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# INCREMENTAL REASONING ON RDFS

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## CONTEXT

The Semantic Web enables to:

- describe knowledge from data
- leverage implicit knowledge through reasoning algorithms

The main limitations of current reasoning methods are:

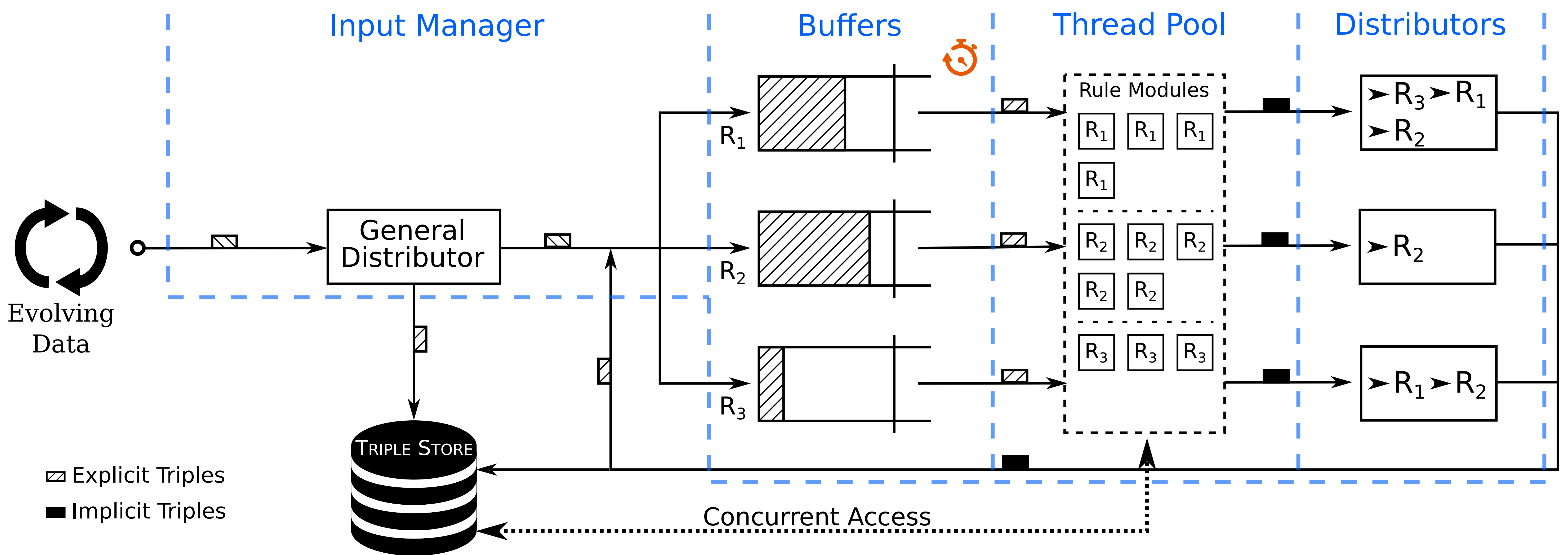
- lack of scalability for large datasets
- inability to reason over knowledge from evolving data

We contribute to solving these problems by introducing Slider, an efficient incremental reasoner.

## MAIN FEATURES

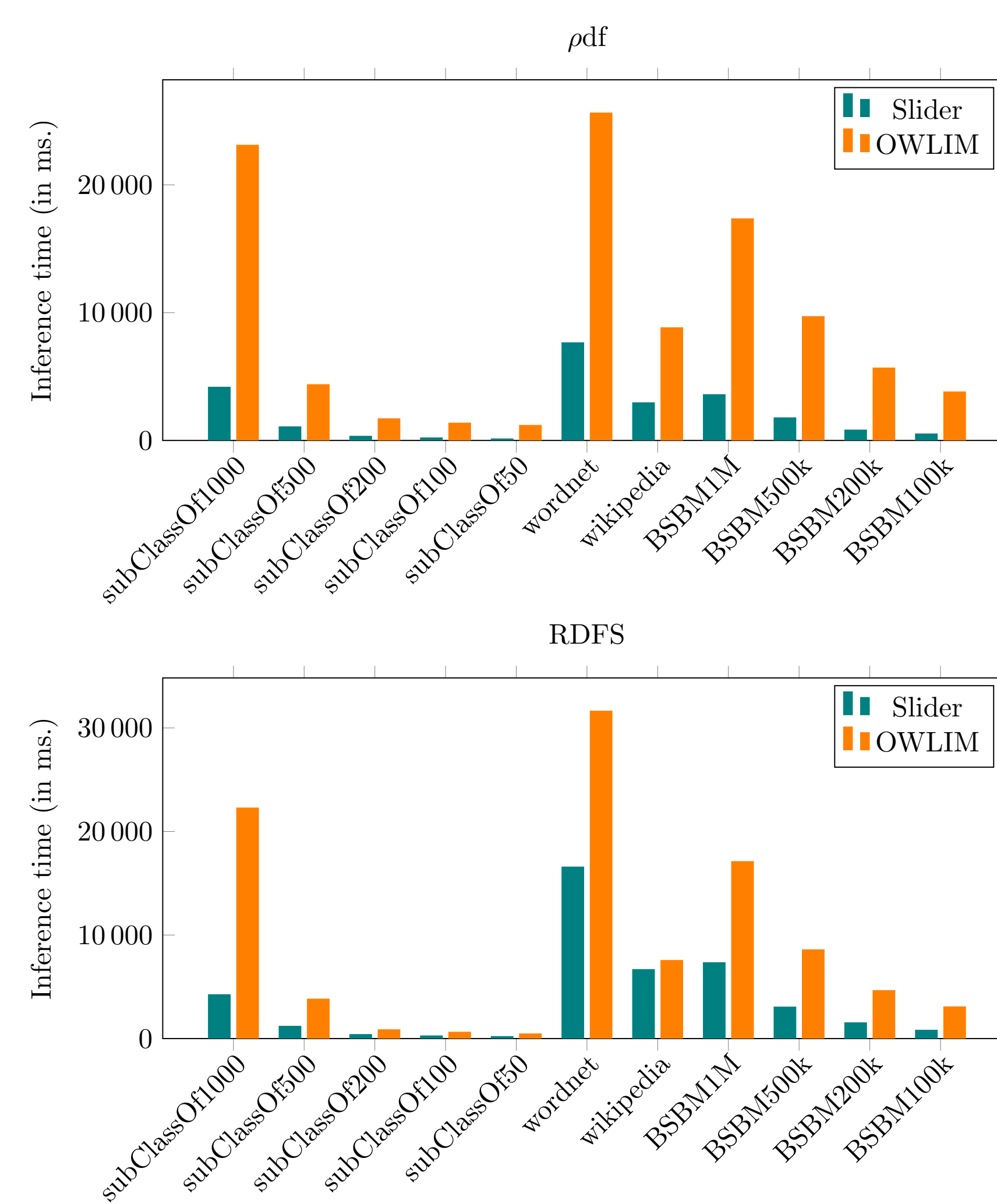
- **Parallel and Scalable Execution:** Each inference rule is mapped to an independent module, receiving intended triples and later distributing them to other modules for further processing.
- **Duplicates Limitation:** Vertical partitioning [1] and multiple indexing limit the production of duplicates and avoid unnecessary computation.
- **Data Stream Support:** Slider can handle both dynamic triple streams and static triples sets by employing parallel architecture.
- **Fragment's Customization:** Slider natively support both RDFS [4] and  $\rho$ df [5] fragments, and can be extended to any other fragments.

## ARCHITECTURAL OVERVIEW



## EXPERIMENTATIONS

- Comparison with OWLIM-SE [2]
- Inference on both RDFS and  $\rho$ df
- 13 different ontologies
  - 5 generated with BSBM [3]
  - 2 from real-world datasets
  - 6 subClassOf ontologies
- **106.86%** improvement for  $\rho$ df
- **36.08%** improvement for RDFS
- **71.47%** improvement in average



## FUTURE WORK

- Implementation of more complex inference rules, to provide reasoning over more complex fragments.
- Just-in-time optimisations of the rules execution's scheduling.
- Use of previous runs informations to adapt and be more reactive.

## SOURCE CODE AND DEMO

The source code is available here:  
<https://github.com/juleschevalier/slider>  
A demo can be found here:  
<http://demo-satin.telecom-st-etienne.fr/slider/>

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