Building an Efficient OWL 2 DL Reasoner

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Abstract
The Ontology Web Language (OWL) has received considerable traction recently and is used in a number of industrial and practical applications. While decidable, all basic reasoning tasks for OWL are intractable (most of them are \text{N2ExpTime-complete}). Thus, in order to obtain a system capable of solving practically-relevant nontrivial problems, a number of theoretical and practical issues need to be resolved. In my talk I will present an overview of the techniques employed in HermiT, a state-of-the-art OWL reasoner developed at Oxford University. I will present the main ideas behind the hypertableau calculus and contrast them with the tableau calculi used in similar systems. Furthermore, I will discuss optimization techniques used in HermiT such as the blocking cache, individual reuse, and core blocking. Finally, I will discuss certain higher-level optimizations implemented on top of the basic calculus, such as the recently-developed optimized classification algorithm.