



# Clipcode Research Library

## Background

The semantic web is a major area of research for the W3C and it is likely that knowledge representation and reasoning will lead to the next major breakthrough in web technologies (<http://www.w3.org/standards/semanticweb/>).

One part of the semantic web is the definition of ontologies. The W3C has released a set of recommendations for the OWL2 Web Ontology Language. One W3C Recommendation - “OWL 2 Web Ontology Language Structural Specification and Functional-Style Syntax” (<http://www.w3.org/TR/owl-syntax>) provides an abstract object model and syntax, including this introduction:

“An OWL 2 ontology is a formal description of a domain of interest. OWL 2 ontologies consist of the following three different syntactic categories:

- *Entities*, such as classes, properties, and individuals, are identified by IRIs. They form the primitive *terms* of an ontology and constitute the basic elements of an ontology. For example, a class *a:Person* can be used to represent the set of all people. Similarly, the object property *a:parentOf* can be used to represent the parent-child relationship. Finally, the individual *a:Peter* can be used to represent a particular person called "Peter".
- *Expressions* represent complex notions in the domain being described. For example, a *class expression* describes a set of individuals in terms of the restrictions on the individuals' characteristics.
- *Axioms* are statements that are asserted to be true in the domain being described. For example, using a *subclass axiom*, one can state that the class *a:Student* is a subclass of the class *a:Person*.

These three syntactic categories are used to express the *logical* part of OWL 2 ontologies — that is, they are interpreted under a precisely defined semantics that allows useful inferences to be drawn. For example, if an individual *a:Peter* is an instance of the class *a:Student*, and *a:Student* is a subclass of *a:Person*, then from the OWL 2 semantics one can derive that *a:Peter* is also an instance of *a:Person*.”

## Clipcode Research Library - Overview

To explore usage of Rx with more specialist scenarios, the Clipcode Research Library provides a .NET 4.0 / C# / Rx implementation of OWL2. .NET does not support OWL2, so a major part of this work is to implement OWL2 using .NET 4.0. The question of most interest to Rx developers is how to integrate Rx support with OWL2. As axioms are added to the knowledge store, observables are exposed to which client code can subscribe and be informed of new assertions as they become available.

## Clipcode Research Library - Object Model

The object model for this project is as follows:

