The goal of a reasoner is to derive information from a knowledge base. The reasoner is involved through an inference engine, e.g., the Jess engine involves a Pellet reasoner.

W3 (World wide web consortium) has published a list of reasoners:

<ref>http://www.w3.org/2007/OWL/wiki/Implementations</ref>
Examples Of Reasoners

FaCT++ is an open-source tableau-based OWL 2 DL reasoner. It is implemented in C++ and shows exceptional performance on expressive ontologies.
- Fully conformant with OWL DL except for keys and some datatypes
- New developed based on ideas from FaCT

Hermit can determine whether or not the input ontology is consistent, identify subsumption relationships between classes, and much more.
- Based on a novel hypetableau algorithm,
- Efficient reasoning
- Fully conformant

Pellet is an open-source Java OWL DL reasoner
- Developed by
- Tableau based decision procedure

Jena is an open-source framework, including reasoning modules
**Terminology**

- **Assertional Box (Abox)**
  - Contains assertions about individuals, i.e., OWL facts such as type, property-value...
  - Realizing the ABox, i.e., computing the most specific concept(s) that each individual is an instance of.
  - Example: *all people being students*

- **Terminological Box (Tbox)**
  - Contains axioms about classes, i.e., OWL axioms such as subclass, equivalent class...
  - Example: *Class: Pizza has subclass: Topping*

**Knowledge Base (KB):**

- A combination of an ABox and a TBox, i.e., a complete OWL ontology.

**Major use cases:**

- Frequent ABox changes (situation classification) and
- Rare ABox changes (social networks).
Reasoner Comparison

Good intro from Bock et al. in "Benchaking OWL Reasoners", [1]/ref:
- open source versus other licenses
- language, portability
- logic support (e.g. OWL DL)
- performance:
  - load time
  - query time
- addressing: Language complexity, and size of ontology

Conclusions from Bock et al.
- reasoners that employ a simple rule engine scale very well for large ABoxes, but are in principle very limited to lightweight language fragments,
- classical tableau reasoners scale well for complex TBox reasoning tasks, but are limited with respect to their support for large ABoxes,
- the reasoning techniques based on reduction to disjunctive datalog as implemented in KAON2 scale well for large ABoxes, while at the same time they support rich language fragments.

Comparison of Pellets, FaCT and HermiT
UNIK4710/UNIK9710
Pellet

Based on a presentation by Jusena: Media:Pellet_Reasoner.pdf

- Pellet is an open-source Java based OWL DL reasoner, see Pellets-based_reasoning
- Can be used with Jena and OWL API libraries.

Features:
- **Consistency checking**: ensures that an ontology does not contain any contradictory facts.
- **Concept satisfiability**: checks if it is possible for a class to have any instances.
- **Classification**: computes the subclass relations between every named class to create the complete class hierarchy.
- **Realization**: computes the direct types for each of the individuals.
Examples Of Reasoners

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ALT A

OWL

Class

likes

SYRL

likes

ALT B

required knowledge

- less propositional
- Rel tab Post 4.1