

# Protègè

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ECSDI

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CS-FIB-UPC 



Protégé



- ⊙ Protégè es una herramienta que permite definir ontologías que pueden ser utilizadas de diferentes formas (Servicios, Agentes, Sistemas Basados en el Conocimiento, ...)
- ⊙ Permite describir la jerarquía de clases de la ontología, sus atributos (slots) y las instancias de la base de conocimiento
- ⊙ La definición de la ontología se puede exportar a diferentes lenguajes (eg: OWL)

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology) : [/home/bejar/tmp/myontology.owl]

File Edit View Reasoner Tools Refactor Window Help

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology) Search for entity

Active Ontology Entities Classes Object Properties Data Properties Annotation Properties Individuals OWLviz DL Query OntoGraf SPARQL Query

Ontology header:

Ontology IRI <http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology>

Ontology Version IRI e.g. <http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology/1.0.0>

Annotations +

Ontology imports Ontology Prefixes General class axioms

Imported ontologies:

Direct Imports +

Indirect Imports

No Reasoner set. Select a reasoner from the Reasoner menu ☒ Show Inferences

The screenshot displays the MyOntology web application interface. The browser address bar shows the URL: `http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology`. The application has a menu bar with options: File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. Below the menu is a toolbar with navigation icons and a search bar labeled "Search for entity".

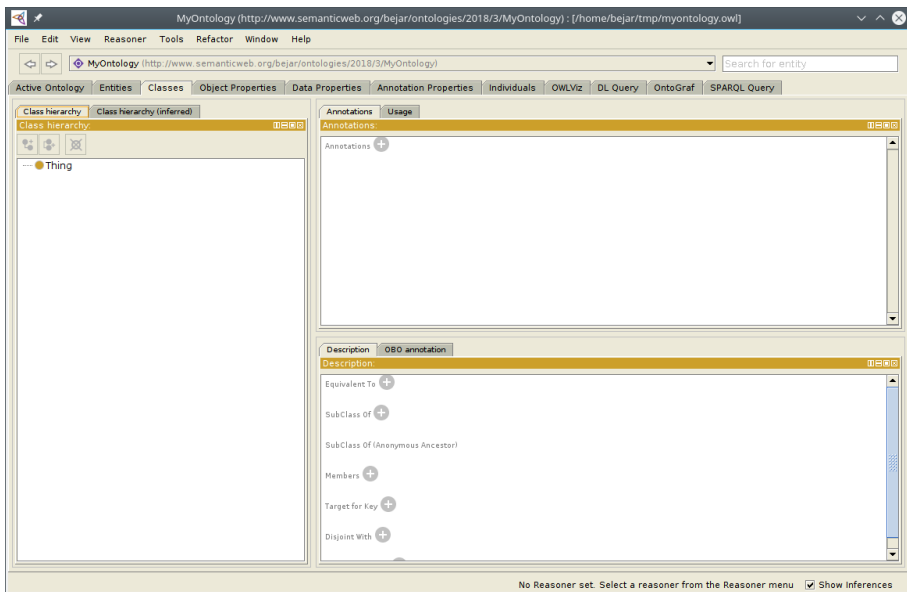
The main content area is divided into several sections:

- Ontology header:** This section contains two fields:
  - Ontology IRI:** The value is `http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology`. This field is circled in red, and a blue label "Nombre de la ontologia" points to it.
  - Ontology Version IRI:** The value is `e.g. http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology/1.0.0`.
- Annotations:** This section shows a list of annotations. One annotation is highlighted with a red circle and a blue label "Comentarios/Anotaciones/Documentacion". The annotation is:
  - VersionInfo**
  - Primera version**
  - comment**
  - Esta es una ontologia de ejemplo
- Ontology imports:** This section is at the bottom and contains two tabs: "Ontology Prefixes" and "General class axioms". It shows "Imported ontologies:" with a "Direct Imports" section (containing a "+" icon) and an "Indirect Imports" section.

At the bottom of the application, there is a status bar that reads: "No Reasoner set. Select a reasoner from the Reasoner menu" and a checkbox labeled "Show Inferences" which is checked.

# Classes

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- ⊙ Podemos definir la jerarquía de clases, todas las clases se colocan debajo de la clase `owl:thing`
- ⊙ Para una clase hemos de indicar su **nombre** (`rdfs:comment`)
- ⊙ Podemos añadir un **comentario** explicativo

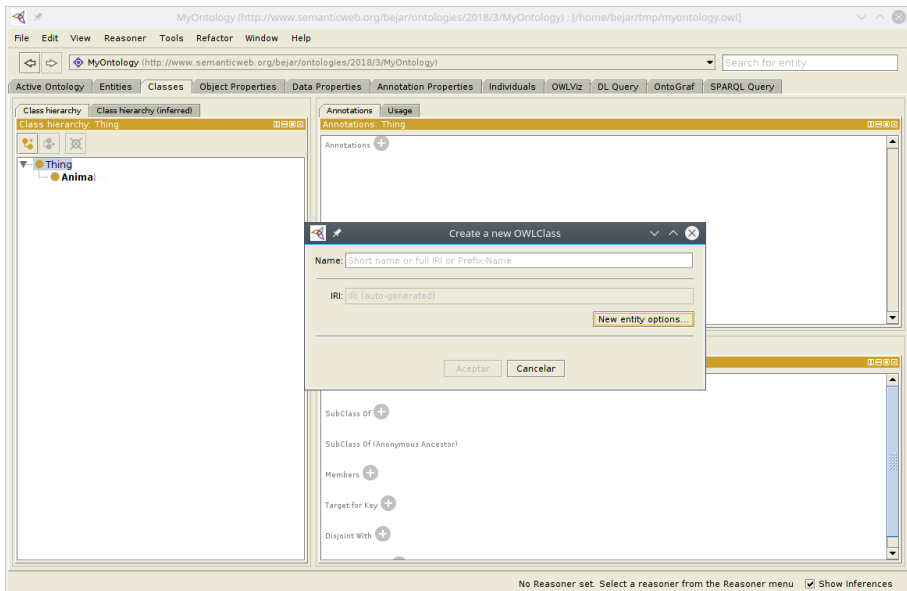


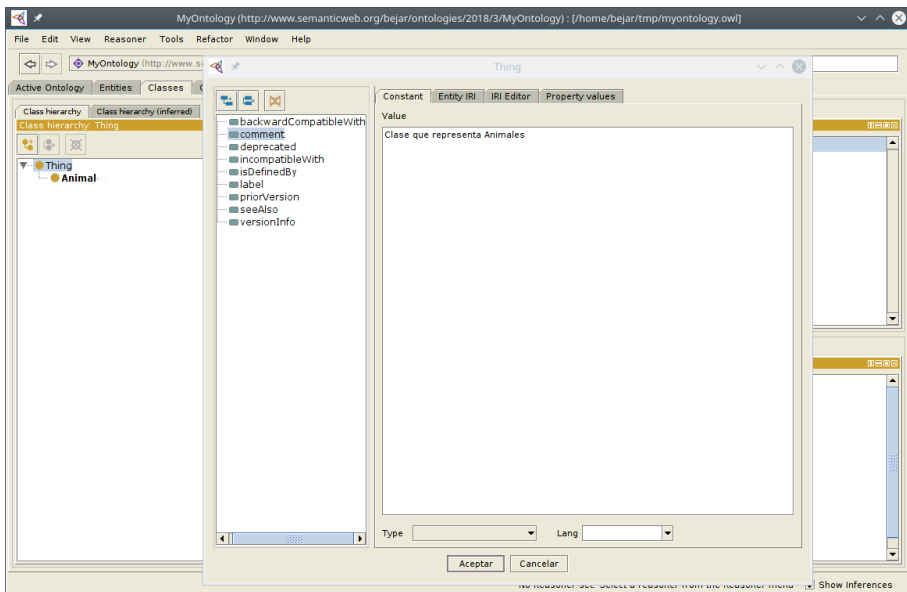
The screenshot displays the Protégé ontology editor interface. The title bar indicates the current ontology is 'MyOntology' located at <http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology>. The interface includes a menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and a toolbar with navigation and editing icons.

The main workspace is divided into several panes:


- Class hierarchy:** Shows a tree structure starting with 'Thing' and its subclass 'Animal'.
- Annotations:** Displays a list of annotations for the selected class 'Animales'. The first annotation is a 'comment' with the text 'Clase que representa animales'. The source is noted as 'Asserted in: <http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology>'.
- Description:** Shows the logical description of the class 'Animales', including options for 'Equivalent To', 'SubClass Of', 'SubClass Of (Anonymous Ancestor)', 'Members', 'Target for Key', and 'Disjoint With'.

At the bottom of the window, a status bar indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and a checkbox for 'Show Inferences' is checked.





# Atributos



- ⊙ Los atributos se diferencian en dos tipos:
  - **ObjectProperties:** Los que se definen a partir de otras clases (realmente son relaciones)
  - **DataProperties:** Los que se definen a partir de tipos primitivos (XMLSchema Datatype, espacio de nombres xsd)
- ⊙ Hemos de definir su nombre, opcionalmente un comentario y escoger el tipo primitivo o el rango de la relación
- ⊙ Las relaciones permiten escoger más características: transitiva, simétrica, funcional, relación inversa

The screenshot displays the Protégé web interface for editing an ontology. The browser address bar shows the URL: `http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology`. The interface includes a menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and a toolbar with navigation icons. The main workspace is divided into several panes:

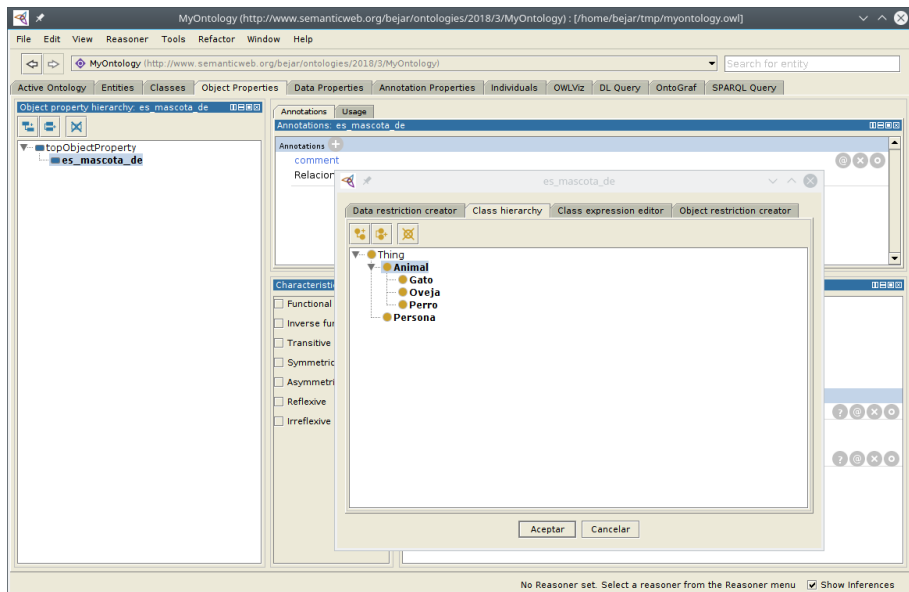
- Object property hierarchy:** Shows a tree view with `topObjectProperty` selected.
- Annotations:** A tabbed pane showing the annotations for `topObjectProperty`. It includes a search bar and a list of annotations.
- Characteristics:** A list of checkboxes for property characteristics:
  - ☐ Functional
  - ☐ Inverse functional
  - ☐ Transitive
  - ☐ Symmetric
  - ☐ Asymmetric
  - ☐ Reflexive
  - ☐ Irreflexive
- Description:** A list of relationships for `topObjectProperty`, each with a plus icon for adding a value:
  - Equivalent To
  - SubProperty Of** (highlighted)
  - Inverse Of
  - Domains (intersection)
  - Ranges (intersection)
  - Disjoint With
  - SuperProperty Of (Chain)

The status bar at the bottom indicates: "No Reasoner set. Select a reasoner from the Reasoner menu" and has a checked checkbox for "Show Inferences".

The screenshot shows the Protégé web interface for defining an ObjectProperty. The interface is divided into several panes:

- Left Pane:** Displays the "Object property hierarchy: topObjectProperty". A red circle highlights the "topObjectProperty" node, with the label "Crear Relaciones" (Create Relationships) next to it.
- Top Pane:** Shows the "Annotations: topObjectProperty" section. A red circle highlights this section, with the label "Anotaciones de la relacion" (Relationship Annotations) next to it.
- Bottom Left Pane:** Displays the "Characteristics: topObjectProperty" section. A red circle highlights this section, with the label "Propiedades de la relacion" (Relationship Properties) next to it. The characteristics listed are: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive.
- Bottom Right Pane:** Displays the "Description: topObjectProperty" section. A red circle highlights this section, with the label "Dominio/Rango de la relacion" (Domain/Range of the relationship) next to it. The description includes: Equivalent To, SubProperty Of, Inverse Of, Domains (Intersection), Ranges (Intersection), Disjoint With, and SuperProperty Of (Chain).

The interface also includes a menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and a search bar at the top.





The screenshot displays the Protégé web interface for editing an ontology. The browser address bar shows the URL: `http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology`. The interface includes a menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and a toolbar with navigation icons. The main content area is divided into several panels:

- Left Panel:** Titled "Data property hierarchy: topDataProperty", it shows a tree view with a single entry, "topDataProperty".
- Top Right Panel:** Titled "Annotations: topDataProperty", it contains a search bar and a list of annotations.
- Bottom Left Panel:** Titled "Characteristics: topDataProperty", it includes a checkbox for "Functional".
- Bottom Right Panel:** Titled "Description: topDataProperty", it lists various property relationships with plus icons for expansion: "Equivalent To", "SubProperty Of", "Domains (intersection)", "Ranges" (which is currently selected), and "Disjoint With".

At the bottom of the interface, a status bar indicates: "No Reasoner set. Select a reasoner from the Reasoner menu" and a checkbox for "Show Inferences" which is checked.

The screenshot displays the Protégé ontology editor window for 'MyOntology'. The interface includes a menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and a toolbar. The 'Data Properties' tab is active, showing a hierarchy of 'topDataProperty' on the left. The main area is divided into three panes: 'Annotations', 'Characteristics', and 'Description'. The 'Annotations' pane is empty. The 'Characteristics' pane shows the 'Functional' checkbox. The 'Description' pane lists various property constraints: 'Equivalent To', 'SubProperty Of', 'Domains (Intersection)', 'Ranges', and 'Disjoint with'. Red circles highlight the 'Data property hierarchy' toolbar icon, the 'Annotations' tab, and the 'Ranges' constraint. Blue text labels identify these elements: 'Crear Propiedades' for the hierarchy icon, 'Anotaciones Propiedad' for the Annotations tab, and 'Dominio/Rango (type) propiedad' for the Ranges constraint.

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology) : [/home/bejar/tmp/myontology.owl]

File Edit View Reasoner Tools Refactor Window Help

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology)

Active Ontology: Entities Classes Object Properties Data Properties Annotation Properties Individuals OWLviz DL Query OntoGraf SPARQL Query

Data property hierarchy: topDataProperty

Annotations: topDataProperty

Annotations +

Crear Propiedades

Anotaciones Propiedad

Characteristics: topDataProperty

☐ Functional

Description: topDataProperty

Equivalent To +

SubProperty Of +

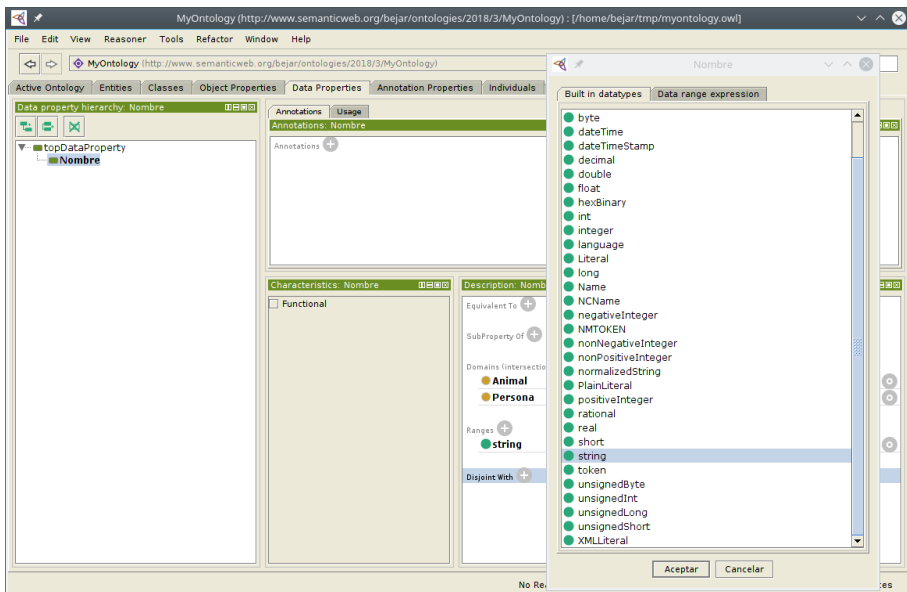
Domains (Intersection) +

Ranges +

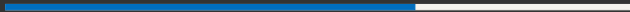
Disjoint with +

Dominio/Rango (type) propiedad

No Reasoner set. Select a reasoner from the Reasoner menu ☒ Show Inferences



Instancias



The screenshot displays the Protégé ontology editor interface for 'MyOntology' (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology). The interface includes a menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and a toolbar with navigation and editing icons. The main workspace is divided into several panels:

- Left Panel:** Displays the class hierarchy. The 'Class hierarchy: Gato' is selected, showing a tree structure: Thing (parent) -> Animal (child) -> Gato (child of Animal) -> Oveja (child of Gato) -> Perro (child of Gato) -> Persona (child of Gato).
- Top Panel:** Contains tabs for 'Active Ontology', 'Entities', 'Classes', 'Object Properties', 'Data Properties', 'Annotation Properties', 'Individuals', 'OWL Viz', 'DL Query', 'OntoGraf', and 'SPARQL Query'. The 'Individuals' tab is currently active.
- Individuals: Felix:** A panel showing the instances of the 'Felix' class. It lists 'Felix' and 'Pepe' as instances.
- Annotations: Felix:** A panel showing the annotations for the 'Felix' instance. It includes a search bar and a list of annotations.
- Description: Felix:** A panel showing the description of the 'Felix' instance. It includes a search bar and a list of descriptions.
- Property assertions: Felix:** A panel showing the property assertions for the 'Felix' instance. It includes a search bar and a list of assertions, such as 'es\_mascota\_de Pepe'.

At the bottom of the interface, a status bar indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and a checkbox for 'Show Inferences' is checked.

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology) : [/home/bejar/tmp/myontology.owl]

File Edit View Reasoner Tools Refactor Window Help

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology)

Search for entity

Active Ontology Entities Classes Object Properties Data Properties Annotation Properties Individuals OWLviz DL Query OntoGraf SPARQL Query

Class hierarchy (inferred)

Class hierarchy: Gato

Class hierarchy: Gato

Thing

- Animal
  - Gato
  - Oveja
  - Perro
- Persona

Individuals: Felix

Annotations: Felix

Annotations

Description: Felix

Types

- Gato

Property assertions: Felix

Object property assertions

- es\_mascota\_de Pepe

Data property assertions

- Nombre "Felix"

Negative object property assertions

Negative data property assertions

No Reasoner set. Select a reasoner from the Reasoner menu ☒ Show Inferences

Crear Instancias

Anotaciones Instancia

Tipo de la Instancia

Relaciones Instancia

Propiedades Instancia

# Visualización



- ⊙ Protege permite diversas visualizaciones de la ontología
- ⊙ Se han de activar los plugins en Window → Tabs
  - OWLviz
  - Ontograph



The screenshot displays the Protégé OWL editor interface. The top menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The address bar shows the URL: <http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology>. The main toolbar contains icons for various actions, including saving, undo, redo, and zooming.

The left pane, titled "Class hierarchy: Thing", shows a tree view of the ontology's classes:

- Thing
  - Animal
    - Gato
    - Oveja
    - Perro
  - Persona

The right pane, titled "OWLviz: Thing", displays an OWL diagram. The diagram shows the following structure:

- Thing** (highlighted with a blue border) is the root class.
- Animal** is a subclass of **Thing** (indicated by a purple arrow labeled "is-a").
- Persona** is a subclass of **Thing** (indicated by a purple arrow labeled "is-a").
- Perro**, **Gato**, and **Oveja** are subclasses of **Animal** (indicated by grey arrows labeled "is-a").

The bottom status bar indicates: "No Reasoner set. Select a reasoner from the Reasoner menu" and a checked checkbox for "Show Inferences".

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology) : [/home/bejar/tmp/myontology.owl]

File Edit View Reasoner Tools Refactor Window Help

MyOntology (http://www.semanticweb.org/bejar/ontologies/2018/3/MyOntology) Search for entity

Active Ontology Entities Classes Object Properties Data Properties Annotation Properties Individuals OWLViz DL Query OntoGraf SPARQL Query

Class hierarchy: Persona

- Thing
  - Animal
    - Gato
    - Oveja
    - Perro
  - Persona

OntoGraf:

Search: contains Search Clear

No Reasoner set. Select a reasoner from the Reasoner menu ☒ Show Inferences

Web Protège

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- ⊙ Protégè tiene una versión web simplificada <http://webprotege.stanford.edu/>
- ⊙ Permite la creación de los elementos básicos de una ontología (clases, propiedades, instancias)
- ⊙ Pensada como una herramienta colaborativa con registro de cambios
- ⊙ Para poder utilizarla hay que registrarse
- ⊙ Las ontologías son inicialmente privadas y se han de compartir entre los miembros del equipo para que sean visibles

## Otras herramientas

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- ⦿ Generación de documentación de ontologías
  - PyLode <https://github.com/rdfliib/pyLODE>
- ⦿ Generación de diagramas de la ontología y traducción de OWL a Namespaces de RDFLib
  - owl2rdfliib <https://pypi.org/project/owl2else/>