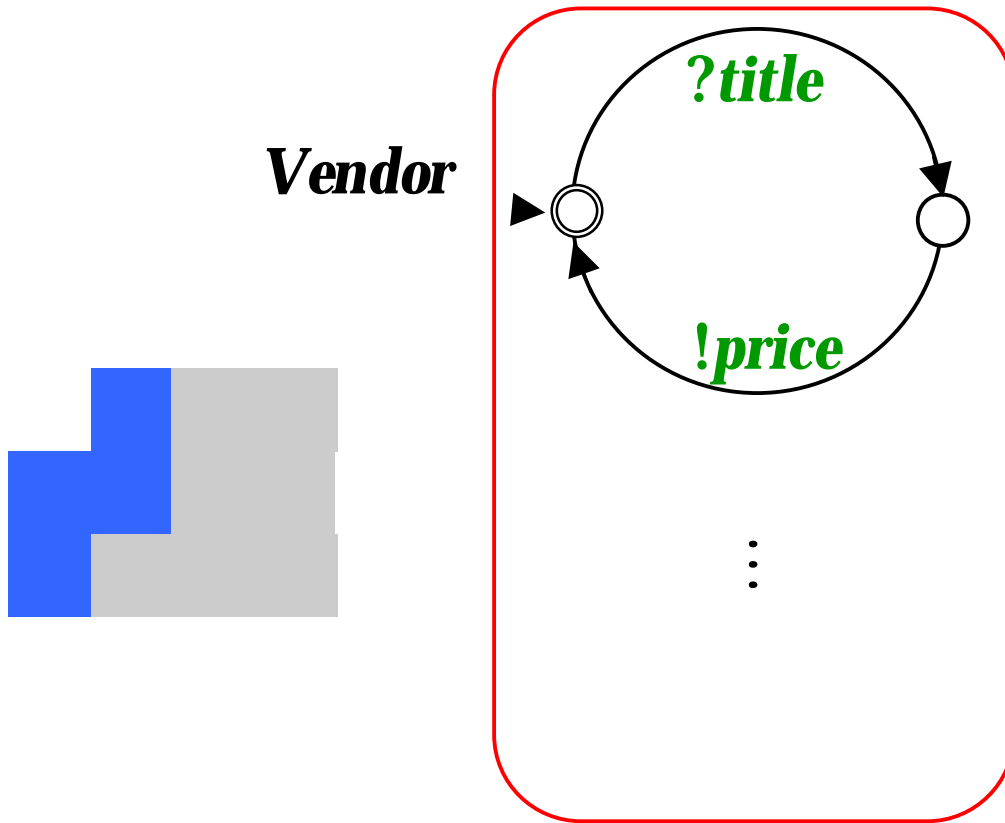
- l Sender knows that the receiver will eventually get it

- l Typically using FIFO queues

- l E.g., email, JMS

# Behavior Signatures

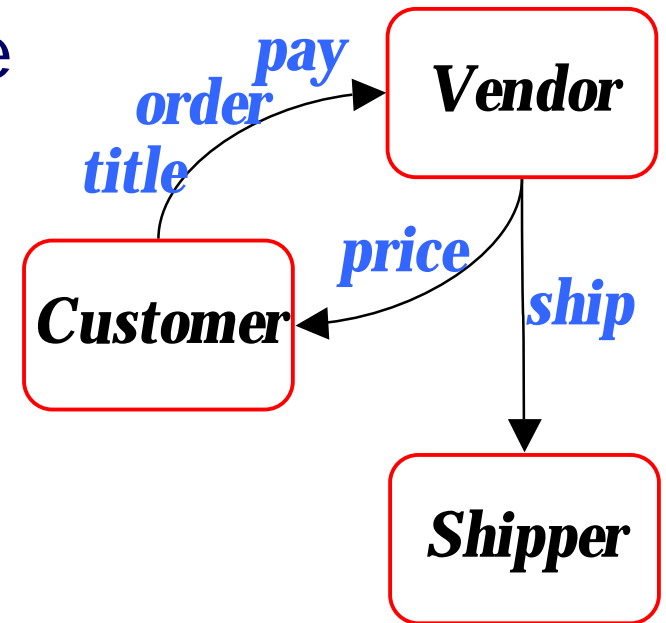
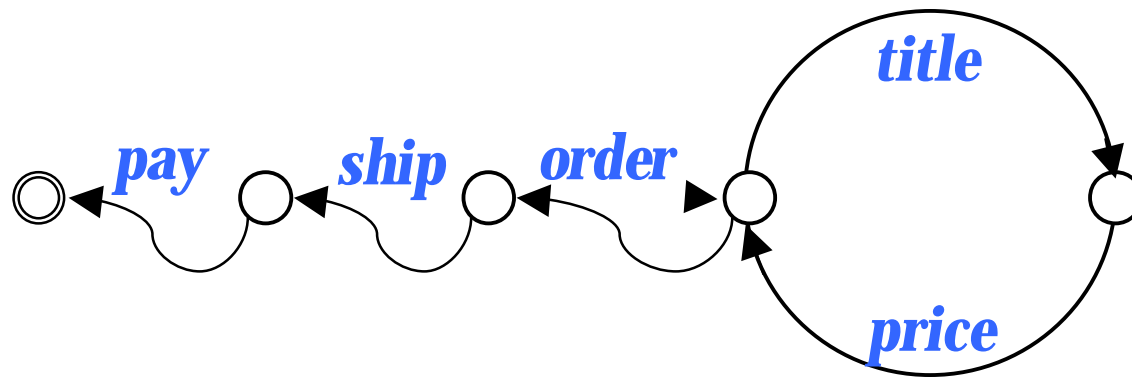
- n Typing the capability of “action” and “reaction” by a process



- n Can be viewed as “local constraints” on interactions

# Conversation Protocols

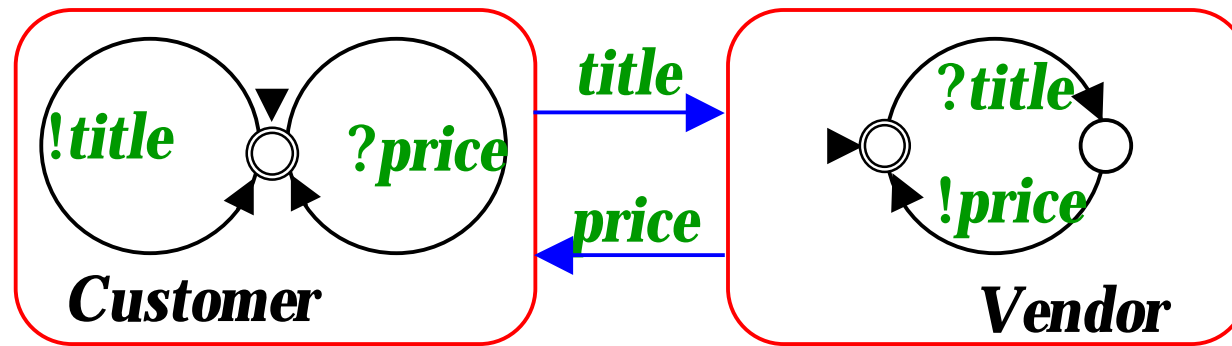
- n Global constraints on interactions
  - l Must “match” behavioral signature  
(title price)\* order ship pay



- n Studied variously

- l IBM conversation project, WSCL
- l Mealy conversations [Bultan et al, WWW'03]

# Asynchronous messaging : not well understood



- n Queues are used to store messages
- n The conversation is not regular!
- n Example: all words with the following properties:
  - l The same number of title and price messages
  - l Each prefix has no less title messages than price messages

# Conversation protocols

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- n Significant difference between synchronous and asynchronous messaging
  - l Asynchronous is harder
- n Characterization cases that guarantee regular conversations in asynchronous case
- n Verifying conversation properties
  - l BPEL with XML contents [WWW '04, ICWS '04]