Demo of MYNG 1.01

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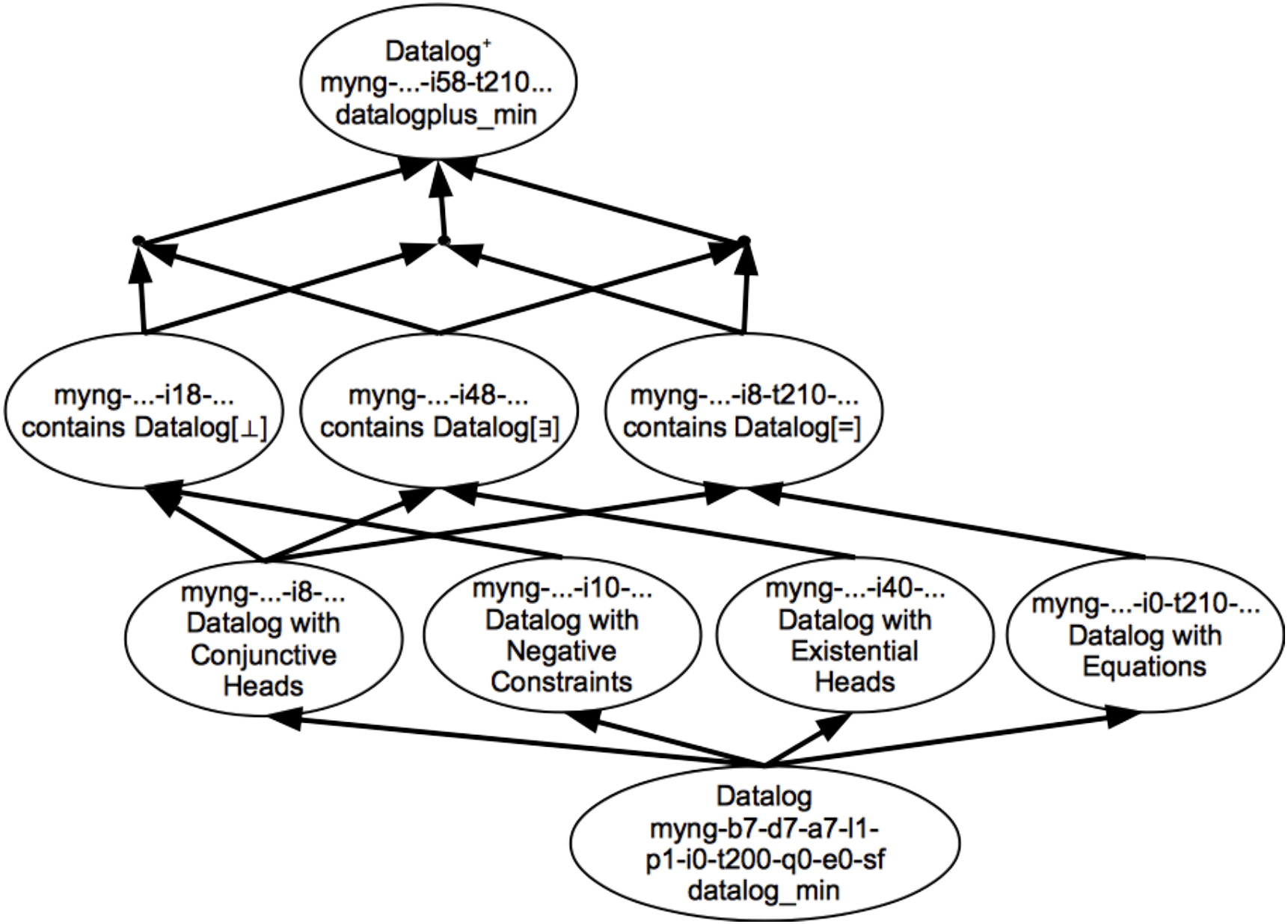
This page (http://wiki.ruleml.org/index.php/Demo_of_MYNG_1.01) provides a quick demonstration of MYNG 1.01 for customizing sublanguages of Deliberation RuleML 1.01 (http://deliberation.ruleml.org/1.01) . Annotated slides (http://ruleml.org/talks/DemoMYNG1.01) were created from a version of this wiki page for presentation at RuleML 2014. The paper (http://ceur-ws.org/Vol-1211/paper7.pdf) [1] gives theoretical underpinnings.

Key new features in MYNG 1.01 include:

- Integration of new Relax NG schema modules -- and the RuleML sublanguages they define -- into MYNG, e.g.
  - Datalog$^+$, Hornlog$^+$, and their many extensions.
- Improved functionality of the MYNG GUI and REST interface, e.g.
  - GUI access to automatically-generated monolithic XSD schemas that are compatible with XML tools, e.g. JAXB.
  - Display of myng-code and myng-code-based schema URLs.

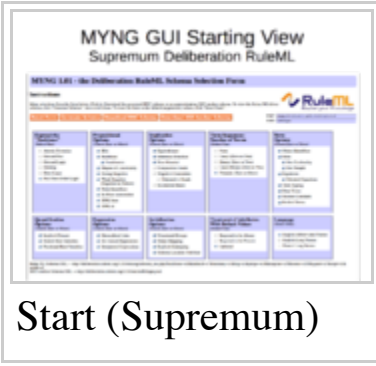
Datalog+


Datalog+
myng-...-i58-t210...
datalogplus_min
myng-...-i18-...
contains Datalog[⊥]
myng-...-i48-...
contains Datalog[∃]
myng-...-i8-t210-...
contains Datalog[=]
myng-...-i8-...
Datalog with
Conjunctive
Heads
myng-...-i10-...
Datalog with
Negative
Constraints
myng-...-i40-...
Datalog with
Existential
Heads
myng-...-i0-t210-...
Datalog with
Equations
Datalog
myng-b7-d7-a7-l1-
p1-i0-t200-q0-e0-sf
datalog_min

Contents

1 Quick Tour of the GUI

- Open the MYNG GUI at http://deliberation.ruleml.org/1.01/myng.
- The selection form opens with the supremum language pre-selected:
  - Clicking the Reset Form button will always return to this selection.
  - The RNC field gives the myng-code for this language (myng-b3f-d7-a7-l1-p3ff-i7f-tf3f-q7-ef-sf).
  - The XSD field gives the name of the best approximating anchor language for the selected language (naffologeq).
  - The two rows of five boxes with blue backgrounds group the configuration options into semantically-related facets, which will be discussed in greater detail below.



Start (Supremum)

MYNG GUI Starting View

Supremum Deliberation RuleML

MYNG 1.01 - the Deliberation RuleML Schema Selection Form

Instructions

Make selections from the form below. Click to Download the generated RNC schema or an approximating XSD anchor schema. To view the Relax NG driver schema, click "Generate Schema", then scroll down. To reset the form to the default (supremum) values, click "Reset Form".

RuleML — Realize your Knowledge

Reset Form | Generate Schema | Download RNC Schema | Download XSD Anchor Schema

RNC: myng-b3f-d7-a7-l1-p3ff-i7f-tf3f-q7-ef-sf
XSD: naffologeq

Expressivity "Backbone" (Select One)
- ○ Atomic Formulas
- ○ Ground Fact
- ○ Ground Logic
- ○ Datalog
- ○ Horn Logic
- ◉ Full First-Order Logic

Propositional Options (Check Zero or More)
- ☑ IRIs
- ☑ Rulebases
  - ☑ Entailments
- ☑ Degree of Uncertainty
- ☑ Strong Negation
- ☑ Weak Negation (Negation as Failure)
- ☑ Node Identifiers
- ☑ In-Place Annotation
- ☑ XML base
- ☑ XML id

Implication Options (Check Zero or More)
- ☑ Equivalences
- ☑ Inference Direction
- ☑ Non-Material
- ☑ Conjunctive Heads
- ☑ Negative Constraints
  - ☑ Disjunctive Heads
- ☑ Existential Heads

Term Sequences: Number of Terms (Select One)
- ○ None
- ○ Unary (Zero or One)
- ○ Binary (Zero or Two)
- ○ Unary/Binary (Zero to Two)
- ◉ Polyadic (Zero or More)

Term Options (Check Zero or More)
- ☑ Object Identifiers
- ☑ Slots
  - ☑ Slot Cardinality
  - ☑ Slot Weight
- ☑ Equations
  - ☑ Oriented Equations
- ☑ Term Typing
- ☑ Data Terms
- ☑ Skolem Constants
- ☑ Reified Terms

Quantification Options (Check Zero or More)
- ☑ Implicit Closure
- ☑ Slotted Rest Variables
- ☑ Positional Rest Variables

Expression Options (Check Zero or More)
- ☑ Generalized Lists
- ☑ Set-valued Expressions
- ☑ Interpreted Expressions

Serialization Options (Check Zero or More)
- ☑ Unordered Groups
- ☑ Stripe-Skipping
- ☑ Explicit Datatyping
- ☑ Schema Location Attribute

Treatment of Attributes With Default Values (Select One)
- ○ Required to be Absent
- ○ Required to be Present
- ◉ Optional

Language (Select One)
- ◉ English Abbreviated Names
- ○ English Long Names
- ○ French Long Names

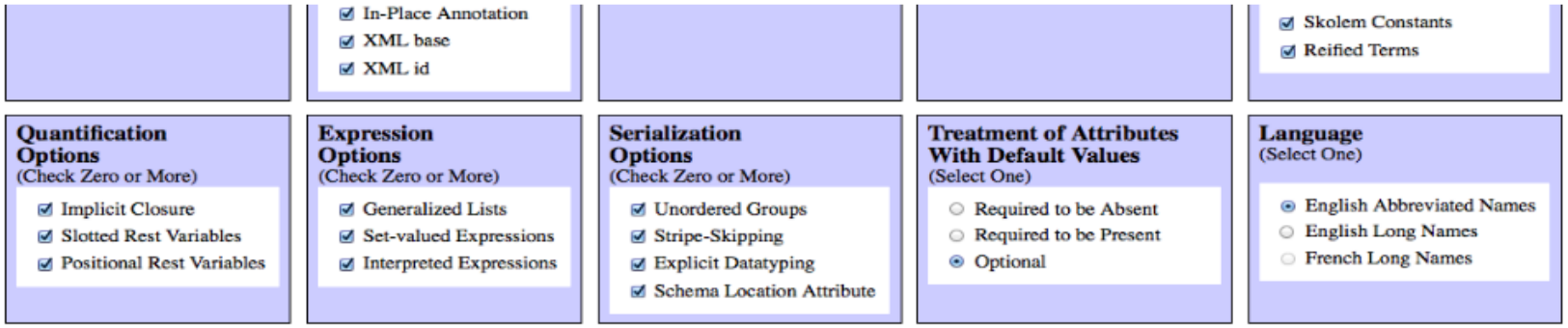
Relax NG Schema URL = http://deliberation.ruleml.org/1.01/relaxng/schema_rnc.php?backbone=x3f&default=x7&termseq=x7&lng=x1&propo=x3ff&implies=x7f&terms=xf3f&quant=x7&expr=xf&serial=xf
XSD Anchor Schema URL = http://deliberation.ruleml.org/1.01/xsd/naffologeq.xsd

- Below the facets, two URLs are given:
  - Relax NG Schema URL = http://deliberation.ruleml.org/1.01/relaxng/schema_rnc.php?backbone=x3f&default=x7&termseq=x7&lng=x1&propo=x3ff&implies=x7f&terms=xf3f&quant=x7&expr=xf&serial=xf
    This is the MYNG "REST call with query string" to obtain the driver schema corresponding to the selections, which can also by reached using the myng-code (http://deliberation.ruleml.org/1.01/relaxng#myng-code) URL http://deliberation.ruleml.org/1.01/myng-b3f-d7-a7-l1-p3ff-i7f-tf3f-q7-ef-sf.rnc.
  - XSD Anchor Schema URL = http://deliberation.ruleml.org/1.01/xsd/naffologeq.xsd
    This is the URL for the monolithic XSD schema of the anchor language naffologeq.
- Clicking the Generate Schema button initiates a request to the MYNG REST interface which produces a copy of the Relax NG Schema at the bottom of the page (scroll down as needed).
- Buttons are also available for downloading the indicated RNC and XSD schemas.

Generate Schema

Scroll Down in the MYNG GUI

Usage and Schema Driver



Relax NG Schema URL = http://deliberation.ruleml.org/1.01/relaxng/schema_rnc.php?backbone=x3f&default=x7&termseq=x7&lng=x1&propo=x3ff&implies=x7f&terms=xf3f&quant=x7&expr=xf&serial=xf
XSD Anchor Schema URL = http://deliberation.ruleml.org/1.01/xsd/naffologeq.xsd

Usage

The RNC and XSD Schema URLs may be used directly for online validation - copy and paste as required by the validator. For a demonstration of RNC validation using the online service Validator.nu, see How to Validate with the RuleML Parameterized Relax NG Schema. Some scripts and processing instructions may require that the character "&" be replaced by "&".

Clicking on the "Download RNC Schema" button downloads a copy of the schema driver into a file named according to the text labelled "RNC". To use the schema driver locally (offline), a local copy of the modules directory is also necessary - for download instructions, see the Deliberation RuleML 1.01 Relax NG Directory. For more information about the re-engineering of RuleML into Relax NG, which made this modularization possible, see the MYNG page on the RuleML Wiki.

Schema Driver

```
# GET parameter: backbone=x3f
# GET parameter: default=x7
# GET parameter: termseq=x7
# GET parameter: lng=x1
# GET parameter: propo=x3ff
# GET parameter: implies=x7f
# GET parameter: terms=xf3f
# GET parameter: quant=x7
# GET parameter: expr=xf
# GET parameter: serial=xf
namespace dc = "http://purl.org/dc/elements/1.1/"
namespace dcterms = "http://purl.org/dc/terms/"
namespace ruleml = "http://ruleml.org/spec"

dc:title [ "Deliberation RuleML Custom-Built Schema" ]
dc:version [ "1.01" ]
dc:creator [ "Tara Athan (taraathan AT gmail.com)" ]
dc:subject [ "Deliberation RuleML, custom-built" ]
dc:description [
    "custom-built main module for a Deliberation RuleML sublanguage."
]
dc:date [ "2014-08-02T17:24:23-04:00" ]
dc:language [ "en" ]
dcterms:rights [ "TBD" ]
dc:relation [ "http://deliberation.ruleml.org/1.01" ]
```

2 Configuring a Custom Relax NG Schema

We will configure the RuleML sublanguage called "disdatalogplus_mid". Its features include Disjunctive Rules ("dis"), Datalog Expressivity ("datalog"), Conjunctive Rules, Existential Rules, and Equality ("plus"), and an assortment of Deliberation RuleML extras such as reification and annotation ("_mid").

- Expressivity "Backbone":
  - This is a radio button input where we Select One level of the Expressivity "Backbone".
  - For our example, we select the Datalog level of Expressivity, corresponding to function-free Horn Logic.
  - Also, all the Expression Options (second row of facets) become disabled, because Datalog is function-free, so those options are irrelevant.
  - Notice that the "b" (backbone) and "e" (expressions) components of the myng-code change (from b3f to b7 and from e7 to e0).
  - Notice that the anchor language changes from "naffologeq" to "nafnegdishornlogplus". This anchor language is an under-specified approximation of the selected language, which has Horn Logic Expressivity.

Datalog

Selection of Expressivity
Datalog

Reset Form | Generate Schema | Download RNC Schema | Download XSD Anchor Schema

RNC: myng-b7-a7-a7-l1-p3ff-i7f-tf3f-q7-e0-s
XSD: nafnegdishornlogplus

Expressivity "Backbone"
(Select One)
- ○ Atomic Formulas
- ○ Ground Fact
- ○ Ground Logic
- ◉ Datalog
- ○ Horn Logic
- ○ Full First-Order Logic

Propositional Options
(Check Zero or More)
- ☑ IRIs
- ☑ Rulebases
  - ☑ Entailments
- ☑ Degree of Uncertainty
- ☑ Strong Negation
- ☑ Weak Negation (Negation as Failure)
- ☑ Node Identifiers
- ☑ In-Place Annotation
- ☑ XML base
- ☑ XML id

Implication Options
(Check Zero or More)
- ☑ Equivalences
- ☑ Inference Direction
- ☑ Non-Material
- ☑ Conjunctive Heads
- ☑ Negative Constraints
  - ☑ Disjunctive Heads
- ☑ Existential Heads

Term Sequences: Number of Terms
(Select One)
- ○ None
- ○ Unary (Zero or One)
- ○ Binary (Zero or Two)
- ○ Unary/Binary (Zero to Two)
- ◉ Polyadic (Zero or More)

Term Options
(Check Zero or More)
- ☑ Object Identifiers
- ☑ Slots
  - ☑ Slot Cardinality
  - ☑ Slot Weight
- ☑ Equations
  - ☑ Oriented Equations
- ☑ Term Typing
- ☑ Data Terms
- ☑ Skolem Constants
- ☑ Reified Terms

Quantification Options
(Check Zero or More)
- ☑ Implicit Closure
- ☑ Slotted Rest Variables
- ☑ Positional Rest Variables

Expression Options
(Check Zero or More)
- ☐ Generalized Lists
- ☐ Set-valued Expressions
- ☐ Interpreted Expressions

Serialization Options
(Check Zero or More)
- ☑ Unordered Groups
- ☑ Stripe-Skipping
- ☑ Explicit Datatyping
- ☑ Schema Location Attribute

Treatment of Attributes With Default Values
(Select One)
- ○ Required to be Absent
- ○ Required to be Present
- ◉ Optional

Language
(Select One)
- ◉ English Abbreviated Names
- ○ English Long Names
- ○ French Long Names

- Propositional Options:
  - Let's disable the Degree of Uncertainty option, which is only needed for Fuzzy Logic.
  - We'll also disable Rulebases and both kinds of Negation.
  - Notice that the "p" (propositional) component of the myng-code changes from p3ff to p3c1.
- Implication Options:
  - We'll disable Equivalences.
  - New in Version 1.01: Disjunctive Logic is not a level on the Expressivity "Backbone", as it was in Version 1.0. Disjunction (Or) in the heads of rules now may be mixed-in with any Expressivity level.
  - Notice that the "i" (implication) component of the myng-code changes from i7f to i7e.

Propositional Options

Implication Options

Selection of Propositional Options

No Rulebases, Fuzzy Logic or Negations

Reset Form | Generate Schema | Download RNC Schema | Download XSD Anchor Schema

RNC: myng-b7-d7-a7-[illegible]-p3c1-i7[illegible]-tf3f-q7-e0-sf

XSD: nafnegdishornlogplus

Expressivity "Backbone"
(Select One)

- ○ Atomic Formulas
- ○ Ground Fact
- ○ Ground Logic
- ◉ Datalog
- ○ Horn Logic
- ○ Full First-Order Logic

Propositional Options
(Check Zero or More)

- ☑ IRIs
- ☐ Rulebases
  - ☐ Entailments
- ☐ Degree of Uncertainty
- ☐ Strong Negation
- ☐ Weak Negation (Negation as Failure)
- ☑ Node Identifiers
- ☑ In-Place Annotation
- ☑ XML base
- ☑ XML id

Implication Options
(Check Zero or More)

- ☑ Equivalences
- ☑ Inference Direction
- ☑ Non-Material
- ☑ Conjunctive Heads
- ☑ Negative Constraints
  - ☑ Disjunctive Heads
- ☑ Existential Heads

Term Sequences: Number of Terms
(Select One)

- ○ None
- ○ Unary (Zero or One)
- ○ Binary (Zero or Two)
- ○ Unary/Binary (Zero to Two)
- ◉ Polyadic (Zero or More)

Term Options
(Check Zero or More)

- ☑ Object Identifiers
- ☑ Slots
  - ☑ Slot Cardinality
  - ☑ Slot Weight
- ☑ Equations
  - ☑ Oriented Equations
- ☑ Term Typing
- ☑ Data Terms
- ☑ Skolem Constants
- ☑ Reified Terms

Quantification Options
(Check Zero or More)

- ☑ Implicit Closure
- ☑ Slotted Rest Variables
- ☑ Positional Rest Variables

Expression Options
(Check Zero or More)

- ☐ Generalized Lists
- ☐ Set-valued Expressions
- ☐ Interpreted Expressions

Serialization Options
(Check Zero or More)

- ☑ Unordered Groups
- ☑ Stripe-Skipping
- ☑ Explicit Datatyping
- ☑ Schema Location Attribute

Treatment of Attributes With Default Values
(Select One)

- ○ Required to be Absent
- ○ Required to be Present
- ◉ Optional

Language
(Select One)

- ◉ English Abbreviated Names
- ○ English Long Names
- ○ French Long Names

Selection of Implication Options

No Equivalences

Reset Form | Generate Schema | Download RNC Schema | Download XSD Anchor Schema

RNC: myng-b7-d7-a7-l1-p3-l1-l7e-f3f-q7-e0-sf
XSD: nafnegdishornlogplus

Expressivity "Backbone"
(Select One)

- ○ Atomic Formulas
- ○ Ground Fact
- ○ Ground Logic
- ◉ Datalog
- ○ Horn Logic
- ○ Full First-Order Logic

Propositional Options
(Check Zero or More)

- ☑ IRIs
- ☐ Rulebases
  - ☐ Entailments
- ☐ Degree of Uncertainty
- ☐ Strong Negation
- ☐ Weak Negation (Negation as Failure)
- ☑ Node Identifiers
- ☑ In-Place Annotation
- ☑ XML base
- ☑ XML id

Implication Options
(Check Zero or More)

- ☐ Equivalences
- ☑ Inference Direction
- ☑ Non-Material
- ☑ Conjunctive Heads
- ☑ Negative Constraints
  - ☑ Disjunctive Heads
- ☑ Existential Heads

Term Sequences: Number of Terms
(Select One)

- ○ None
- ○ Unary (Zero or One)
- ○ Binary (Zero or Two)
- ○ Unary/Binary (Zero to Two)
- ◉ Polyadic (Zero or More)

Term Options
(Check Zero or More)

- ☑ Object Identifiers
- ☑ Slots
  - ☑ Slot Cardinality
  - ☑ Slot Weight
- ☑ Equations
  - ☑ Oriented Equations
- ☑ Term Typing
- ☑ Data Terms
- ☑ Skolem Constants
- ☑ Reified Terms

Quantification Options
(Check Zero or More)

- ☑ Implicit Closure
- ☑ Slotted Rest Variables
- ☑ Positional Rest Variables

Expression Options
(Check Zero or More)

- ☐ Generalized Lists
- ☐ Set-valued Expressions
- ☐ Interpreted Expressions

Serialization Options
(Check Zero or More)

- ☑ Unordered Groups
- ☑ Stripe-Skipping
- ☑ Explicit Datatyping
- ☑ Schema Location Attribute

Treatment of Attributes With Default Values
(Select One)

- ○ Required to be Absent
- ○ Required to be Present
- ◉ Optional

Language
(Select One)

- ◉ English Abbreviated Names
- ○ English Long Names
- ○ French Long Names

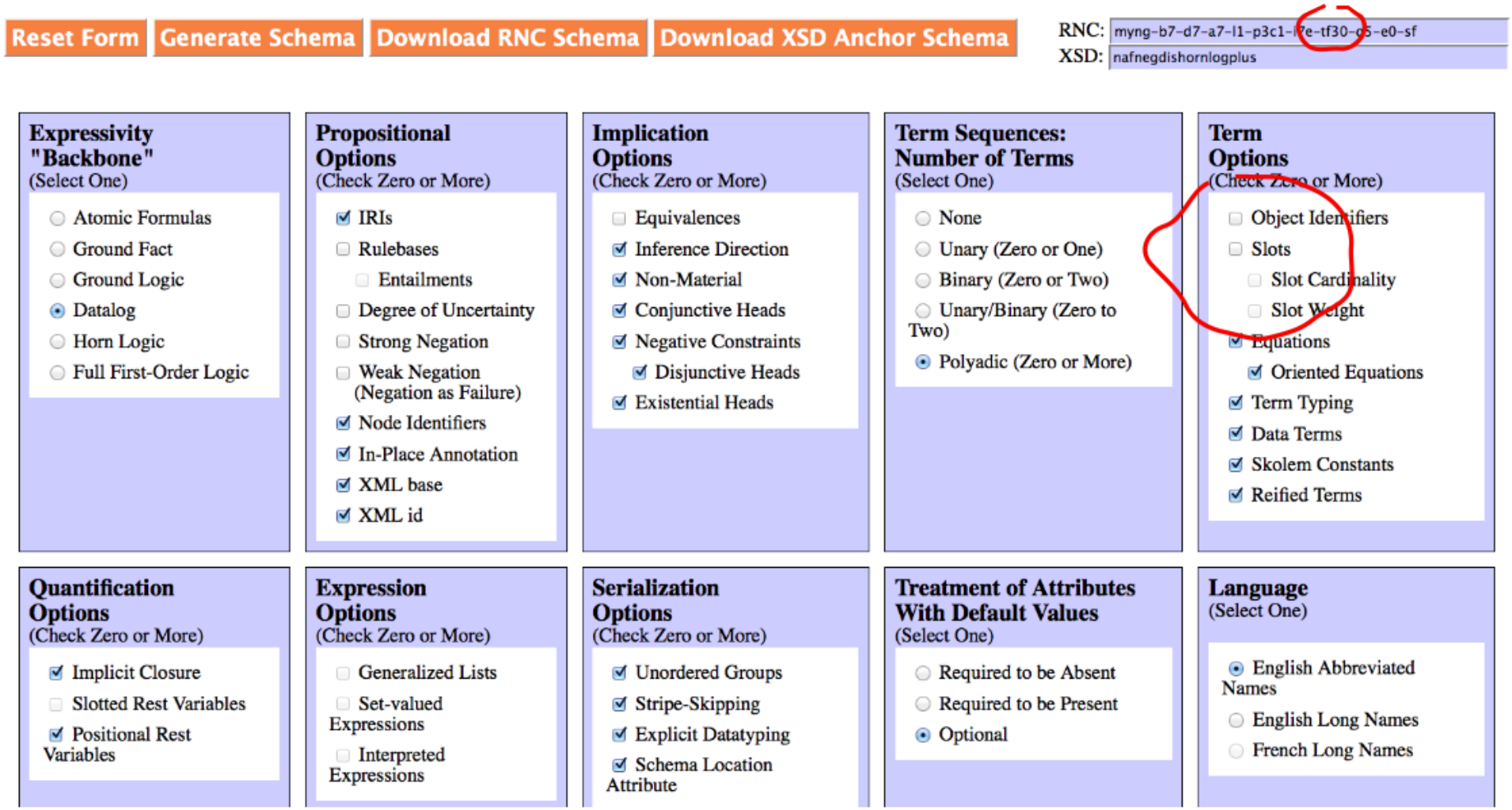
- Term Sequences:
  - We keep Polyadic Term Sequences.
- Term Options:
  - We disable the frame-like options: Object Identifiers and Slots.
  - Notice that the "t" (terms) component of the myng-code changes from tf3f to tf30.
- Quantification Options:
  - We disable all of them.
  - Notice that the "q" (quantification) component of the myng-code changes from q7 to q0.
  - The anchor language now reads "disdatalogplus_mid". This is one of the RuleML sublanguages that is newly available in Version 1.01. Recent research[2] has shown that with some additional constraints, querying becomes decidable in these languages. The additional constraints are too complex to implement directly in Relax NG or XSD, but may be possible via Schematron.

Term Options

Quantification Options

Selection of Term Options

No Object Identifiers, or Slots



Selection of Quantification Options

No Implicit Closure, Rest Variables

Reset Form | Generate Schema | Download RNC Schema | Download XSD Anchor Schema

RNC: myng-b7-d7-a7-l1-p3c1-i7e-tf3C-q0-e6-sf
XSD: disdatalogplus_mid

Expressivity "Backbone"
(Select One)

- ○ Atomic Formulas
- ○ Ground Fact
- ○ Ground Logic
- ◉ Datalog
- ○ Horn Logic
- ○ Full First-Order Logic

Propositional Options
(Check Zero or More)

- ☑ IRIs
- ☐ Rulebases
  - ☐ Entailments
- ☐ Degree of Uncertainty
- ☐ Strong Negation
- ☐ Weak Negation (Negation as Failure)
- ☑ Node Identifiers
- ☑ In-Place Annotation
- ☑ XML base
- ☑ XML id

Implication Options
(Check Zero or More)

- ☐ Equivalences
- ☑ Inference Direction
- ☑ Non-Material
- ☑ Conjunctive Heads
- ☑ Negative Constraints
  - ☑ Disjunctive Heads
- ☑ Existential Heads

Term Sequences: Number of Terms
(Select One)

- ○ None
- ○ Unary (Zero or One)
- ○ Binary (Zero or Two)
- ○ Unary/Binary (Zero to Two)
- ◉ Polyadic (Zero or More)

Term Options
(Check Zero or More)

- ☐ Object Identifiers
- ☐ Slots
  - ☐ Slot Cardinality
  - ☐ Slot Weight
- ☑ Equations
  - ☑ Oriented Equations
- ☑ Term Typing
- ☑ Data Terms
- ☑ Skolem Constants
- ☑ Reified Terms

Quantification Options
(Check Zero or More)

- ☐ Implicit Closure
- ☐ Slotted Rest Variables
- ☐ Positional Rest Variables

Expression Options
(Check Zero or More)

- ☐ Generalized Lists
- ☐ Set-valued Expressions
- ☐ Interpreted Expressions

Serialization Options
(Check Zero or More)

- ☑ Unordered Groups
- ☑ Stripe-Skipping
- ☑ Explicit Datatyping
- ☑ Schema Location Attribute

Treatment of Attributes With Default Values
(Select One)

- ○ Required to be Absent
- ○ Required to be Present
- ◉ Optional

Language
(Select One)

- ◉ English Abbreviated Names
- ○ English Long Names
- ○ French Long Names

3 Usage of Customized Schemas

- Instructions for online validation of RuleML instances against the Relax NG schemas are presented at "Validating with Relax NG for RuleML 1.01" (http://wiki.ruleml.org/index.php/Validating_with_Relax_NG_for_RuleML_1.01) .
- Example in Validator.nu: Validating disdatalogplus_min.ruleml (http://validator.nu/?doc=http%3A%2F%2Fdeliberation.ruleml.org%2F1.01%2Fexa%2FDatalogPlus%2Fdisdatalogplus_min.ruleml&schema=http%3A%2F%2Fdeliberation.ruleml.org%2F1.01%2Fmyng-b7-d7-a7-l1-p1-i78-t210-q0-e0-sf.rnc&showsource=yes) against the smallest Relax NG schema (disdatalogplus_min, a sublanguage of the above-introduced disdatalogplus_mid) for this instance, referenced using its myng code.

Validator.nu

Using Validator.nu

Validation of disdatalogplus_min.ruleml

Validation results for http://deliberation.ruleml.org/1.01/exa/DatalogPlus/disdatalogplus_min.ruleml

Validator Input

Address	http://deliberation.ruleml.org/1.01/exa/DatalogPlus/disdatalogplus_min.ruleml
Encoding	As set by the server/page
Schemas	http://deliberation.ruleml.org/1.01/myng-b7-d7-a7-l1-p1-i78-t210-q0-e0-sf.rnc
Preset	None
Parser	Automatically from Content-Type
XMLNS Filter	

- [ ] Be lax about HTTP Content-Type
- [ ] Show Image Report
- [x] Show Source
- [ ] Show Outline

Validate

Group Messages

1. **Info**: The Content-Type was `text/xml`. Using the XML parser (not resolving external entities).

The document validates according to the specified schema(s) and to additional constraints checked by the validator.

4 References

1. ↑ Tara Athan and Harold Boley. The MYNG 1.01 Suite for Deliberation RuleML 1.01: Taming the Language Lattice. In Theodore Patkos, Adam Wyner, and Adrian Giurca, editors, Proceedings of the RuleML 2014 Challenge, at the 8th International Web Rule Symposium. CEUR, August 2014.
2. ↑ Georg Gottlob, Giorgio Orsi, Andreas Pieris, and Mantas Šimkus. Datalog and its extensions for semantic web databases. In Thomas Eiter and Thomas Krennwallner, editors, Reasoning Web. Semantic Technologies for Advanced Query Answering, volume 7487 of Lecture Notes in Computer Science, pages 54–77. Springer Berlin Heidelberg, 2012.