

# Using UML for Knowledge Representation

Mark Dutra

Sandpiper Software, Inc.

Mdutra@Sandsoft.com

# Motivation

- Importance of knowledge representation (ontologies) increasing
- No existing commercial tools for KR modeling
- Pool of experienced ontologists small
- Population of UML experienced engineers is growing
- Need to make KR modeling accessible to domain experts

# KR Domain Overview

- Early work on KR done by the Artificial Intelligence community
- KR domain has historically neglected common software engineering discipline
- Mapping between KR concepts and UML not always straight forward
- Granularity of ontology models vary greatly between organizations

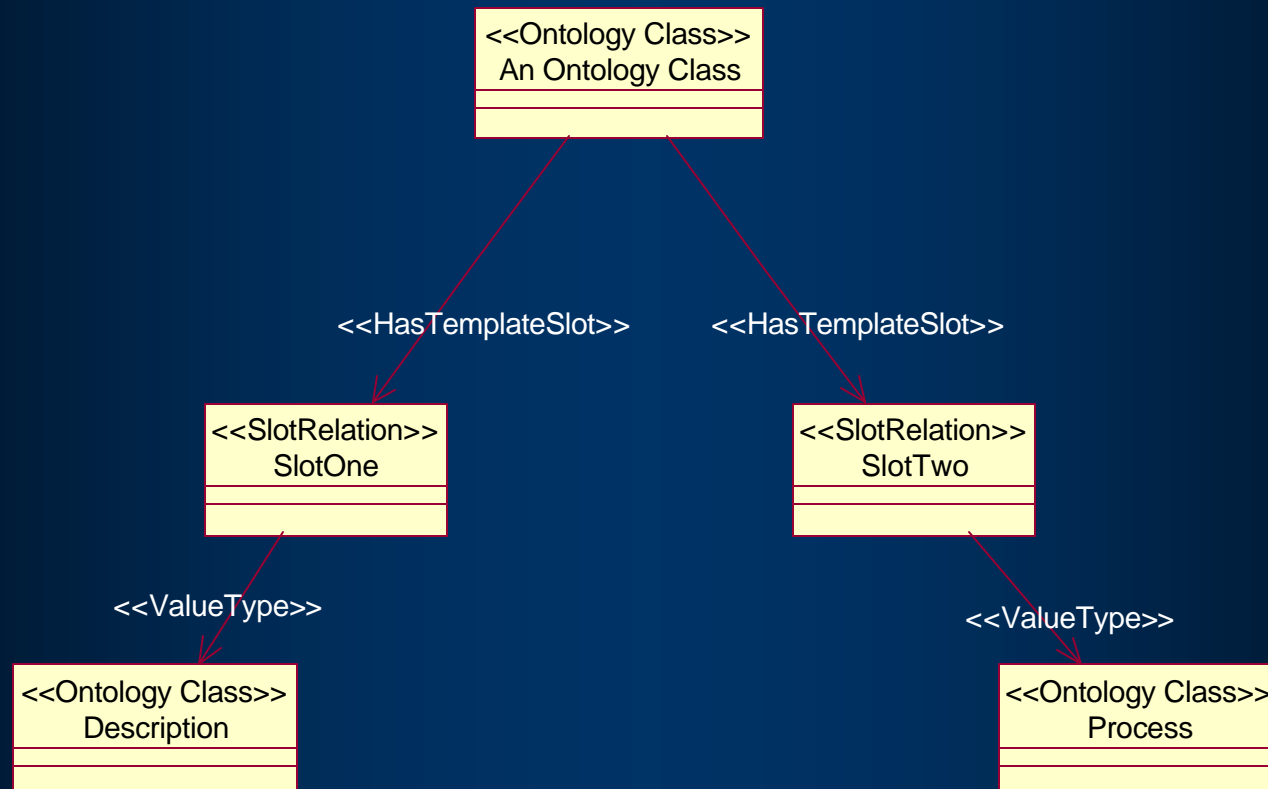
# UML Profile for KR

Frame-Based KR (Ontology) Element	UML Metamodel Element(s)	UML Stereotype
Ontology	Package	Ontology
Class	Package	ClassFrame
	Class	OntologyClass
Relation	Package	RelationFrame
	Class	Relation
Function	Association	Domain
	Package	FunctionFrame
	Class	Function
	Association	Domain
	Association	Range
Individual	Operation	Function
	Class	Individual
	Association	IndividualOf
Slot	Class	SlotRelation
	Association	HasSlot
Facet	Attribute	Facet
Axiom	Operation, External File	Axiom

## Issues Encountered

- Conceptual differences between the KR and UML domains
- Limitations in tool support impacted implementation of ontology modeler add-in, and therefore impacted the profile itself

# Example – slots of a class



# Example – n-ary relationship

