



UML Profile for BPMN 2 Processes

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Background

- **BPMN is the most widely used modeling language for enterprise-level processes.**
- **Also used for operational requirements on manufactured systems.**
- **Integration needed with SysML/UML models of system design.**
- **Expected usage is through BPMN notation.**

RFP for BPMN Profile

- **Issued June 2010 through BMI.**
- **Initial submission February 2011.**
- **Most recent revised submission February 2012.**
- **Another revised submission for December vote to vote.**

Submission Team

- **Submitters:**

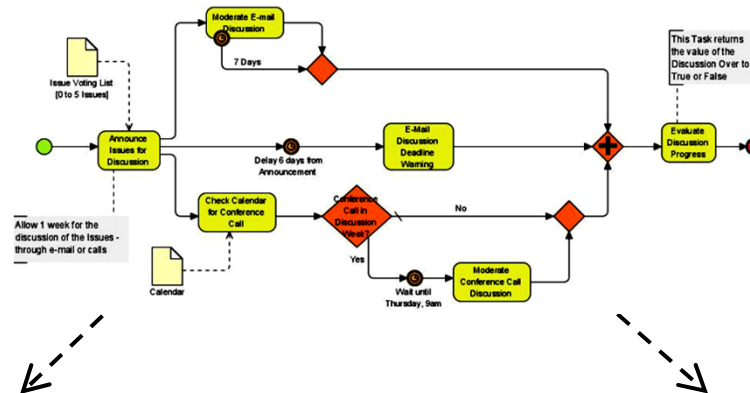
- MEGA International
- Model Driven Solutions
- No Magic
- Sparx Systems

- **Supporters:**

- Atego
- Axway
- Computer Sciences Corporation
- oose Innovative Informatik GmbH
- Softeam
- The MITRE Corporation
- U.S. Department of Defense
- U.S. National Aeronautics and Space Administration
- U.S. National Institute of Standards and Technology

Equivalent Semantics

BPMN Notation



Instances of BPMN 2
MM / XSD

Instances of the UML MM
with profile applied.

BPMN
semantics

UML semantics
extended for BPMN



- Business works the same regardless of metamodel.

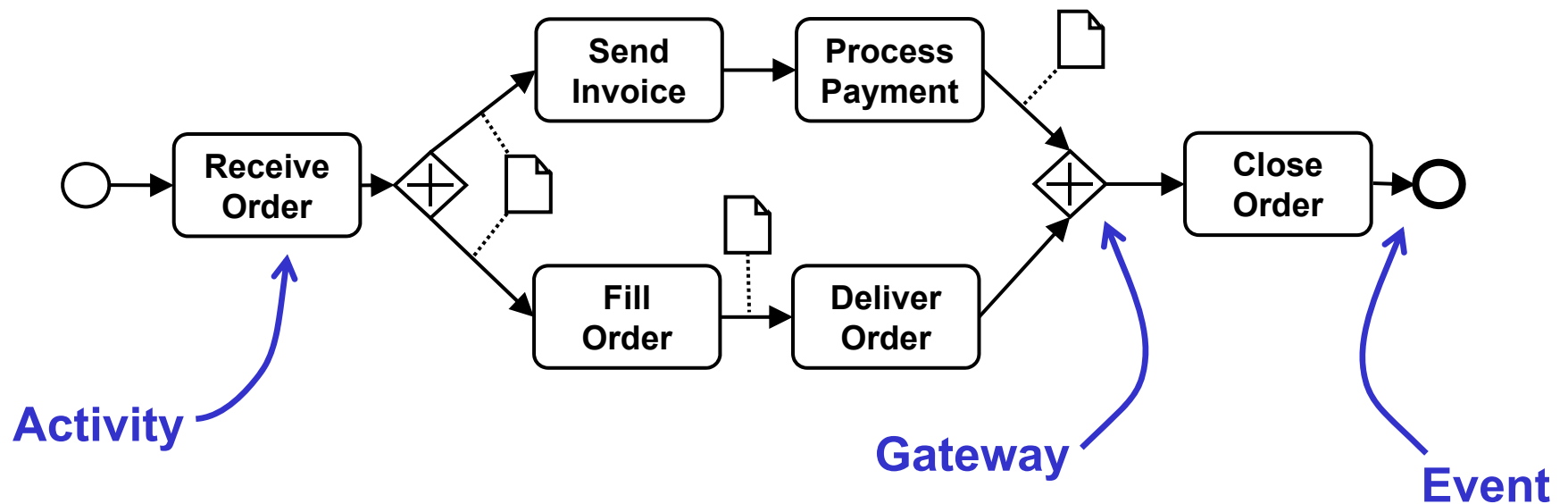
RFP Requirements

- **Equivalence reflected in the RFP requirements on the profile:**
 - **Mapping between BPMN 2 semantics and the profiled UML semantics.**
 - **XSLT and QVT transforms between BPMN and profiled UML interchange formats.**

UML & BPMN

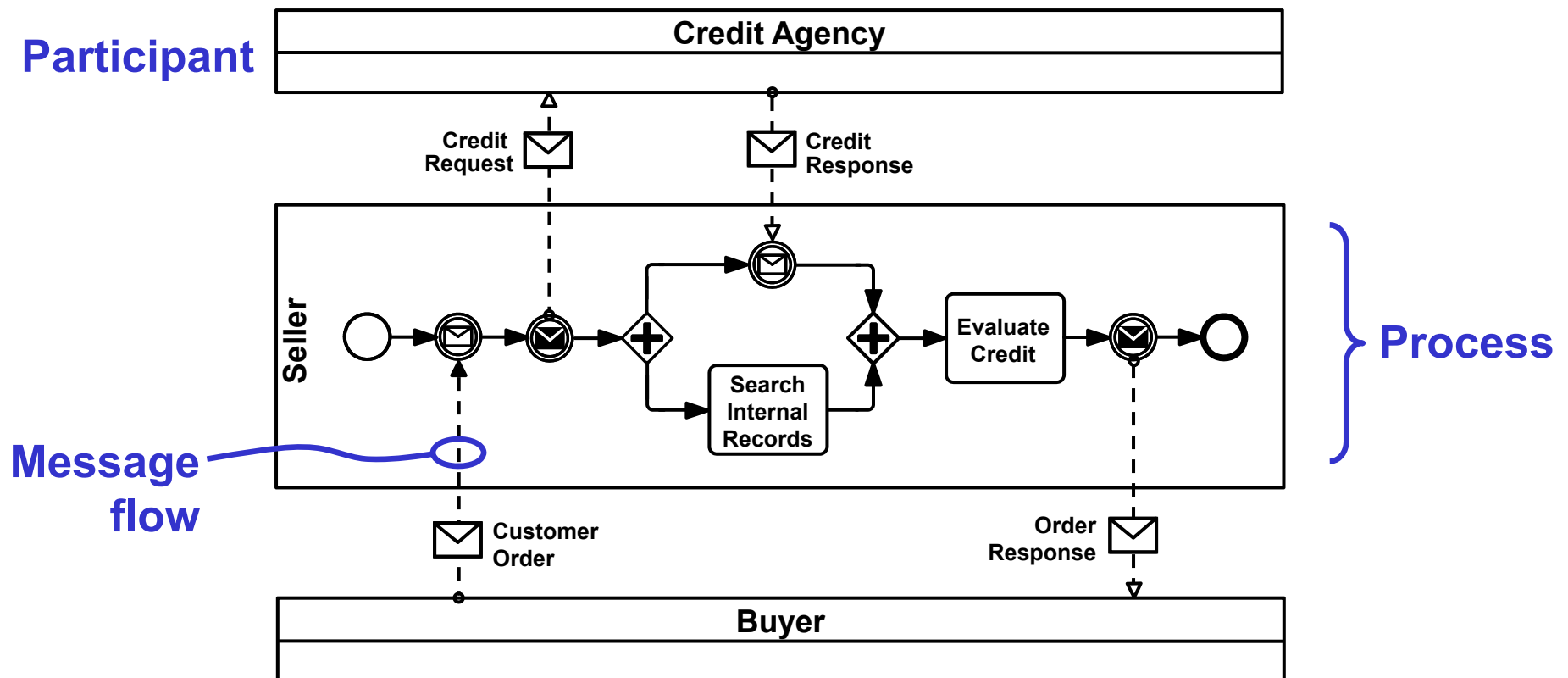
- **Developed in parallel with significant of cross-pollination.**
 - Influenced each other, including unadopted UML submissions, such as DTSC.
- **UML includes models for the two areas requested in the RFP:**
 - Processes (called “activities”)
 - Collaborations (interaction between processes)
- **Quite a bit of shared notation and semantics, but also many differences.**

BPMN Processes



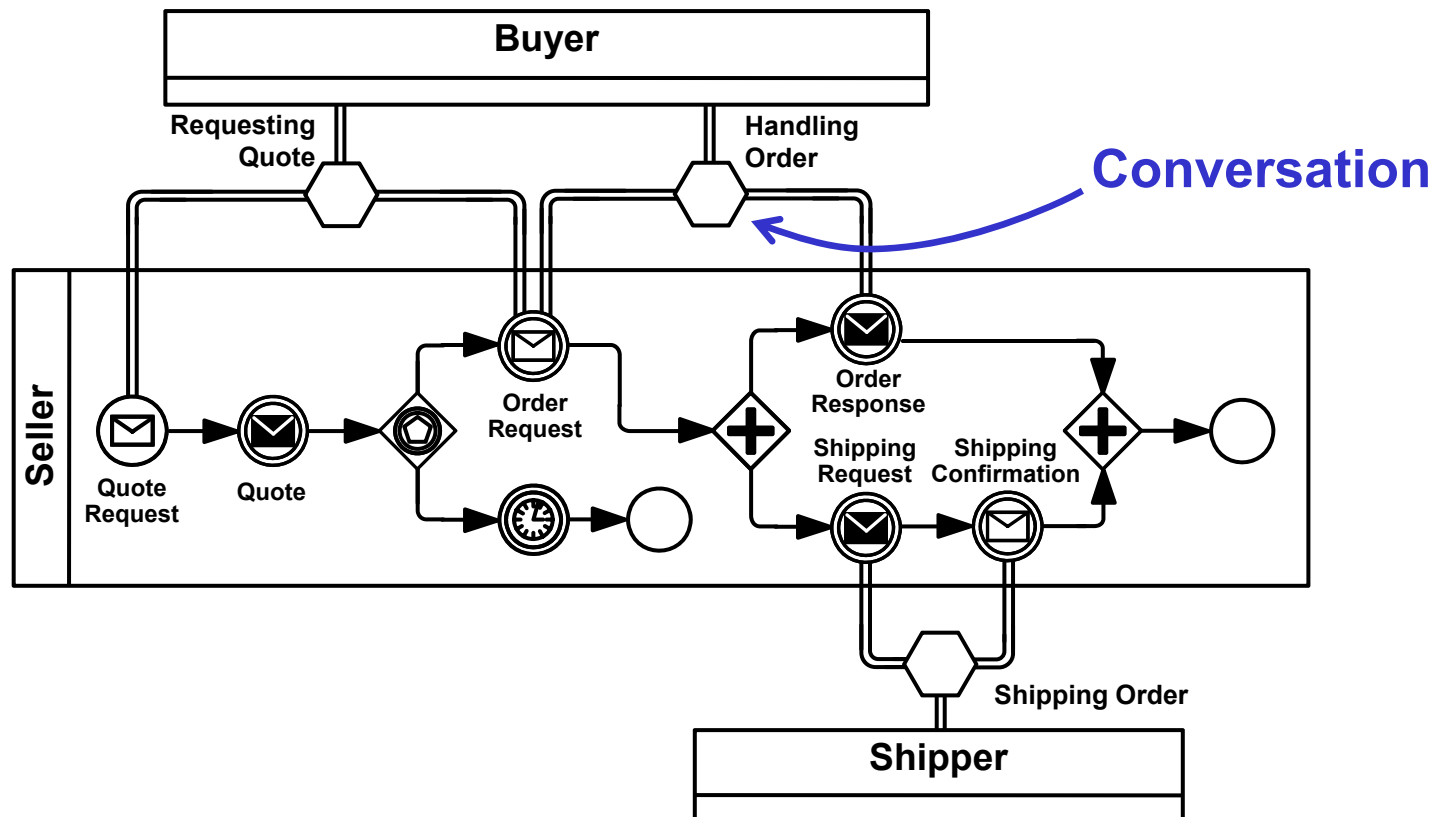
- Usually internal to a business.

Processes and Collaborations



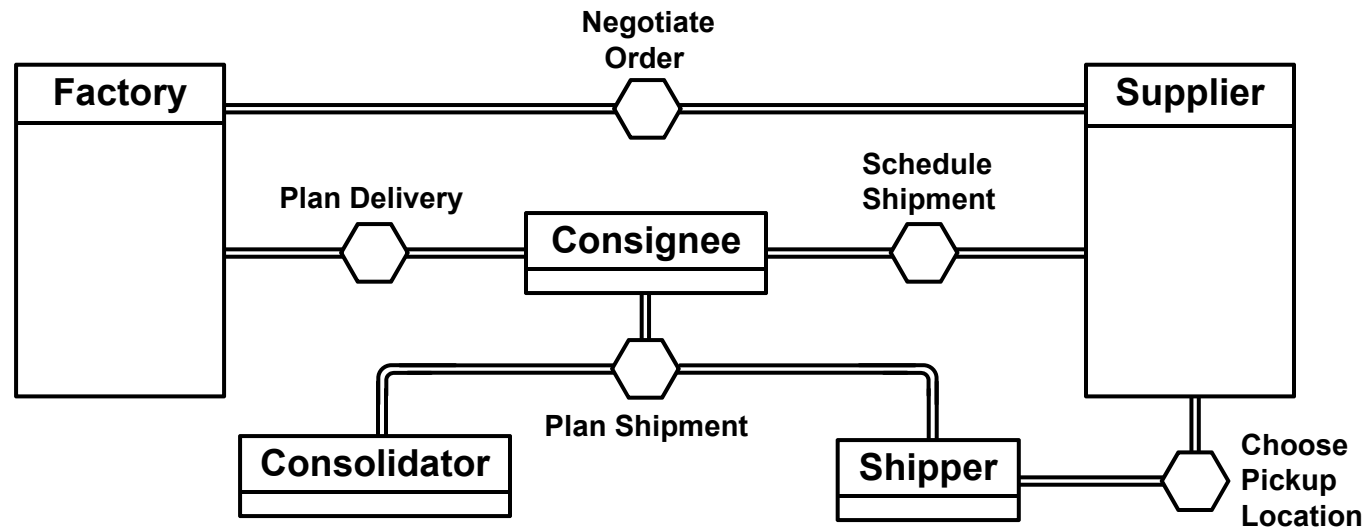
- Collaborations show message flows between participants.

Conversations



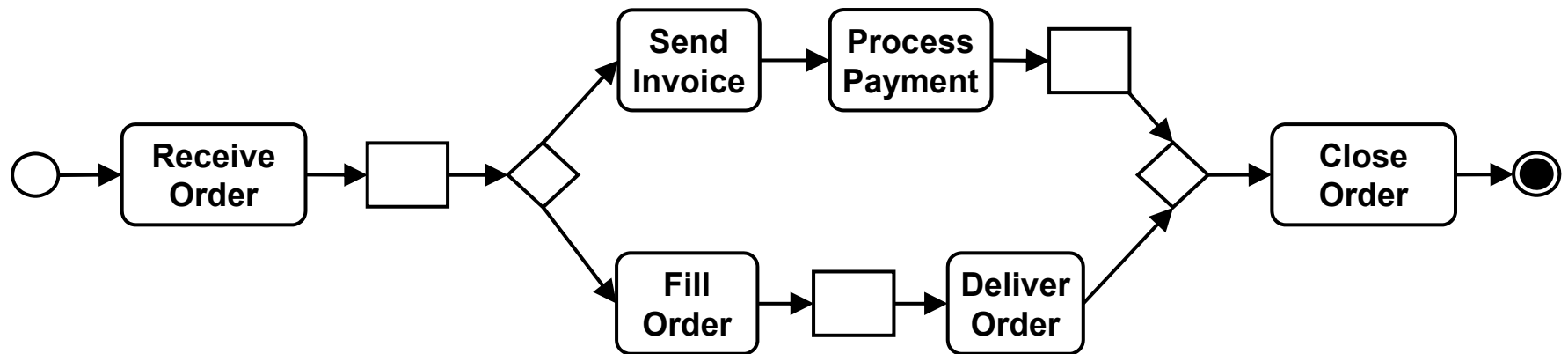
- **Conversations group message flows.**

Conversations



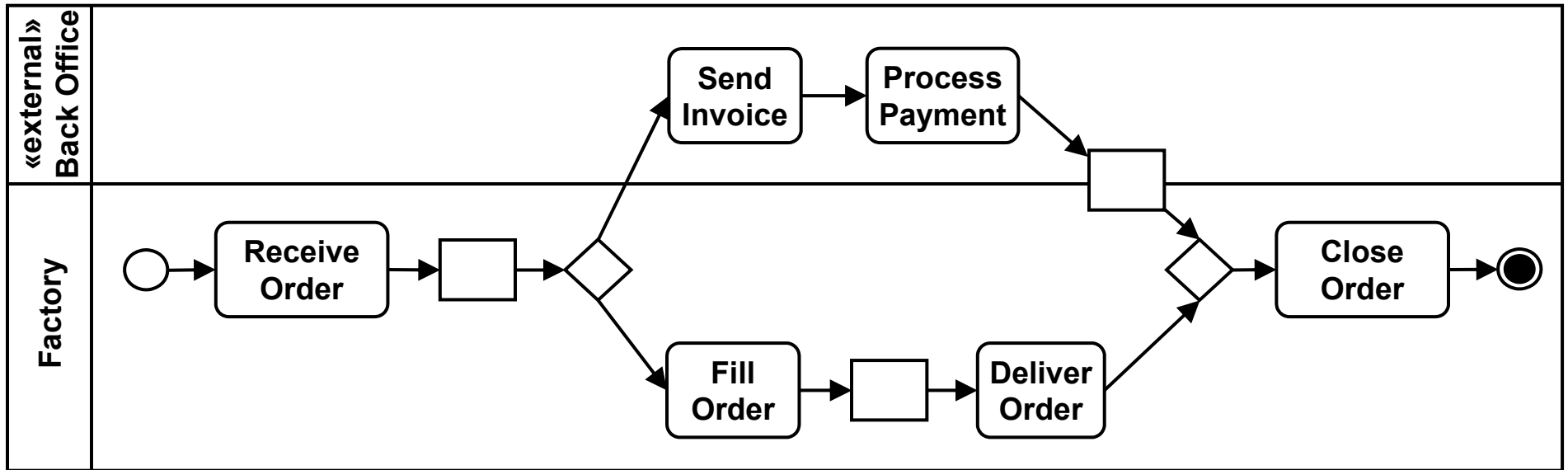
- **Collaborations might only show conversations**
 - No processes or message flow.
 - Informally called a “conversation diagram”¹.

UML Activities



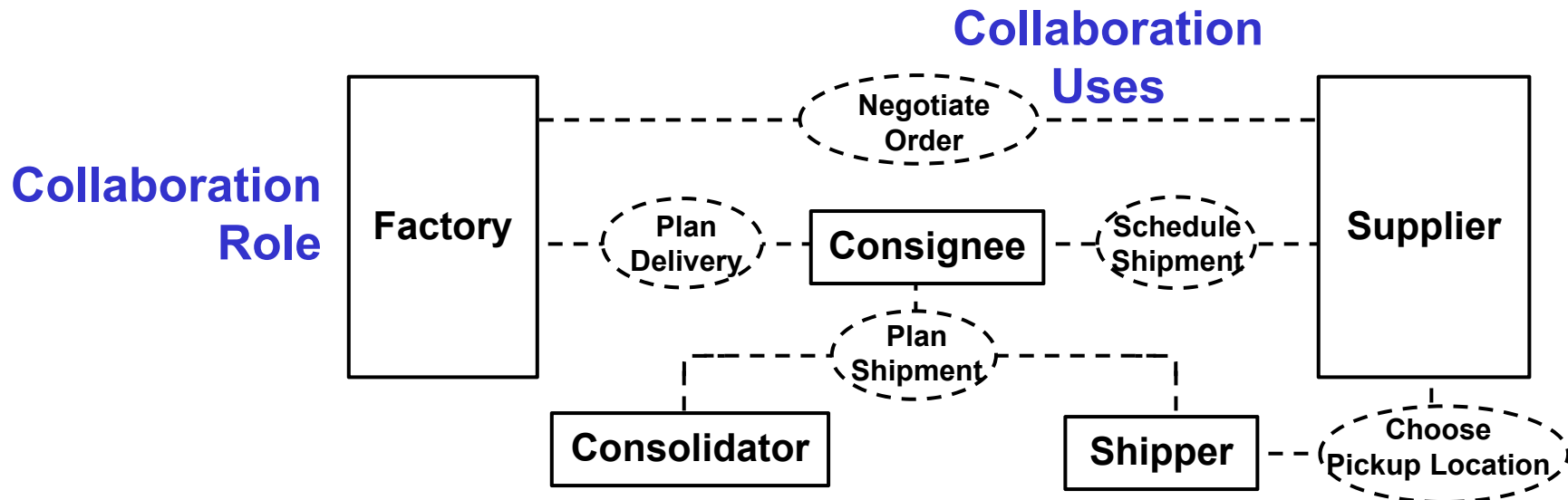
- **Very similar to BPMN processes, but some notational and semantic differences.**

UML Activities ≠ BPMN Collaborations



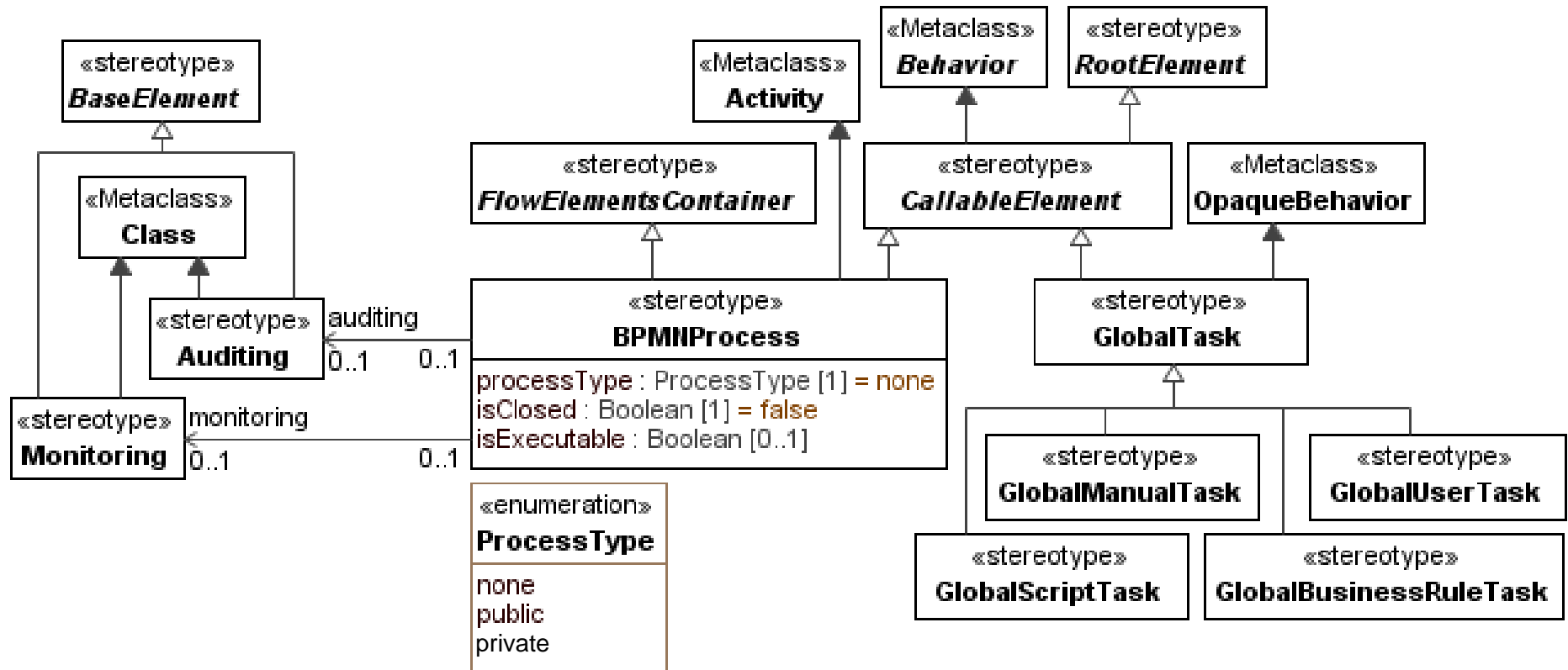
- **Activities model a single process.**
 - Not interactions between processes.
 - Same for BPMN processes.

UML Collaborations

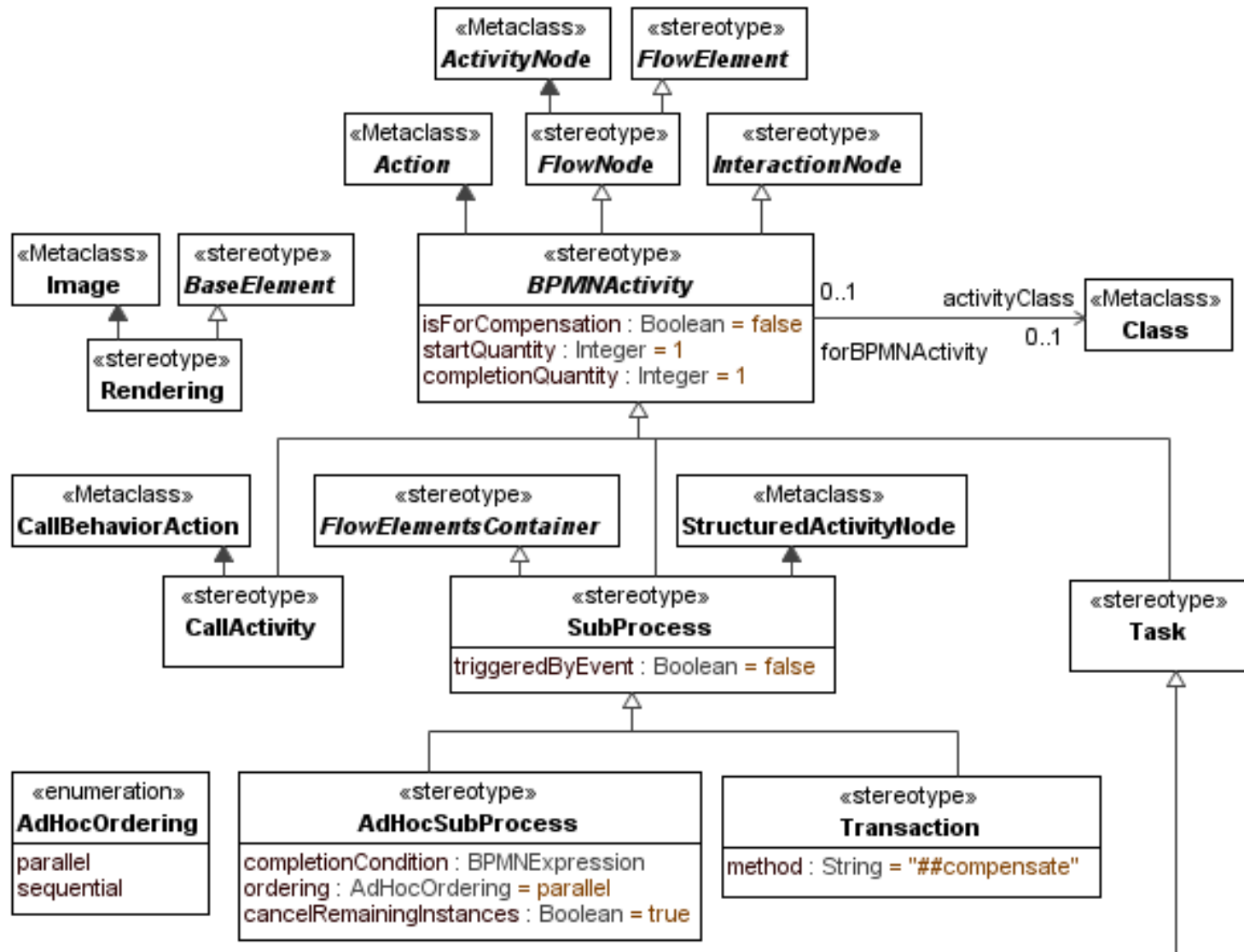


- Similar to conversation-only BPMN Collaboration.
- Does not have notation for activities inside collaboration roles.
 - But the UML metamodel supports roles referring to activities.

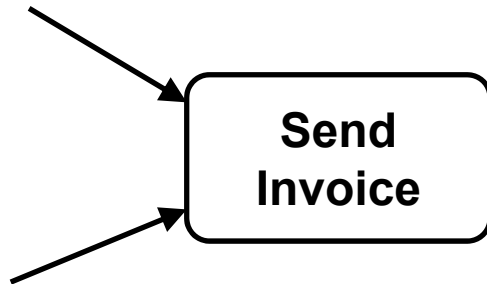
Processes in Profile



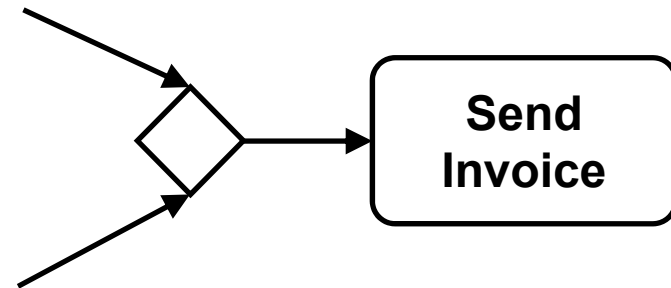
BPMN Activities in Profile



Equivalent Semantics

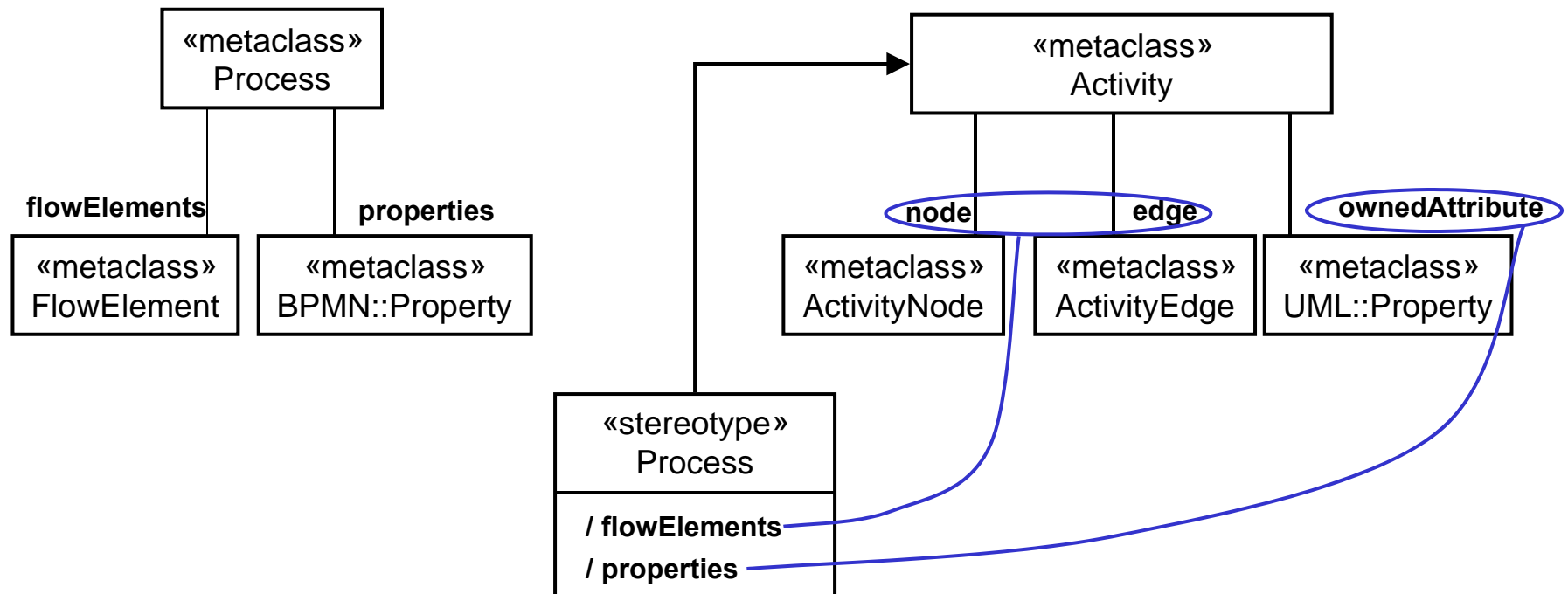


**In BPMN the activity
executes twice, in UML
once.**



**Transform with no
modification of UML
semantics.**

BPMN Metamodel Navigation

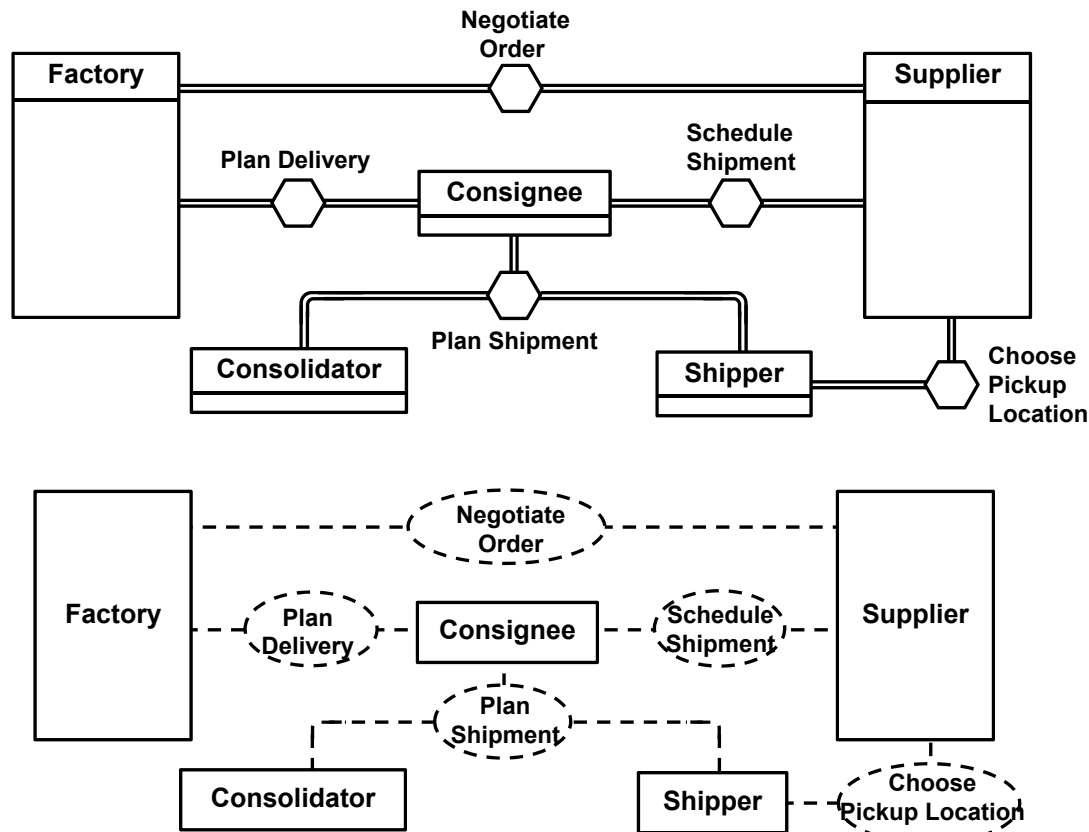


- **Stereotypes have properties for BPMN derived from UML properties.**
- **Can navigate a profiled UML model as if it were a BPMN model.**

Other Process Elements

		BPMN	UML
Events		Catch Events	Accept Event Actions, Initial Nodes
		Throw Events	Call Operation Actions, Activity Final Nodes
		Event Definitions	Events
Gateways		Exclusive Gateways	DecisionNodes, MergeNodes
		Parallel, Complex, Inclusive Gateways	JoinNodes, ForkNodes
		Event-based Gateways	Interruptible Regions
Data		Data Inputs, Data Outputs	Input Pins, Activity Parameter Nodes, Output Pins
		Data Associations	Object Flows
		Data Objects	Data Store Nodes
Lanes & Resources		Input Sets, Output Sets	Parameter Sets
		Lanes, LaneSets	Activity Partitions
		Resources, Item Definitions	Classes
		Resource Roles / Parameters / Bindings	Properties, Slots

Collaborations in Profile

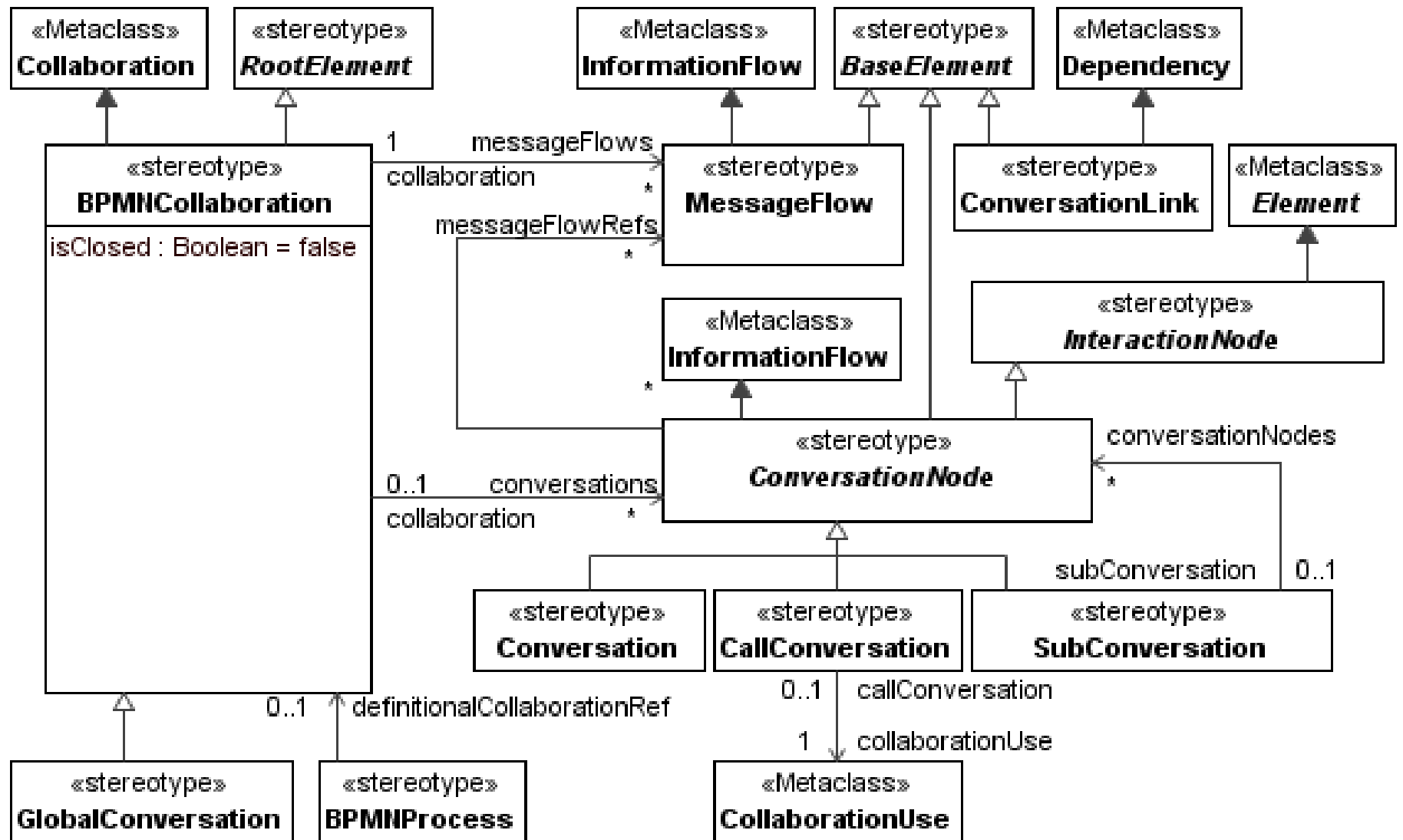


UML Collaboration
in underlying model



- **UML Collaborations are Classifiers.**
- **Collaboration roles (BPMN Participants) are properties.**

Collaborations in Profile



Summary

- **UML and BPMN share purpose and development history.**
- **Profile extends UML with BPMN terminology, syntax, and provides equivalent semantics.**
- **BPMN Processes => UML Activities**
- **BPMN Collaborations => UML Collaborations**
- **BPMN Message Flow => UML Information Flow**