OTHER PRESENTATIONS ON RULES IN TODAY’S SESSIONS

• SWRL V0.5 overview by Peter Patel-Schneider
• SWRL V0.6 overview by Mike Dean
• SWRL Implementation (incl. Hoolet) by Ian Horrocks
• WWW-2004 DevDay Rules Track Overview by Harold Boley
Usage Comments about SWRL V0.6

Benjamin Grosof
MIT Sloan School of Management,
http://ebusiness.mit.edu/bgrosof

with Mike Dean, co-chair
BBN Technologies

Presented at DAML PI Mtg., May 25, 2004, New York City
Usage Comments about SWRL V0.6

- Outline:

  - Expressiveness
  - "Warning Label"
  - Later today: Implementation strategy
Expressiveness of SWRL (V0.6)

SWRL expressiveness =
1. OWL-DL (i.e., SHOIQ Description Logic (DL) which is an expressive subset of FOL)
2. + Horn FOL rules, with no logical functions, where each predicate may be:
   - OWL named class (thus arity 1)
     - More generally, may use a complex class, but this is expressively inessential – can just replace by a named class and define that named class as equivalent to the complex class.
   - OWL property (thus arity 2)
   - OWL data range (thus arity 1)
     - RDF datatype
     - set of literal values, e.g., \{3\} or \{1,2,3,4,5\} or \{“Fred”,“Sue”\}
3. + some built-ins (mainly XML-Schema datatypes and operations on them)
   - This is new with V0.6
   - (All have arity 1 or 2.)
   - Plan: the set of built-ins is extensible

- The fundamental KR is an expressive subset of FOL
  - We’ll call it “DH” here. (It doesn’t have a real name yet.)
  - Its expressiveness is equivalent to: DL + function-free Horn.
Venn Diagram: Expressive Overlaps among KR’s
“Warning Label”

1. The Theory of DH is Little Explored Territory as a KR.
   - In its full generality, DH is a relatively **unstudied** fragment of FOL.
   - Its worst-case computational **complexity** is undecidable and is not known to be better than that of full FOL (e.g., for the propositional case).
   - There are **not yet efficient algorithms** known for inferencing on it “natively” as a KR.

2. To ensure **extensibility** of SWRL rulebases to include **LP** features that go beyond Horn expressiveness, restrict the OWL ontologies used within SWRL to be in the DLP subset of OWL-DL. E.g.:
   - If you want to use **nonmonotonicity** / negation-as-failure / priorities in your rules
   - If you want to use **procedural attachments** that go beyond the SWRL built-ins
   - E.g., effectors/actions with side effects
Venn Diagram: Expressive Overlaps among KR’s

First-Order Logic

Description Logic

Horn Logic Programs

Description Logic Programs

Logic Programs

(Negation As Failure)

(Procedural Attachments)

DH KR’s rough position. Subsumes DLP, DL, and part of Horn. Subsumed by FOL.
Design Perspective

Alternative points in design space:

1. partial LP + full DL = SWRL V0.6

versus

2. full LP + partial DL = SCLP RuleML V0.8+
   (with DLP OWL2RuleML)

(SCLP = Situated Courteous Logic Programs KR)