

Matthias Farnbauer-Schmidt, Victor Charpenay and Andreas Harth

Chair of Technical Information Systems, Friedrich-Alexander University Erlangen-Nürnberg

# N3X: Notation3 with SPARQL Expressions

## Notation3 and the Internet of Things

### Notation3 101

- ▶ Notation3 (N3) is a logical framework for the Semantic Web [1].
- ▶ It can be used to write inference rules.
- ▶ Uses built-in predicates to calculate new values.

### Issues

- ▶ Writing arithmetic calculations in N3 is cumbersome.
- ▶ A lot of data in the Internet of Things (IoT) is numeric.
  - ▶ Rules for the Semantic Web of Things (SWoT) are required to perform (complex) calculations.

## N3X

### Description

- ▶ Use the syntax of SPARQL expressions for calculations.
- ▶ N3X-expressions can be used at every position within a triple.
- ▶ Each N3X-expression is a function call whose arguments can be function calls again.
  - ▶ In contrast to N3, this allows for easy nesting of expressions.
- ▶ Nesting expressions generally reduces the number of triples required.
  - ▶ Therefore, less computation is required to evaluate an N3X-rule.
- ▶ The explicit function calls in N3X are a suitable hook for custom expansion functions.

### Evaluation

N3 rules using arithmetic calculations have been rewritten to N3X. The evaluation can be found at <https://github.com/MattesWhite/n3x>.

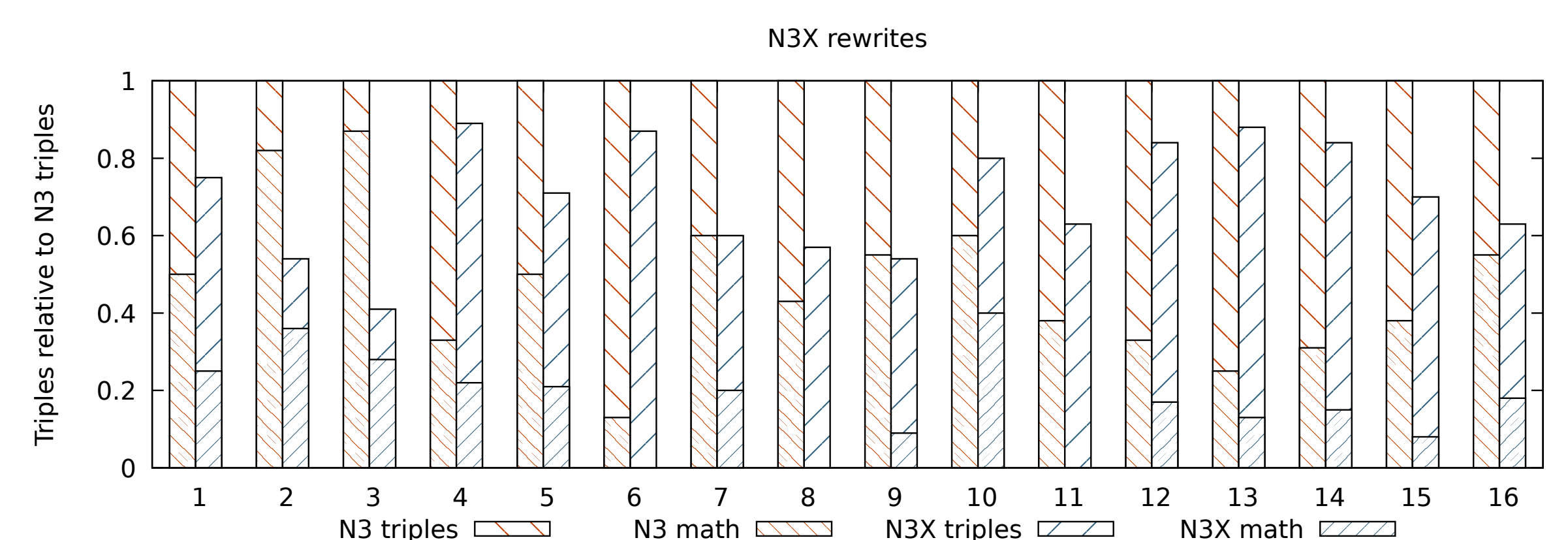


Figure 1: Resulting reduction of triples by using N3X.

## Example and Comparison

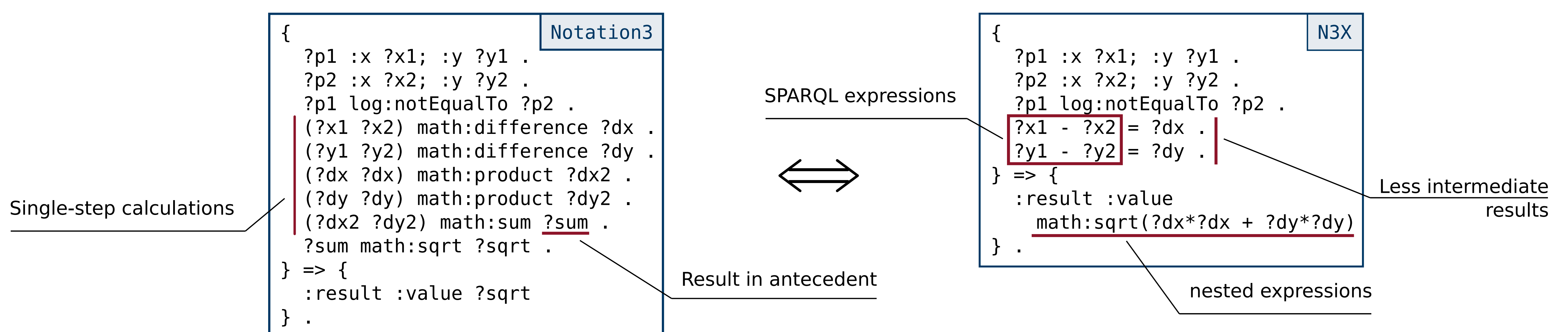


Figure 2: Euclidean distance between two 2D-points.

## Other

### Support us - answer our questionnaire



Help us improving N3X by answering the questionnaire linked by QR code or at:  
<https://forms.gle/t51u3jS1kNK9UyYa9>

### References

- [1] Tim Berners-Lee et al. "N3Logic: A logical framework for the World Wide Web". en. In: *Theory and Practice of Logic Programming* 8.3 (May 2008), pp. 249–269. ISSN: 1471-0684, 1475-3081. DOI: 10.1017/S1471068407003213.