A Pattern Calculus for Rule Languages:
Expressiveness, Compilation, and Mechanization
(Artifact)

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Abstract
This artifact contains the accompanying code for
the ECOOP 2015 paper: “A Pattern Calculus for
Rule Languages: Expressiveness, Compilation, and
Mechanization”. It contains source files for a full
mechanization of the three languages presented in
the paper: CAMP (Calculus for Aggregating Match-
ing Patterns), NRA (Nested Relational Algebra)
and NNRC (Named Nested Relational Calculus).
Translations between all three languages and their
attendant proofs of correctness are included. Addition-
ally, a mechanization of a type system for the
main languages is provided, along with bidirectional
proofs of type preservation and proofs of the time
complexity of the various compilers.

1998 ACM Subject Classification I.2.5 Programming Languages and Software: Expert system tools and
 techniques, D.3.3 Language Constructs and Features: Patterns, H.2.3 Languages: Query Languages
Keywords and phrases Rules, Pattern Matching, Aggregation, Nested Queries, Mechanization

Digital Object Identifier 10.4230/DARTS.1.1.8

Related Article Avraham Shinnar, Jérôme Siméon and Martin Hirzel, “A Pattern Calculus for Rule
Languages: Expressiveness, Compilation, and Mechanization”, in Proceedings of the 29th European
http://dx.doi.org/10.4230/LIPIcs.ECOOP.2015.542

Related Conference 29th European Conference on Object-Oriented Programming (ECOOP 2015), July
5–10, 2015, Prague, Czech Republic

1 Scope
The artifact is designed as a complete verified implementation of the formalisms in the paper,
including proofs for all the main theorems, with the exception of the type inference theorem from
Section 7.6. As described in Figure 2 from the introduction of the paper, the original JRules
language is also outside the scope of our mechanization.

2 Content
The artifact package includes:

- The complete source for the mechanization, organized in the following directories:
  - Basic: Basic definitions, lemmas, and utilities shared by all the language developments.
  - Rules: Defines CAMP and the rule language
  - NRA: Defines the Nested Relational Algebra
  - NNRC: Defines the Named Nested Relational Calculus
  - Translation: Translations between the languages, as well as their accompanying correctness
    and type preservation results.

- HTML documentation corresponding to the source is provided to facilitate inspection of the
code, produced through coqdoc. (html directory)
3 Getting the artifact

The artifact endorsed by the Artifact Evaluation Committee is available free of charge on the Dagstuhl Research Online Publication Server (DROPS).

4 Tested platforms

The artifact should work on any platform that supports the Coq proof assistant [1] version 8.4pl5 or later, and gnu make. It has been tested on Linux (Ubuntu 14.04) and MacOS X.

5 License

EPL-1.0 (http://www.eclipse.org/legal/epl-v10.html)

6 MD5 sum of the artifact

24e0a0d6b258565630a5e372039cbf44

7 Size of the artifact

392 KB

--- References