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Pellet Reasoner

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Clark & Parsia

- Clark & Parsia is a semantic software startup
  - HQ in Washington, DC & office in Boston
- Provides software products, application development and integration services
- Specializing in Semantic Web, web services, and advanced AI technologies for federal and enterprise customers

http://clarkparsia.com/

Twitter: @candp

Pellet

- Pellet is an OWL 2 reasoner
- Pure Java implementation
- Being developed and maintained by C&P
- Dual-licensed open-source software
  - AGPL license for open source applications
  - Proprietary license for commercial use
- http://clarkparsia.com/pellet

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Pellet Features

- Supports all constructs in OWL 2
  - Property chains, user-defined datatypes, keys, etc.
- SWRL rules over OWL ontologies
  - DL-safe interpretation
  - Built-in function support
- Sound and complete reasoning
  - A family of reasoning algorithms
  - Algorithms chosen based on input ontology

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Reasoning Services

- Standard reasoning features
  - Consistency: find contradictions in data
  - Classification: compute class hierarchy
  - Realization: find instances for each class
- Conjunctive query answering via SPARQL
  - SPARQL query answering with OWL 2 entailments
  - Answer higher-order queries
  - Additional query predicates for OWL

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Additional Services

- Explanation generation
  - Based on axiom tracing service
  - Computes justifications for any kind of entailment
- Module extraction
  - Compute subset of an ontology that guarantees reasoning completeness
- Incremental reasoning
  - Recompute reasoning results based on changes
  - Limit reasoning to affected modules

Pellet Usage

- Command-line interface
  - Provides all reasoning services mentioned
- Programmatic interface
  - Support for OWLAPI and Jena libraries
  - Complete implementation of reasoner interfaces
- Usage through PelletServer
  - Clients in different languages (Scala, etc.)
- Access through ontology browser/editor
  - Protege 3.x and 4.x
  - OwlSight web-based browser

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Pellet Extensions

- Pellet Integrity Constraint Validator (ICV)
  - Data validation with Closed World Assumption
  - IC validation via SPARQL reduction
- Pellet Distributed Query (PDQ)
  - Reasoning and querying over distributed data sources
- Pellet Spatial
  - Qualitative spatial reasoning based on RCC
  - Consistency checking and SPARQL query answering
- Pronto - Probabilistic Reasoning Extension
  - Associate probability intervals with OWL axioms
  - Inferring new probabilistic statements

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PelletDb

- Reasoning over secondary storage
  - Persistence of reasoning results
  - Separate schema and instance reasoning for maximum scalability
- Reasoning support over triples stores
  - Version 1.0 tightly integrated with Oracle RDF store
- More features in the upcoming version 2.0
  - Compatible with most triple stores
  - Reasoning over legacy relation databases via mapping

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Some Applications

- Ontology development
  - Classification and explanation at edit time
  - Used for National Cancer Institute (NCI) Thesaurus
- Configuration management
  - Find a set of components that satisfy a given system specification and constraints
  - Software configuration for cloud computing by Elastra
- Business intelligence
  - Find which customer would be interested in buying a certain product
- Service discovery and matchmaking
  - Services deployed as part of iPlant Collaborative

Thank you!