



Università degli Studi di Roma “Tor Vergata”

Gestione di dati RDF con Ontotext GraphDB *...ed un pizzico di LOV*

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Ontotext GraphDB è una *famiglia di repository semantici* affidabili, scalabili e ricchi di funzionalità.

- **GraphDB Free**: gratuito da usare, ma limitato a 2 query concorrenti
- **GraphDB SE**: nessun limite al numero di query concorrenti
- **GraphDB EE**: modalità cluster per garantire alta disponibilità (availability), resilienza (resilience) and throughput

Possibilità di deployment con Docker o Puppet.

GraphDB Free può essere **usato gratuitamente**, ma è necessario registrarsi sul sito di Ontotext:

Il link per il download viene fornito in una email spedita all'indirizzo indicato nel form di registrazione

È **equivalente a GraphDB SE**, fatta eccezione per il fatto di essere limitato a due query concorrenti.

È implementato come un **Sail RDF4J** (ulteriori informazioni nelle prossime lezioni)

Noi useremo lo **standalone server**:

- È una *distribuzione autosufficiente*: nel richiede un servlet container esterno (es. Apache Tomcat); tuttavia, necessità che nel sistema sia installato Java 8+
- Può essere lanciato eseguendo *un solo script* (`graphdb[.cmd]`)
- Il *workbench grafico* è raggiungibile all'indirizzo <http://localhost:7200>

GraphDB Free – Funzionalità (1/4)

- Usabile gratuitamente;
- Gestisce decine di miliardi di statement RDF su un singolo server;
- Esegue operazioni di query e ragionamento usando indici basati su file;
- Pieno supporto a SPARQL 1.1;
- Deployment e portabilità semplificate dall'uso di JAVA;
- Scalabilità, sia in termini di volume dei dati sia di velocità di caricamento e inferenza;
- Compatibile con RDF4J 2.0;
- Compatible con Jena attraverso un adattatore incluso;

Fonte: <http://graphdb.ontotext.com/documentation/free/free/graphdb-free.html>

GraphDB Free – Funzionalità (2/4)

- Ragionamento pienamente compatibile con gli standard per RDFS, OWL 2 RL e QL;
- Supporto per regole personalizzate; regole ottimizzate per le prestazioni;
- Supporto ottimizzato per l'integrazione dei dati attraverso owl:sameAs;
- Indici speciali per vincoli geo-spaziali efficienti (near-by, within, distance);
- Ricerca full-text, basata su Lucene;

Source: <http://graphdb.ontotext.com/documentation/free/free/graphdb-free.html>

GraphDB Free – Funzionalità (3/4)

- Ritrazione efficiente di statement inferita dopo aggiornamenti;
- Affidabile nel preservare i dati, la loro consistenza ed integrità;
- Import/export di sintassi RDF attraverso RDF4J: XML, N3, N-Triples, N-Quads, Turtle, TriG, TriX;
- API plugin framework, public classes and interfaces;
- Ottimizzatore di query che permette di valutare diverse piani di interrogazione;

Source: <http://graphdb.ontotext.com/documentation/free/free/graphdb-free.html>

GraphDB Free – Funzionalità (4/4)

- RDF rank per ordinare i risultati delle query per rilevanza o altre misure;
- Notifiche permettono ai client di reagire a statement nel flusso degli aggiornamenti;
- Connettore Lucene per ricerche normali e faceted (aggregazione) estremamente veloci; automaticamente aggiornato con i dati in GraphDB;
- GraphDB Workbench - lo strumento predefinito di amministrazione basato sul web;
- LoadRDF per creare repository molto velocemente da dataset grandi;

Source: <http://graphdb.ontotext.com/documentation/free/free/graphdb-free.html>

Avviare GraphDB

Avviare il Workbench di GraphDB è davvero semplice:

- Scompattare l'archivio relativo alla distribuzione standalone
- Avviare lo script `bin/graphdb` (Linux) o `bin/graphdb.cmd` (Windows)
- Puntare il browser web all'indirizzo <http://localhost:7200>

Per impostazione predefinita, GraphDB parte in maniera non sicura; tuttavia, esso supporta l'**autenticazione** degli utenti, **controllo di accesso** basato su ruoli e l'uso della **crittografia in transito**. Inoltre, possibilità di specificare **timeout e limit sui risultati delle query**.

Workench a colpo d'occhio

The screenshot shows the GraphDB Workbench interface in a browser window. The address bar shows 'localhost:7200'. The left sidebar contains navigation options: Import, Explore, SPARQL, Monitor, Setup, and Help. The main content area displays a warning message about repository connectivity and a list of available repositories. Below this, the 'License' section is visible, with 'GraphDB Free Edition' circled in purple. A hand cursor icon points to the 'Create new repository' button. The license details table is as follows:

Licensed to	Valid until	Number of cores	Maintenance date
Freeware	Perpetual	Unlimited	Perpetual

Below the table, there is a disclaimer: 'THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.'

At the bottom of the interface, the footer text reads: 'GraphDB 8.7.0 • RDF4J 2.3.2 • Connectors 9.0.0 • © 2002–2018 Ontotext AD. All rights reserved.'

Creazione di un repository (1/4)

La *creazione di un nuovo repository* è il **primo passo** indispensabile per usare GraphDB.

- Un repository è il *luogo in cui possiamo caricare le triple RDF* e la maggior parte delle operazioni sono eseguite su un certo repository.
- Quando creiamo un repository, possiamo specificare diversi *parametri di configurazione* (alcuni dei quali possono essere cambiati in seguito):
<http://graphdb.ontotext.com/documentation/free/configuring-a-repository.html#configuring-a-repository-configuration-parameters>

GraphDB può gestire più repository.

Creazione di un repository (2/4)

The screenshot shows a web browser window with the address bar displaying `localhost:7200/repository/create/free`. The page title is "Select Repository Type | GraphDB". The main content area is titled "Select repository type" and features a "Choose repository" dropdown menu. Two repository options are presented in rounded rectangular boxes:

- GraphDB Free**: GraphDB Free repositories store data, answer queries and execute updates.
- Ontop Virtual SPARQL**: Ontop repositories translate data stored in an SQL database to a virtual SPARQL endpoint.

The left sidebar contains the GraphDB logo and a "FREE" badge, followed by a list of navigation items: Import, Explore, SPARQL, Monitor, Setup, and Help, each with a dropdown arrow.

Creazione di un repository (3/4)

The screenshot shows the 'Create Repository' page for GraphDB Free. The browser address bar indicates the URL is localhost:7200/repository/create/free. The page title is 'Create GraphDB Free repository'. The interface includes a sidebar with 'SPARQL', 'Monitor', and 'Setup' options. The main content area is titled 'Inference and Validation' and contains several settings:

- Test:** A text input field.
- Read-only:** A checkbox that is currently unchecked.
- Ruleset:** A dropdown menu set to 'RDFS-Plus (Optimized)'. A 'Custom ruleset...' button is visible next to it.
- Disable owl:sameAs:** A checked checkbox.
- Enable consistency checks:** An unchecked checkbox.
- Enable SHACL validation:** An unchecked checkbox with a 'SHACL options' link.
- Entity ID size:** Radio buttons for '32-bit' (selected) and '40-bit'.
- Enable context index:** An unchecked checkbox.

Annotations in purple boxes and ovals provide the following information:

- Impedire modifiche al repository (da attivare dopo la creazione e inizializzazione del repository):** Points to the 'Read-only' checkbox.
- Set di regole:** Points to the 'Custom ruleset...' button.
- Ottimizzazione per owl:sameAs:** Points to the 'Disable owl:sameAs' checkbox.
- Rollback di una transazione che introduce una inconsistenza:** Points to the 'Enable consistency checks' checkbox.
- Abilita SHACL e permetterne la configurazione:** Points to the 'Enable SHACL validation' checkbox.

Creazione di un repository (4/4)

The screenshot shows the 'Create Repository' form in GraphDB. The interface includes a dropdown for 'RDFS-Plus (Optimized]', a 'Choose repository' button, and several checkboxes for 'Disable owl:sameAs', 'Enable consistency checks', and 'Enable SHACL validation'. The 'Indexing' section has 'Entity ID size' set to '32-bit', 'Enable context index' unchecked, and 'Enable predicate list index' checked. The 'Queries and Updates' section has 'Query timeout (seconds)' and 'Limit query results' both set to '0'. 'Create' and 'Cancel' buttons are at the bottom.

Dimensione in bit degli identificatori usati dall'entity index: 32 o 40. Siccome valori negativi sono riservati, 32 supporta al più 2^{31} entità

Indici subject-predicate (SP) e object-predicate (OP) (per query con predicato non istanziato, se ci sono tanti predicati)

Numero di risultati dopo il quale una query viene terminata (0 = illimitato)

32-bit 40-bit

Enable context index
Enable predicate list index

Indice CPSO

0 Throw exception on query timeout

0

Timeout per le query (0 = illimitato)

Create Cancel

Selezione di un repository (1/2)

The screenshot shows the GraphDB Workbench interface in a browser window. The address bar shows 'localhost:7200'. The left sidebar contains navigation options: Import, Explore, SPARQL, Monitor, Setup, and Help. The main content area features a 'Choose repository' dropdown menu. A yellow warning banner states: 'Some functionality is not available because you are not connected to any repository. Click one of the repositories below to connect to it or create a new repository.' Below this, a list of repositories is displayed:

DBpedia_Ontology_core • Core repesi...	EuroVoc_core • Core repository for project ...
OpenMultilingualWordnet_core • Cor...	RemoteHistory_core • Core repository f...
RemoteHistory_support • Support rep...	Test

A hand cursor icon is positioned over the 'Test' repository. To the right of the list is a '+ Create new repository' button. Below the repository list, the 'License' section is visible, showing 'GraphDB Free Edition' with the following details:

Licensed to	Valid until	Number of cores	Maintenance date
Freeware	Perpetual	Unlimited	Perpetual

Below the license table, there is a disclaimer: 'THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.'

At the bottom of the interface, the footer text reads: 'GraphDB 8.7.0 • RDF4J 2.3.2 • Connectors 9.0.0 • © 2002–2018 Ontotext AD. All rights reserved.'

Selezione di un repository (2/2)

The screenshot shows the GraphDB Workbench interface. On the left is a navigation sidebar with options: Import, Explore, SPARQL, Monitor, Setup, and Help. The main area is titled 'View resource' and shows a search bar for 'Search RDF resou...'. Below this is the 'Active repository' section, which displays the 'Test' repository (Local) with 70 total statements (0 explicit, 70 inferred) and an expansion ratio of 1.00. A dropdown menu is open over the 'Test' repository, listing other available repositories: DBpedia_Ontology_core (Local), EuroVoc_core (Local), OpenMultilingualWordnet_core (Local), RemoteHistory_core (Local), and RemoteHistory_support (Local). A mouse cursor is pointing at the 'Test' repository in the dropdown. Below the repository list are sections for 'Add statements', 'Clear graph', 'Remove statements', and 'SPARQL Select template'. At the bottom, the 'License' section shows 'GraphDB Free Edition'.

Import (1/2)

The screenshot shows the GraphDB Workbench interface. The left sidebar contains a navigation menu with the following items: Import (highlighted with a mouse cursor), Explore, SPARQL, Monitor, Setup, and Help. The main content area is titled 'View resource' and shows a search bar for RDF resources with 'Text' and 'Visual' view options. Below this, there are two panels: 'Active repository' and 'Saved SPARQL queries'. The 'Active repository' panel shows a local repository named 'Test' with 70 total statements (0 explicit, 70 inferred) and an expansion ratio. It includes options for 'Import RDF data', 'Import tabular data with OntoRefine', and 'Export RDF data'. The 'Saved SPARQL queries' panel contains three query templates: 'Add statements', 'Clear graph', and 'Remove statements', each with a corresponding SPARQL query snippet. At the bottom, the 'License' section indicates 'GraphDB Free Edition'.

Import (2/2)

The screenshot shows the GraphDB Workbench interface in a browser window. The address bar shows 'localhost:7200'. The left sidebar contains a navigation menu with the following items: Import, RDF, Tabular (OntoRefine), Explore, SPARQL, Monitor, Setup, and Help. A mouse cursor is pointing at the 'Tabular (OntoRefine)' option. The main content area is titled 'View resource' and features a search bar for RDF resources with 'Text' and 'Visual' view options. Below this, there are two panels: 'Active repository' and 'Saved SPARQL queries'. The 'Active repository' panel shows a local repository named 'Test' with 70 total statements (0 explicit, 70 inferred) and an expansion ratio. It includes links for 'Import RDF data', 'Import tabular data with OntoRefine', and 'Export RDF data'. The 'Saved SPARQL queries' panel contains sections for 'Add statements', 'Clear graph', 'Remove statements', and 'SPARQL Select template'. At the bottom, the 'License' section displays 'GraphDB Free Edition'.

Import RDF

The screenshot shows the GraphDB Workbench 'Import' page. The left sidebar contains navigation options: Import, RDF (highlighted), Tabular (OntoRefine), Explore, SPARQL, Monitor, Setup, and Help. The main content area is titled 'Import' and features three primary options: 'Upload RDF files' (All RDF formats, up to 200 MB), 'Get RDF data from a URL' (All RDF formats), and 'Import RDF text snippet' (Type or paste RDF data). Annotations include: a callout box pointing to the 'Import' title stating 'Dati inviati dal client come payload di una richiesta HTTP'; a callout box pointing to the 'User data' and 'Server files' tabs stating 'Dati caricati da file recuperato da cartella nel filesystem del server'; and a callout box at the bottom right stating 'Supporta vari formati RDF: .ttl .rdf .rj .n3 .nt .nq .trig .trix .brf .owl, come pure le loro version .gz e archivi .zip'.

Vogliamo caricare la nostra prima ontologia...

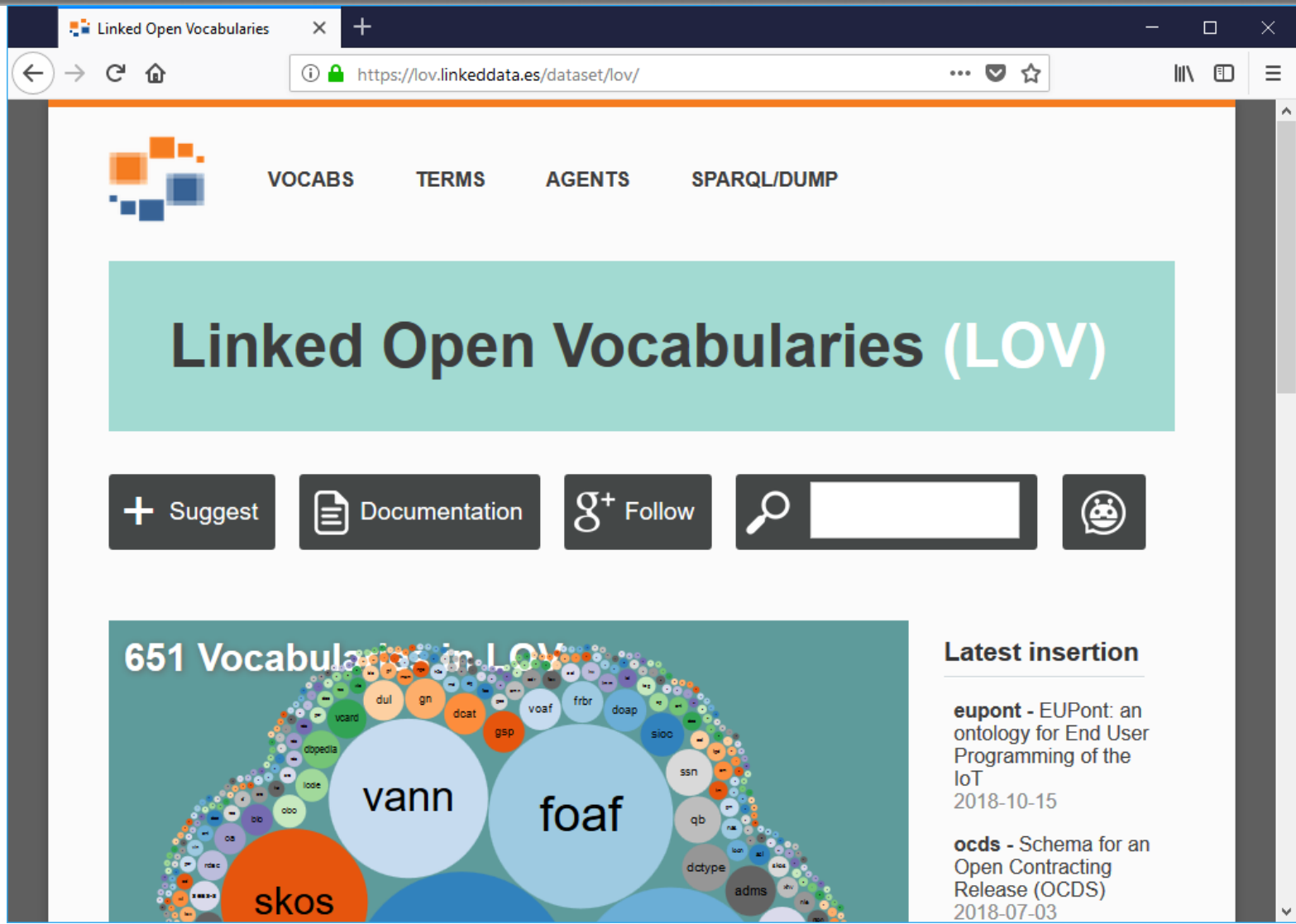
...in particolare, una *ontologia che parli delle persone e delle loro relazioni sociali*.

Andiamo su Linked Open Vocabularies (LOV):

<https://lov.linkeddata.es/>

- Un catalogo (curato!) di vocabolari
- Metadati rappresentati in RDF usando VOID, VOAFA ed altri vocabolari
- Copia cache dei vocabolari
- Catalogo accessibile via dump, SPARQL endpoint o API
- Fulltext search sui termini definiti dai vocabolari indicizzati


LOV - Homepage



Linked Open Vocabularies

[VOCABS](#) [TERMS](#) [AGENTS](#) [SPARQL/DUMP](#)

Linked Open Vocabularies (LOV)

+ Suggest Documentation g+ Follow 

651 Vocabularies in LOV

skos vann foaf

Latest insertion

eupont - EUPont: an ontology for End User Programming of the IoT
2018-10-15

ocds - Schema for an Open Contracting Release (OCDS)
2018-07-03

LOV – Ricerca (con completamento)

The screenshot shows the LOV website interface. At the top, there are navigation tabs: VOCABS, TERMS, AGENTS, and SPARQL/DUMP. A large teal banner displays the title "Linked Open Vocabularies (LOV)". Below this, there are buttons for "+ Suggest", "Documentation", "Follow", and a search icon. The search bar contains the text "per" and a dropdown menu lists suggestions: "Person", "person", "Performer", "Period", and "performer". To the right of the search bar, there is a "insertion" section with two entries: "EUPont: an ontology for End User Programming of the IoT" (dated 2018-10-15) and "ocds - Schema for an Open Contracting Release (OCDS)" (dated 2018-07-03). At the bottom of the page, a large bubble chart titled "651 Vocabularies in LOV" shows various vocabulary acronyms, with "vann" and "foaf" being the most prominent.

LOV – Risultati della ricerca

The screenshot shows the LOV interface with the search term 'Person' entered in the search bar. The results are displayed in a list format, with the top result being 'foaf:Person'.

TERMS Person

Results	URI	Score
1996 results	foaf:Person (foaf) 2,320,027 occurrences in 72 LOD datasets http://xmlns.com/foaf/0.1/Person	0.650
	rdfs:comment A person. rdfs:label Person localName Person	
	npg:Person (npg) n/a (use in LOD) http://ns.nature.com/terms/Person	0.556
	skos:definition The :Person class represents a single person entity. @en skos:prefLabel Person @en localName Person	
	bbccore:Person (bbccore) n/a (use in LOD) http://www.bbce.co.uk/ontology/bbceconcepts/Person	0.511

Type

- vocabulary >
- property/class
- property (1561)
- class (435)
- agent >

Tag

- FRBR (577)

LOV – FOAF (1)

Linked Open Vocabularies

https://lov.linkeddata.es/dataset/lov/vocabs/foaf

VOCABS TERMS AGENTS SPARQL/DUMP

Friend of a Friend vocabulary (foaf)

Metadata

URI	http://xmlns.com/foaf/0.1/
Namespace	http://xmlns.com/foaf/0.1/
homepage	http://www.foaf-project.org/
Description	FOAF is a project devoted to linking people and information using the Web. Regardless of whether information is in people's heads, in physical or digital documents, or in the form of factual data, it can be linked. @en

Statistics

Classes	13
Properties	62
Datatypes	0
Instances	0

Statistiche sul contenuto del vocabolario

LOV – FOAF (2)

LOV integra diversi servizi esterni:

WebVOWL (<http://visualdataweb.de/webvowl/>)

per visualizzare il vocabolario come un grafo

OOPS! (OntOlogy Pitfall Scanner)

(<http://oops.linkeddata.es>)

per rilevare potenziali problemi dentro l'ontologia

Parrot

per generare una documentazione HTML dell'ontologia

Vapour

(<http://linkeddata.uriburner.com:8000/vapour>)

per verificare il funzionamento della dereferenziazione

RDF Triple-Checker

(<http://graphite.ecs.soton.ac.uk/checker/>)

Per rilevare errori di battitura e altri problemi comuni all'interno di dati RDF

The screenshot shows a web browser window with the URL <https://lov.linkeddata.es/dataset/lov/vocabs/foaf>. The page displays a vocabulary interface with a large teal header area containing the word 'Vocabulary'. Below the header, there is a navigation bar with icons for 'oops!', 'parrot', 'vapour', and a checkmark. A 'Statistics' section is visible on the right side of the page, showing a bar chart with the following data:

Category	Count
Classes	13
Properties	62
Datatypes	0
Instances	0

LOV – FOAF (3)

FOAF is a project devoted to linking people and information using the Web. Regardless of whether information is in

Espressività del linguaggio di rappresentazione usato dal vocabolario

Tag per la classificazione dei vocabolari

Statistiche d'uso recuperate da LODStats (<http://stats.lod2.eu/>)

Creator: Dan Brickley (<http://google.com/+DanBrickley>)

Comment: (2013-06-04) Bernard Vatant: From the specification : "FOAF has been evolving gradually since its creation in mid-2000. There is now a stable core of classes and properties that will not be changed, beyond modest adjustments to their documentation to track implementation feedback and emerging best practices." (2014-12-16) Bernard Vatant: Annual review OK (2014-01-15) Bernard Vatant: Looking forward for v1.0 :) (2015-12-16) Ghislain Ateazing: Annual review OK

Datatypes: 0
Instances: 0

Expressivity
RDF RDFS

Tags
People

LOD
Vocabulary used in 249 datasets

LOV – FOAF (5)

Linked Open Vocabularies

https://lov.linkeddata.es/dataset/lov/vocabs/foaf

Metadata
Extends
Specializes
Generalizes
Has Equivalences with
Has Disjunction with
Imports

Vocabulary Version History

Year	Version
2011	v0.98
2012	
2013	
2014	v0.99
2015	
2016	
2017	
2018	

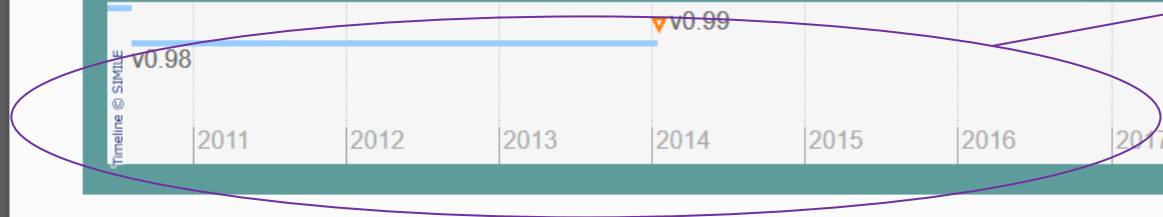
Timeline © SIMILE

Linked Open Vocabularies
DOCUMENTATION
 About
 API documentation
 Source code
 Contact
PUBLICATION
 Semantic Web Journal '16
 ERCIM News '14
 Library Hi Tech '13

Hosted by the
 Ontology Engineering Group - UPM

CC BY

Accesso alle versioni precedenti del vocabolario



Import di dati RDF da URL (1/3)

The screenshot shows the GraphDB Workbench interface. A dialog box titled "Import RDF data from URL" is open in the center. The dialog has a close button (X) in the top right corner. Below the title is a text input field containing the URL "http://xmlns.com/foaf/0.1/". Below the input field is a checkbox labeled "Start import automatically" which is checked. At the bottom of the dialog are three buttons: "Cancel", "Format: Auto" (with a dropdown arrow), and "Import" (with a download icon). The background shows the GraphDB sidebar with options like Import, RDF, Tabular (OntoRefine), Explore, SPARQL, Monitor, Setup, and Help. The main content area is dimmed, showing a "Test" button and a "Help" button. A red box highlights a section of the background text that reads "Import RDF text snippet or paste RDF data".

Import di dati RDF da URL (2/3)

Import settings

Base IRI

Target graphs From data The default graph Named graph

Enable replacement of existing data

Replaced graphs

I understand that data in the replaced graphs will be cleared before importing new data.

[Show advanced settings](#)

Cancel Import

In quale grafo mettere i dati?

Sovrascrive i dati già esistenti nel grafo di destinazione?

Configurazioni avanzate (es. preservare bnode id, checking sintattici, etc.)

Import di dati RDF da URL (3/3)

The screenshot shows the GraphDB Workbench 'Import' page. The browser address bar indicates the URL is localhost:7200/import#user. The left sidebar contains navigation options: Import, RDF (selected), Tabular (OntoRefine), Explore, SPARQL, Monitor, Setup, and Help. The main content area is titled 'Import' and has two tabs: 'User data' and 'Server files'. Three main actions are available: 'Upload RDF files' (up to 200 MB), 'Get RDF data from a URL' (All RDF formats), and 'Import RDF text snippet'. Below these, there is a search bar and a list of items. One item is visible: a checkbox, a link icon, the URL 'http://xmlns.com/foaf/0.1/', a refresh icon, and the text 'Importing...'. There are also trash and 'Abort' icons for this item.

Disporre di **opportune visualizzazioni** è indispensabile per comprendere i dati e generare approfondimenti (insight)

GraphDB offre diverse visualizzazioni:

- resource view (visualizzazione/editing delle triple)
- visual graph (connettività delle risorse)
- domain-range graph (relazioni tra classi)
- class relationships (relazioni tra istanze delle classi)

RDF Rank permette di determinare l'«importanza» delle risorse, e ciò influisce sulle visualizzazioni esaltando certe parti dei dati e tagliandone altre.

Explore

Import | GraphDB Workbench

localhost:7200/import#

GraphDB

Import

Explore

SPARQL

Monitor

Setup

Help

Import

User data Server files

Help

Upload RDF files
All RDF formats, up to 200 MB

Get RDF data from a URL
All RDF formats

Import RDF text snippet
Type or paste RDF data

Type to filter

<http://xmlns.com/foaf/0.1/>
Imported successfully in less than a second. Import

Explore – Graph Overview (1/2)

The screenshot displays the GraphDB Workbench interface. The left sidebar contains navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph, Similarity, SPARQL, Monitor, Setup, and Help. The main content area is titled 'Import' and features three primary actions: 'Upload RDF files' (All RDF formats, up to 200 MB), 'Get RDF data from a URL' (All RDF formats), and 'Import RDF text snippet' (Type or paste RDF data). A search bar with the placeholder 'Type to filter' is located below these options. A list of imported items is shown, including a successful import of 'http://xmlns.com/foaf/0.1/' with a message 'Imported successfully in less than a second.' and an 'Import' button.

Explore – Graph Overview (2/2)

Graphs overview | GraphDB Web

localhost:7200/graphs

GraphDB FREE

Import

Explore

Graphs overview

Class hierarchy

Class relationships

Visual graph

Similarity

SPARQL

Monitor

Setup

Help

Search Graphs

Showing 1 - 2 of 2 results Graphs per page: All

Export repository Clear repository

<input type="checkbox"/>		Graphs		
<input type="checkbox"/>		The default graph		
<input type="checkbox"/>		http://xmlns.com/foaf/0.1/		

Explore – Resource view (1/2)

Un resource view in cui sono mostrati gli statement che hanno una certa risorsa come contesto

Scaricare i dati

Mostrare bnode

subject predicate object

Explicit only

Show Blank Nodes

Download as

Visual graph

context all

È possibile mostrare gli statement che hanno una certa risorsa come soggetto, predicato o oggetto

Mostrare solo statement espliciti, impliciti o entrambi

Aprire visual graph sulla risorsa

	subject	predicate	object	context
1	foaf:	dc11:description		foaf:
2	foaf:	dc11:title		foaf:
3	foaf:	rdf:type	owl:Ontology	foaf:
4	foaf:Agent	rdf:type	rdfs:Class	foaf:
5	foaf:Agent	rdf:type	owl:Class	foaf:
6	foaf:Agent	rdfs:comment	An agent (eg. person, group, software or physical artifact).	foaf:
7	foaf:Agent	rdfs:isDefinedBy	foaf:	foaf:
8	foaf:Agent	rdfs:label	Agent	foaf:
9	foaf:Agent	owl:equivalentClass	dcterms:Agent	foaf:

Explore – Resource view (2/2)

Il *resource view* è una visualizzazione ad elevata risoluzione, utile per vedere nel dettaglio:

- Ciò che si conosce su una risorsa (*come soggetto*)
- Riferimenti ad una risorsa (*come oggetto*)
- Usi di una risorsa *come predicato*

Può anche essere usato per *editare gli statement* e *definire nuove risorse*.

Explore – Class Hierarchy (1/5)

The screenshot shows the GraphDB Workbench interface. The left sidebar contains navigation options: Import, Explore, Graphs overview, Class hierarchy (selected), Class relationships, Visual graph, Similarity, SPARQL, Monitor, Setup, and Help. The main area displays the resource `0.1/` with source `http://xmlns.com/foaf/0.1/`. Below the source are filters for 'subject', 'predicate', and 'object', and buttons for 'Explicit only', 'Show Blank Nodes', 'Download as', and 'Visual graph'. A table lists the class hierarchy entries:

	subject	predicate	object	context
1	foaf:	dc11:description	The Friend of a Friend (FOAF) RDF vocabulary, described using W3C RDF Schema and the Web Ontology Language.	foaf:
2	foaf:	dc11:title	Friend of a Friend (FOAF) vocabulary	foaf:
3	foaf:	rdf:type	owl:Ontology	foaf:
4	foaf:Agent	rdf:type	rdfs:Class	foaf:
5	foaf:Agent	rdf:type	owl:Class	foaf:
6	foaf:Agent	rdfs:comment	An agent (eg. person, group, software or physical artifact).	foaf:
7	foaf:Agent	rdfs:isDefinedBy	foaf:	foaf:
8	foaf:Agent	rdfs:label	Agent	foaf:
9	foaf:Agent	owl:equivalentClass	dcterms:Agent	foaf:

Explore – Class Hierarchy (2/5)

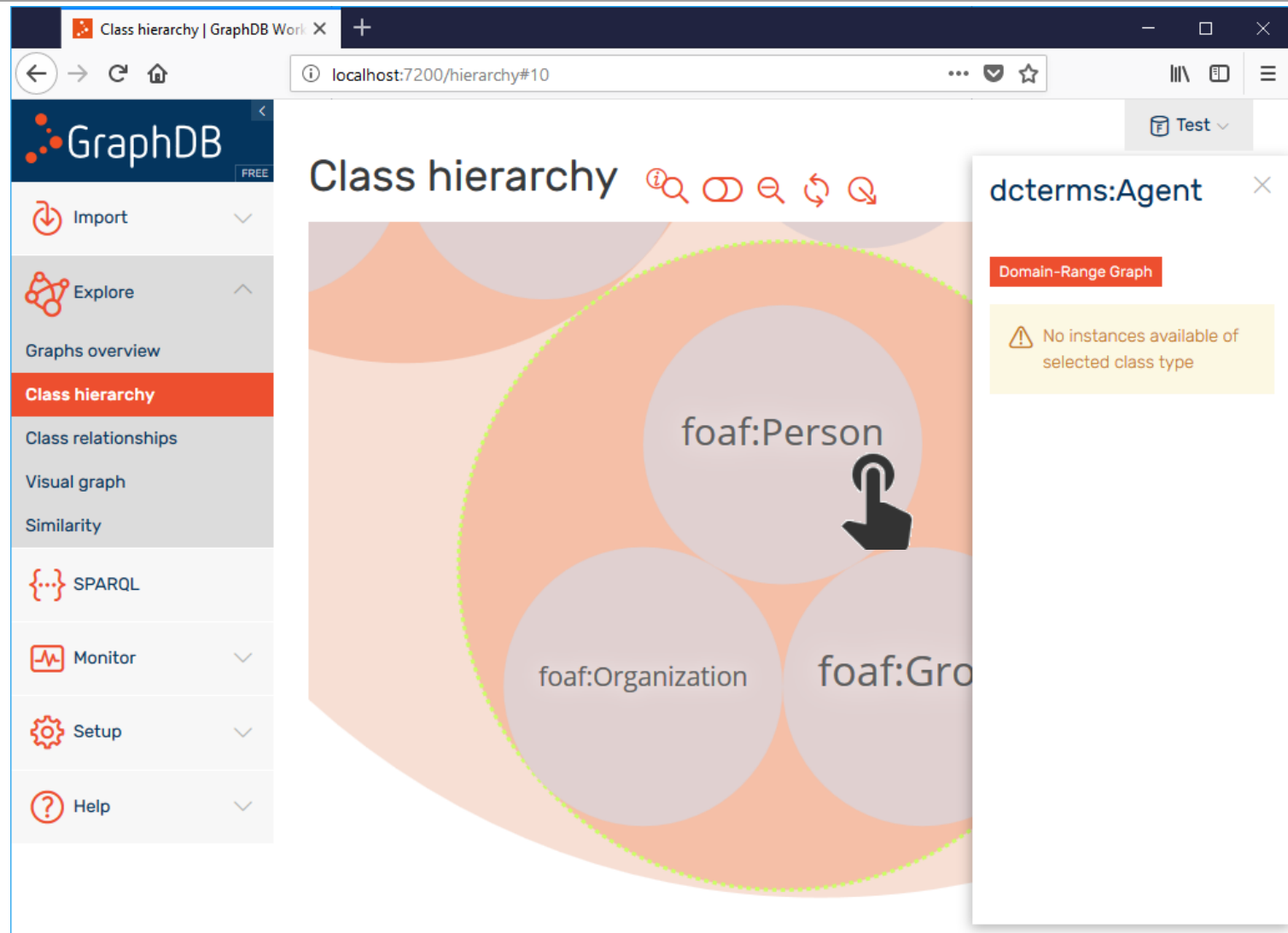
The screenshot shows the GraphDB interface for a class hierarchy. The main area displays a bubble chart where the size of each bubble represents the number of instances of a class. The classes shown are:

- wgs:SpatialThing
- foaf:OnlineAccount
- http://www.w3.org/20...
- foaf:Document
- dcterms:Agent

A 'Class Count' indicator shows a total of 14 instances. A callout box points to this indicator with the text: 'Mostrare il numero di classi indicato, scegliendo le classi con più istanze'.

Mostrare il numero di classi indicato, scegliendo le classi con più istanze

Explore – Class Hierarchy (3/5)



The screenshot shows the GraphDB interface. The main window displays a class hierarchy diagram with nodes for `foaf:Person`, `foaf:Organization`, and `foaf:Group`. A mouse cursor is hovering over the `foaf:Person` node. A details panel for `dcterms:Agent` is open on the right, showing a "Domain-Range Graph" and a warning message: "No instances available of selected class type". The left sidebar contains navigation options: Import, Explore, Graphs overview, Class hierarchy (selected), Class relationships, Visual graph, Similarity, SPARQL, Monitor, Setup, and Help.

Explore – Class Hierarchy (4/5)

The screenshot shows the GraphDB interface with the 'Class hierarchy' view selected. The sidebar on the left contains various navigation options. The main area displays a large 'foaf:Person' label. A 'Domain-Range Graph' panel is open on the right, showing 'Person' and 'A person.' with a hand cursor icon. A yellow warning box states 'No instances available of selected class type'. A text box at the bottom explains the sidebar's features.

Il **pannello laterale** include **rdfs:label**, **rdfs:comment**, al più 1000 istanze, un pulsante per richiedere tramite **SPARQL** tutte le istanze, ed il pulsante per aprire la **visualizzazione domain-range**

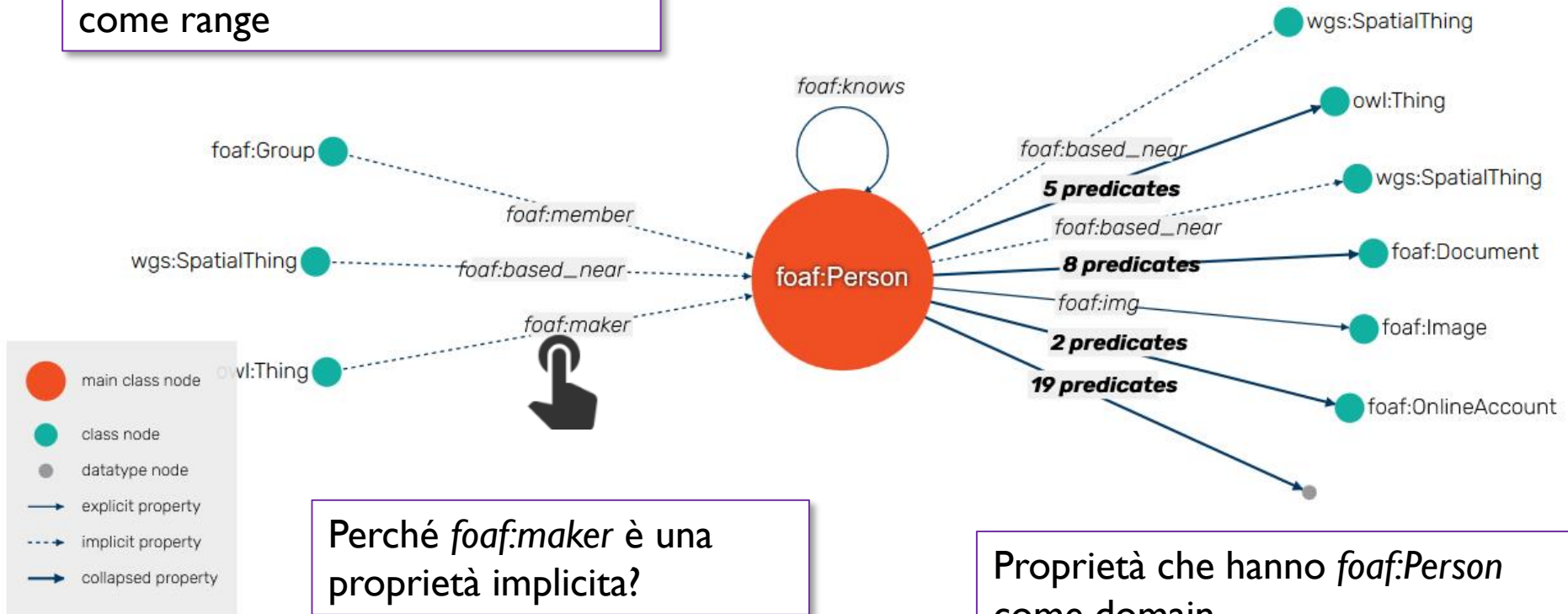
Explore – Class Hierarchy (5/5)

La visualizzazione *class hierarchy* ci permette di visualizzare ed esplorare la gerarchia delle classi.

Ci permette di limitare il numero di classi visualizzate, dando la priorità a quelle con più istanze.

Explore – Domain-Range Graph (1/3)

Proprietà che hanno *foaf:Person* come range



Perché *foaf:maker* è una proprietà implicita?

Proprietà che hanno *foaf:Person* come domain.

Gli elementi in grassetto indicano gruppi di proprietà con una certa combinazione di domain e range

Explore – Domain-Range Graph (2/3)

The screenshot shows the GraphDB interface with the following components:

- Navigation Panel (Left):** Includes buttons for Import, Explore, SPARQL, Monitor, Setup, and Help.
- Header:** Shows the GraphDB logo and a 'Test' button.
- Resource Information:** The resource is 'maker' with the source 'http://xmlns.com/foaf/0.1/maker'.
- Filters:** 'subject', 'predicate', and 'object' are selected. 'Explicit only' is chosen in the dropdown. Buttons for 'Show Blank Nodes', 'Download as', and 'Visual graph' are present.
- Table:** A table with 10 rows and 4 columns: subject, predicate, object, and context.

	subject	predicate	object	context
1	foaf:maker	rdf:type	rdf:Property	foaf:
2	foaf:maker	rdf:type	owl:ObjectProperty	foaf:
3	foaf:maker	rdfs:comment	An agent that made this thing.	foaf:
4	foaf:maker	rdfs:domain	owl:Thing	foaf:
5	foaf:maker	rdfs:isDefinedBy	foaf:	foaf:
6	foaf:maker	rdfs:label	maker	foaf:
7	foaf:maker	rdfs:range	foaf:Agent	foaf:
8	foaf:maker	owl:equivalentProperty	dcterms:creator	foaf:
9	foaf:maker	owl:inverseOf	foaf:made	foaf:
10	foaf:maker	http://www.w3.org/2003/06/sw-vocab-status/ns#term_status	stable	foaf:

Il motivo è che il range di *foaf:maker* è *foaf:Agent*, una superclasse di *foaf:Person*

Explore – Domain-Range Graph (3/3)

Il *domain-range graph* ci permette di analizzare le relazioni tra le classi (a livello assiomatico).

Il concetto di proprietà implicita ci aiuta a gestire meglio l'interazione tra dichiarazioni di domain/range e la gerarchia delle classi.

Explore – Graph Relationships – senza istanze

The screenshot shows the GraphDB web interface. The browser address bar is at localhost:7200/relationships. The sidebar on the left contains the following menu items: Import, Explore, Graphs overview, Class hierarchy, Class relationships (highlighted), Visual graph, Similarity, SPARQL, Monitor, Setup, and Help. The main content area shows the title 'Class relationships' and a yellow warning box with the text: 'The currently selected repository contains no dependencies data. Please, reload the diagram if you have imported data recently.'

Questo diagramma ci mostra le **relazioni tra le classi**, come sono determinate da legami tra le loro istanze (diversamente dai diagrammi precedenti basati sullo schema dell'ontologia).
Ci ritorneremo dopo aver definito alcune istanze.

Import RDF text snippet (1/4)

GraphDB Workbench | Import | localhost:7200/import#user

Import ⓘ

User data | Server files | Help ⓘ

Import RDF text snippet
Type or paste RDF data

The supported RDF formats are .ttl .rdf .rj .n3 .nt .nq .trig .trix .owl

<http://xmlns.com/foaf/0.1/>
Imported successfully in less than a second.

Import RDF text snippet (2/4)

The screenshot shows the GraphDB Workbench interface with a modal dialog titled "Import RDF data from a text snippet". The dialog contains a text area with the following RDF data:

```
@prefix : <http://example.org/> .  
  
:john a foaf:Person ;  
  foaf:givenName "John" ;  
  foaf:familyName "Someone"  
 .  
  
:mary a foaf:Person ;  
  foaf:givenName "Mary" ;  
  foaf:familyName "Someone else"  
 .
```

Below the text area, there is a checkbox labeled "Start import automatically" which is checked. At the bottom of the dialog, there are three buttons: "Cancel", "Format: Turtle" (with a dropdown arrow), and "Import".

The background interface shows the "Import" menu with "RDF" selected, and a list of text snippets with "Import" buttons next to them.

Import RDF text snippet (3/4)

```
@prefix : <http://example.org/> .

:john a foaf:Person ;
  foaf:givenName "John" ;
  foaf:familyName "Someone"
.

:mary a foaf:Person ;
  foaf:givenName "Mary" ;
  foaf:familyName "Someone else"
.

:philip a foaf:Person ;
  foaf:givenName "Philip" ;
  foaf:familyName "The One"
.
```

```
:alice a foaf:Person ;
  foaf:givenName "Alice" ;
  foaf:familyName "Cetara"
.

:john foaf:knows :mary, :philip, :alice .
:mary foaf:knows :john, :philip .
:philip foaf:knows :john, :mary .
:alice foaf:knows :john .
```

Definiamo alcune istanze di fantasia della classe `foaf:Person`, ed immaginiamo che alcune si conoscano (*foaf:knows*) tra di loro.

Import RDF text snippet (4/4)

The screenshot shows the 'Import settings' dialog in GraphDB Workbench. The 'Base IRI' is set to `http://exampleuri.com/examplepath`. Under 'Target graphs', the 'Named graph' option is selected, and the field below it contains `http://example.org/`. There is also an unchecked checkbox for 'Enable replacement of existing data' and a 'Show advanced settings' link. At the bottom of the dialog are 'Restore defaults', 'Cancel', and 'Import' buttons.

Inseriamo le triple in un nuovo grafo chiamato `http://example.org/`

Setup - Namespaces

Namespaces | GraphDB Workb...

localhost:7200/namespaces

GraphDB FREE

Import

Explore

SPARQL

Monitor

Setup

Namespaces

Namespaces

examplePrefix http://example.com/data# Add namespace

Namespaces per page: 10

Showing 1 - 10 of 10 results First 1 Last

<input type="checkbox"/>	Prefix	URI	<input type="checkbox"/>
<input type="checkbox"/>	:	http://example.org/	<input type="checkbox"/>
<input type="checkbox"/>	dc11 :	http://purl.org/dc/elements/1.1/	<input type="checkbox"/>
<input type="checkbox"/>	dcterms :	http://purl.org/dc/terms/	<input type="checkbox"/>
<input type="checkbox"/>	foaf :	http://xmlns.com/foaf/0.1/	<input type="checkbox"/>
<input type="checkbox"/>	gn :		<input type="checkbox"/>
<input type="checkbox"/>	owl :		<input type="checkbox"/>
<input type="checkbox"/>	rdf :		<input type="checkbox"/>
<input type="checkbox"/>	rdfs :		<input type="checkbox"/>
<input type="checkbox"/>	wgs :		<input type="checkbox"/>

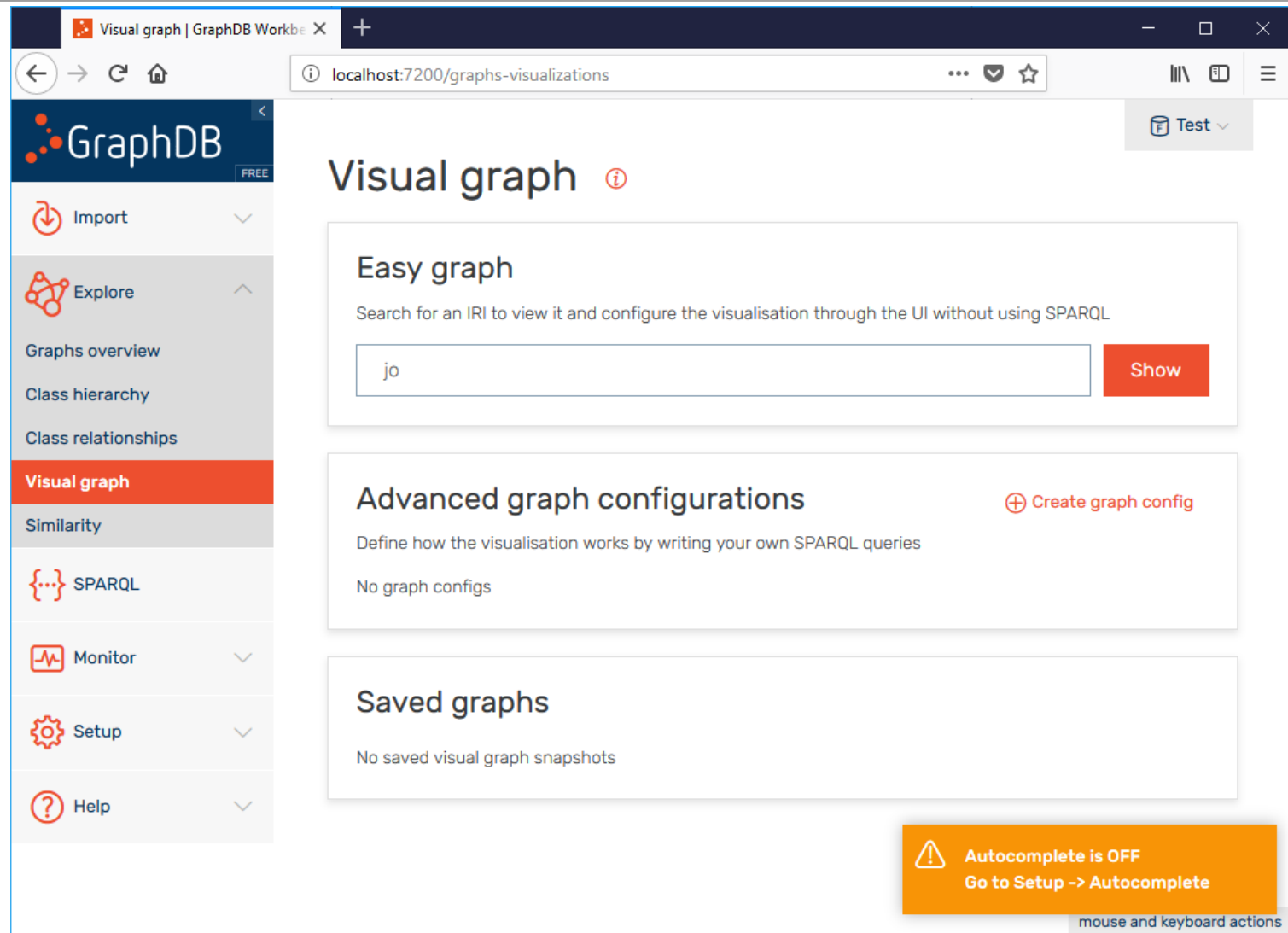
Espressioni come foaf:Person sono state interpretate correttamente perché dopo aver importato l'ontologia FOAF è stato aggiunta automaticamente una definizione per il prefisso foaf:

Visual graph (1/10)

The screenshot shows the GraphDB Visual graph interface. The browser address bar indicates the URL is localhost:7200/graphs-visualizations. The left sidebar contains navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph (highlighted), Similarity, SPARQL, Monitor, Setup, and Help. The main content area is titled 'Visual graph' and includes three sections: 'Easy graph' with a search input and 'Show' button; 'Advanced graph configurations' with a 'Create graph config' link and 'No graph configs' text; and 'Saved graphs' with 'No saved visual graph snapshots' text. A 'Test' button is visible in the top right corner of the interface.

mouse and keyboard actions

Visual graph (2/10)



The screenshot shows the GraphDB Visual graph interface in a browser window. The browser address bar shows `localhost:7200/graphs-visualizations`. The interface has a dark blue sidebar on the left with the GraphDB logo and a 'FREE' badge. The sidebar menu includes: Import, Explore, Graphs overview, Class hierarchy, Class relationships, **Visual graph** (highlighted in orange), Similarity, SPARQL, Monitor, Setup, and Help. The main content area is titled 'Visual graph' and contains three sections: 1. 'Easy graph' with a search box containing 'jo' and a 'Show' button. 2. 'Advanced graph configurations' with a 'Create graph config' button and the text 'Define how the visualisation works by writing your own SPARQL queries' and 'No graph configs'. 3. 'Saved graphs' with the text 'No saved visual graph snapshots'. An orange notification banner at the bottom right says 'Autocomplete is OFF Go to Setup -> Autocomplete'. A small tooltip 'mouse and keyboard actions' is visible at the bottom right corner of the interface.

Autocompletamento (1/2)

Autocomplete index | GraphDB

localhost:7200/autocomplete

GraphDB FREE

Import

Explore

SPARQL

Monitor

Setup

Repositories

Users and Access

My Settings

Connectors

Namespaces

Autocomplete

RDF Rank

Help

Autocomplete index ?

Click to enable autocomplete

Autocomplete for repository Test is **OFF**

Index IRIs is **ON** + Add label

Label IRI	Languages
http://www.w3.org/2000/01/rdf-schema#label	any language ✎ 🗑

Autocompletamento (2/2)

Autocomplete index | GraphDB

localhost:7200/autocomplete

GraphDB FREE

Autocomplete index ⓘ

Autocomplete for repository Test is **ON** with status **Ready** Build Now

Index IRIs is **ON** Add label

Label IRI	Languages
http://www.w3.org/2000/01/rdf-schema#label	any language ✎ 🗑️

Visual graph (3/10)

The screenshot shows the GraphDB Visual graph interface. The browser address bar indicates the URL is localhost:7200/graphs-visualizations. The left sidebar contains navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph (highlighted), Similarity, SPARQL, Monitor, Setup, and Help. The main content area is titled 'Visual graph' and features three sections: 'Easy graph' with a search input containing 'jo|' and a 'Show' button, 'Advanced graph configurations' with a 'Create graph config' link, and 'Saved graphs'.

mouse and keyboard actions

Visual graph (4/10)

The screenshot shows the GraphDB Visual graph interface. The browser address bar indicates the URL: localhost:7200/graphs-visualizations?uri=http:%2F%2Fexample.org%2Fjohn. The interface includes a sidebar with navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph (selected), Similarity, SPARQL, Monitor, Setup, and Help. The main area displays a visual graph with four nodes: philip, john, mary, and alice. Edges connect philip to john (labeled 'knows'), john to philip (labeled 'SMOVS'), john to alice (labeled 'knows'), and john to mary (labeled 'knows'). A hand cursor is positioned over the philip node. A settings gear icon in the top right is circled, with a callout box containing the text 'Tante possibilità di configurazione'. Another callout box at the bottom right contains the text 'Grafo visuale delle connessioni focalizzato sulla risorsa :john.'.

Visual graph

Import

Explore

Graphs overview

Class hierarchy

Class relationships

Visual graph

Similarity

SPARQL

Monitor

Setup

Help

philip

alice

john

mary

knows

SMOVS

knows

knows

Tante possibilità di configurazione

Grafo visuale delle connessioni focalizzato sulla risorsa :john.

mouse and keyboard actions

Visual graph (5/10)

Il *visual graph* ci permette di visualizzare ed esplorare le relazioni tra le risorse.

Per default, mostra al più 20 connessioni ad altre risorse ordinate per RDF Rank (se calcolato)

→ concentrarsi sulle connessioni più importanti (o meglio, alle risorse più importanti)

I nodi associati alle diverse risorse hanno un colore determinato dalla classe di appartenenza, ed hanno una dimensione che esprime il loro RDF Rank (se calcolato)

→ Discriminare l'importanza di una risorsa

Visual graph (6/10)

The screenshot shows the GraphDB Visual graph interface. The browser address bar indicates the URL: `localhost:7200/graphs-visualizations?uri=http:%2F%2Fexample.org%2Fjohn`. The interface features a sidebar on the left with navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph (highlighted), Similarity, SPARQL, Monitor, Setup, and Help. The main area displays a graph titled "Visual graph" with four nodes: philip, alice, john, and mary. The nodes are connected by edges labeled "knows" and "SMOUL". A hand cursor is positioned over the "philip" node, and a tooltip with icons (info, search, zoom, etc.) is visible. The bottom right corner of the interface contains the text "mouse and keyboard actions".

Visual graph (7/10)

The screenshot shows the GraphDB Visual graph interface. The browser address bar indicates the URL: `localhost:7200/graphs-visualizations?uri=http:%2F%2Fexample.org%2Fjohn`. The interface includes a sidebar with navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph (selected), Similarity, SPARQL, Monitor, Setup, and Help. The main area displays a graph with four nodes: philip, alice, john, and mary. The edges are labeled 'knows' and 'SMOUL'. The relationships are as follows:

- philip and john are connected by a bidirectional 'knows' edge.
- alice and john are connected by a bidirectional 'knows' edge.
- mary and john are connected by a bidirectional 'knows' edge.
- philip and john are connected by a bidirectional 'SMOUL' edge.

Additional interface elements include a 'Test' button, a toolbar with icons for zooming, navigating, and saving, and a footer note: 'mouse and keyboard actions'.

Visual graph (8/10)

The screenshot shows the GraphDB Visual graph interface. The browser address bar indicates the URL: `localhost:7200/graphs-visualizations?uri=http:%2F%2Fexample.org%2Fjohn`. The interface features a sidebar on the left with navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph (highlighted), Similarity, SPARQL, Monitor, Setup, and Help. The main area displays a graph titled "Visual graph" with four nodes: mary, philip, john, and alice. The nodes are connected by edges labeled "knows". The edges are: mary to philip, philip to john, john to philip, john to mary, and john to alice. A hand cursor is hovering over the john node, and a tooltip labeled "info" is visible. The interface also includes a toolbar with icons for zooming, navigating, and saving, and a "Test" button in the top right corner.

mouse and keyboard actions

Visual graph (9/10)

The screenshot displays the GraphDB Visual graph interface. The main area shows a graph with nodes 'philip' and 'john' connected by 'knows' edges. A tooltip for the 'john' node is open, showing its type as 'foaf:Person', RDF rank as 0, and properties like 'foaf:familyName' and 'foaf:givenName'. The sidebar on the left contains navigation options like 'Import', 'Explore', 'Visual graph', etc.

Il pennello laterale include **rdfs:label**, **rdfs:comment**, i **tipi**, **RDF Rank**, **foaf:depiction** (visualizzata come figura), tutte le **datatype property**

RDF Rank (1/4)

RDF Rank | GraphDB Workbench X

localhost:7200/rdfrank

GraphDB FREE

Import

Explore

SPARQL

Monitor

Setup

Repositories

Users and Access

My Settings

Connectors

Namespaces

Autocomplete

RDF Rank

Help

RDF Rank ⓘ

RDFRank for repository Test is with status **RDFRank not built yet**

Compute Full

Filtering OFF

RDF Rank (2/4)

RDF Rank | GraphDB Workbench X

localhost:7200/rdfrank

GraphDB FREE

Import

Explore

SPARQL

Monitor

Setup

Repositories

Users and Access

My Settings

Connectors

Namespaces

Autocomplete

RDF Rank

Help

Test

RDF Rank

RDFRank for repository Test is with status **Computed**

Compute Full

Filtering **ON**

Include Explicit **YES** Include Implicit **YES**

Graphs **Predicates**

Included

<http://example.org/> Add Included Graphs

Excluded

Add Excluded Graphs

RDF Rank (3/4)

RDF Rank determina l'importanza di un nodo in un grafo RDF esaminando le sue interconnessioni:

Molto simile all'algoritmo PageRank utilizzato da Google per ordinare i risultati di una ricerca (assieme a molti altri segnali!)

Il PageRank di una pagina Web è il suo *long-term visit rate* di un utente che naviga sul Web seguendo con equiprobabilità i link uscenti da ciascuna pagina

Questo processo è modellato come una catena di Markov a tempo discreto. Affinché il long-term visit rate sia definito è necessario che la catena di Markov sia *ergodica*.

A tale scopo, la catena è modificata in modo che i) giunto a un dead end (pagina senza link uscenti), l'utente salti con equiprobabilità in una qualsiasi pagina del web, ii) in ogni istante, c'è una probabilità (teleportation rate) che l'utente salti ad una qualunque pagina Web (teleporting) anziché seguire uno dei link uscenti

Dietro le quinte RDF Rank viene **configurato inviando opportuni UPDATE SPARQL** al repository.

In aggiunta al **ricomputo completo**, viene offerta la possibilità di un **ricomputo incrementale**:

Utilizza un algoritmo può veloce rispetto a quello usato nel ricomputo completo dell'RDF Rank, che introduce però alcune approssimazioni. In un contesto di aggiornamenti frequenti alla base di conoscenza, l'algoritmo incrementale permette un aggiornamento più efficiente del rango delle risorse.

RDF Rank ci mostra che è possibile applicare comuni algoritmi per grafi ai dati RDF.

In altre parole, RDF può non solo essere visualizzato come un grafo, ma anche elaborato come un grafo.

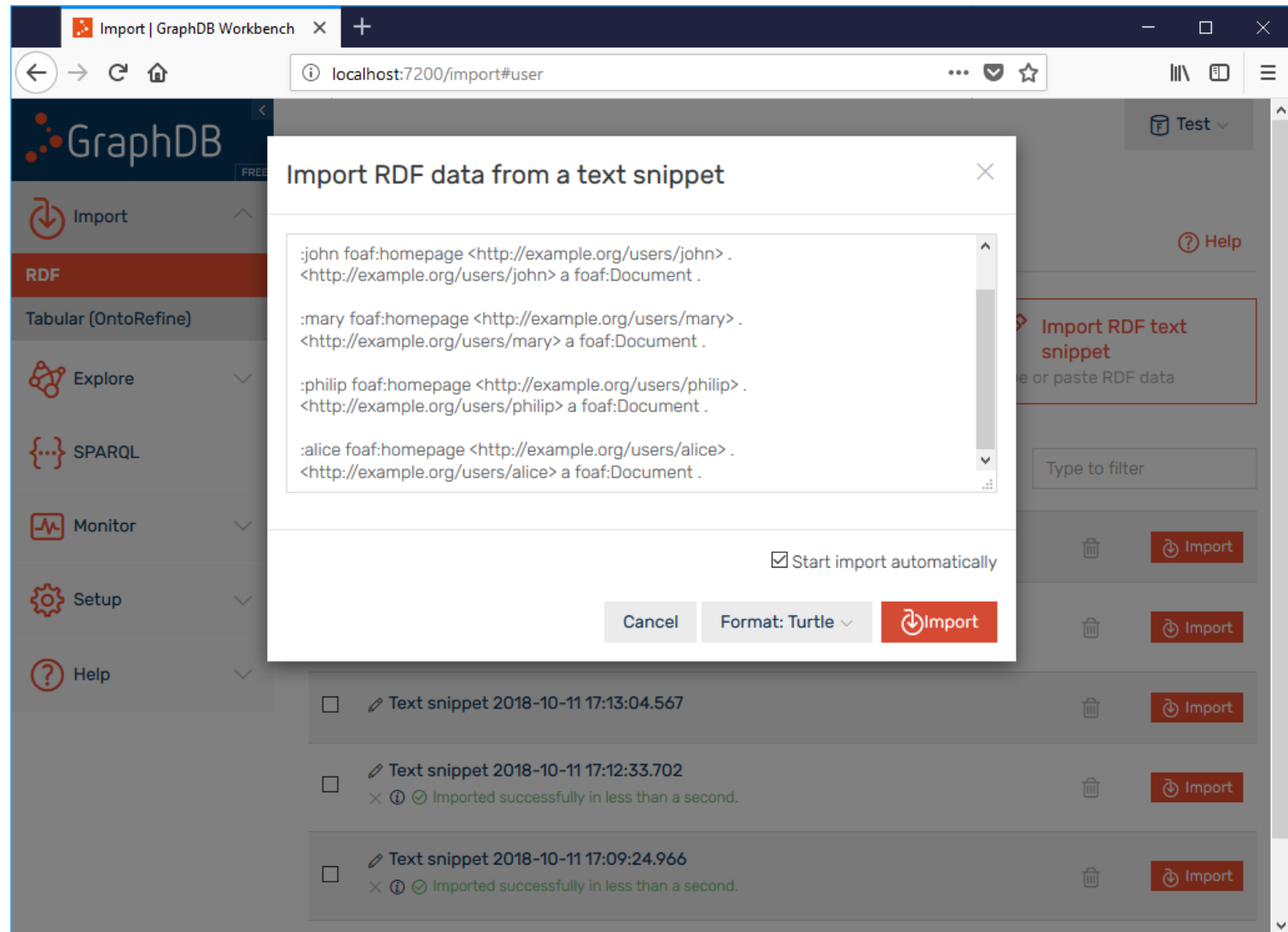
Visual graph (10/10)

The screenshot displays the GraphDB Visual graph interface. The main area shows a graph with four nodes: philip, mary, john, and alice. Bidirectional 'knows' relationships connect philip to mary, philip to john, and john to alice. The node 'john' is the largest, indicating a high RDF rank. A side panel for 'john' shows the following details:

- john
- Types: foaf:Person
- RDF rank: 0.76 (represented by a green progress bar)
- foaf:familyName: Someone
- foaf:givenName: John

A text box at the bottom right explains: "L'RDF Rank delle risorse viene mostrato nel pannello laterale, determina la dimensione dei nodi e quali connessioni vengono mostrate."

Rendiamo più interessante la descrizione delle istanze (1/3)



Import | GraphDB Workbench

localhost:7200/import#user

Import RDF data from a text snippet

```

:john foaf:homepage <http://example.org/users/john> .
<http://example.org/users/john> a foaf:Document .

:mary foaf:homepage <http://example.org/users/mary> .
<http://example.org/users/mary> a foaf:Document .

:philip foaf:homepage <http://example.org/users/philip> .
<http://example.org/users/philip> a foaf:Document .

:alice foaf:homepage <http://example.org/users/alice> .
<http://example.org/users/alice> a foaf:Document .

```

Start import automatically

Cancel Format: Turtle Import

Text snippet 2018-10-11 17:13:04.567 Import

Text snippet 2018-10-11 17:12:33.702
Imported successfully in less than a second. Import

Text snippet 2018-10-11 17:09:24.966
Imported successfully in less than a second. Import

Rendiamo più interessante la descrizione delle istanze (2/3)

```
@prefix : <http://example.org/> .

:bigGroup a foaf:Group ;
  foaf:name "Big Group" ;
  foaf:member :john, :mary, :philip .

:mediumGroup a foaf:Group ;
  foaf:name "Medium Group" ;
  foaf:member :john, :alice .

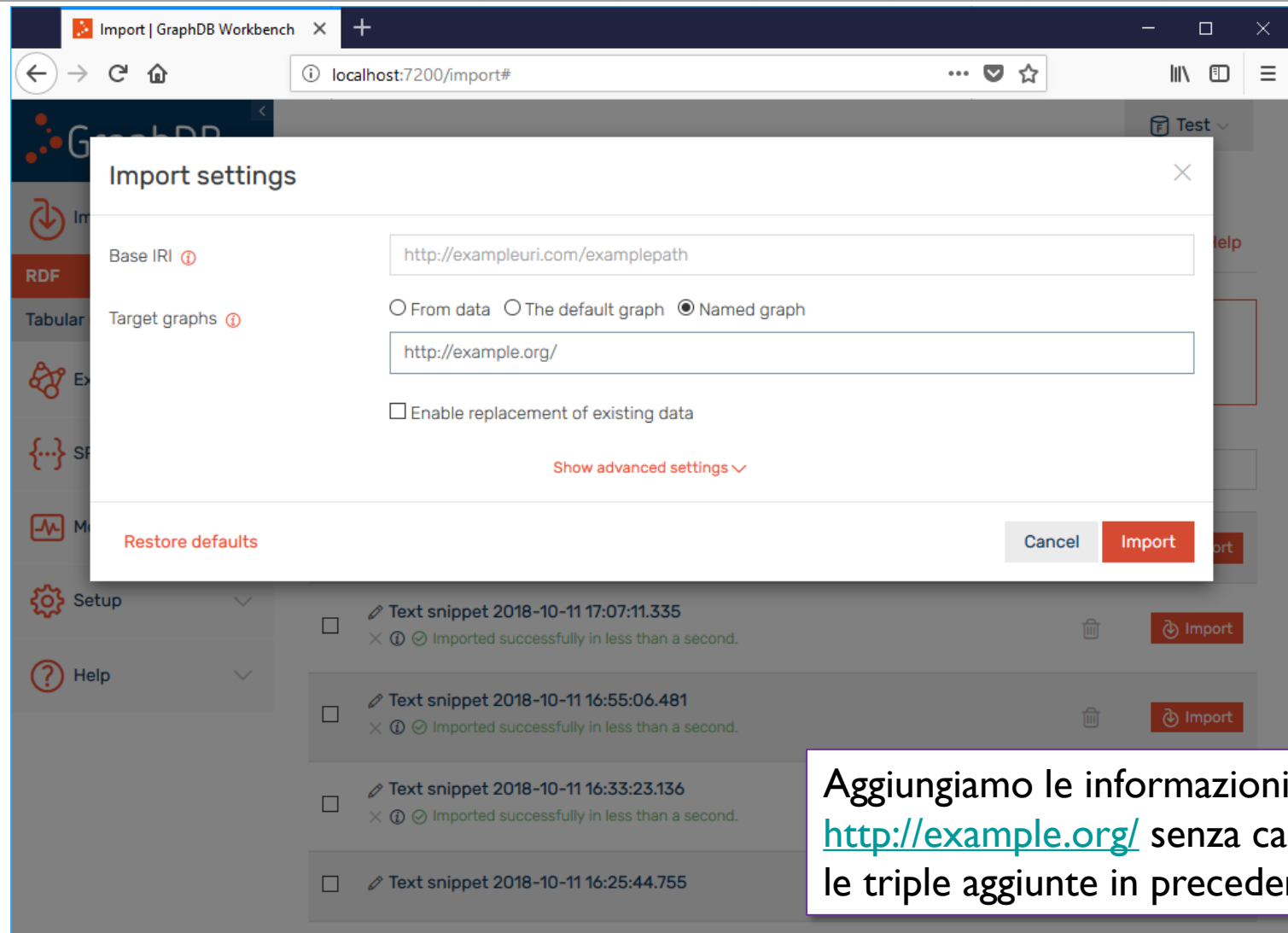
:john foaf:homepage
<http://example.org/users/john> .
<http://example.org/users/john> a
foaf:Document .
```

```
:mary foaf:homepage
<http://example.org/users/mary> .
<http://example.org/users/mary> a
foaf:Document .

:philip foaf:homepage
<http://example.org/users/philip> .
<http://example.org/users/philip> a
foaf:Document .

:alice foaf:homepage
<http://example.org/users/alice> .
<http://example.org/users/alice> a
foaf:Document .
```

Rendiamo più interessante la descrizione delle istanze (3/3)



The screenshot shows the 'Import settings' dialog box in GraphDB Workbench. The 'Base IRI' field is set to 'http://exampleuri.com/examplepath'. The 'Target graphs' section has three radio buttons: 'From data', 'The default graph', and 'Named graph', with 'Named graph' selected. Below this, the 'Target graphs' field is set to 'http://example.org/'. There is an unchecked checkbox for 'Enable replacement of existing data'. At the bottom of the dialog, there are buttons for 'Restore defaults', 'Cancel', and 'Import'. The background shows a list of imported text snippets with their timestamps and a status of 'Imported successfully in less than a second.'

Aggiungiamo le informazioni al grafo <http://example.org/> senza cancellare le triple aggiunte in precedenza

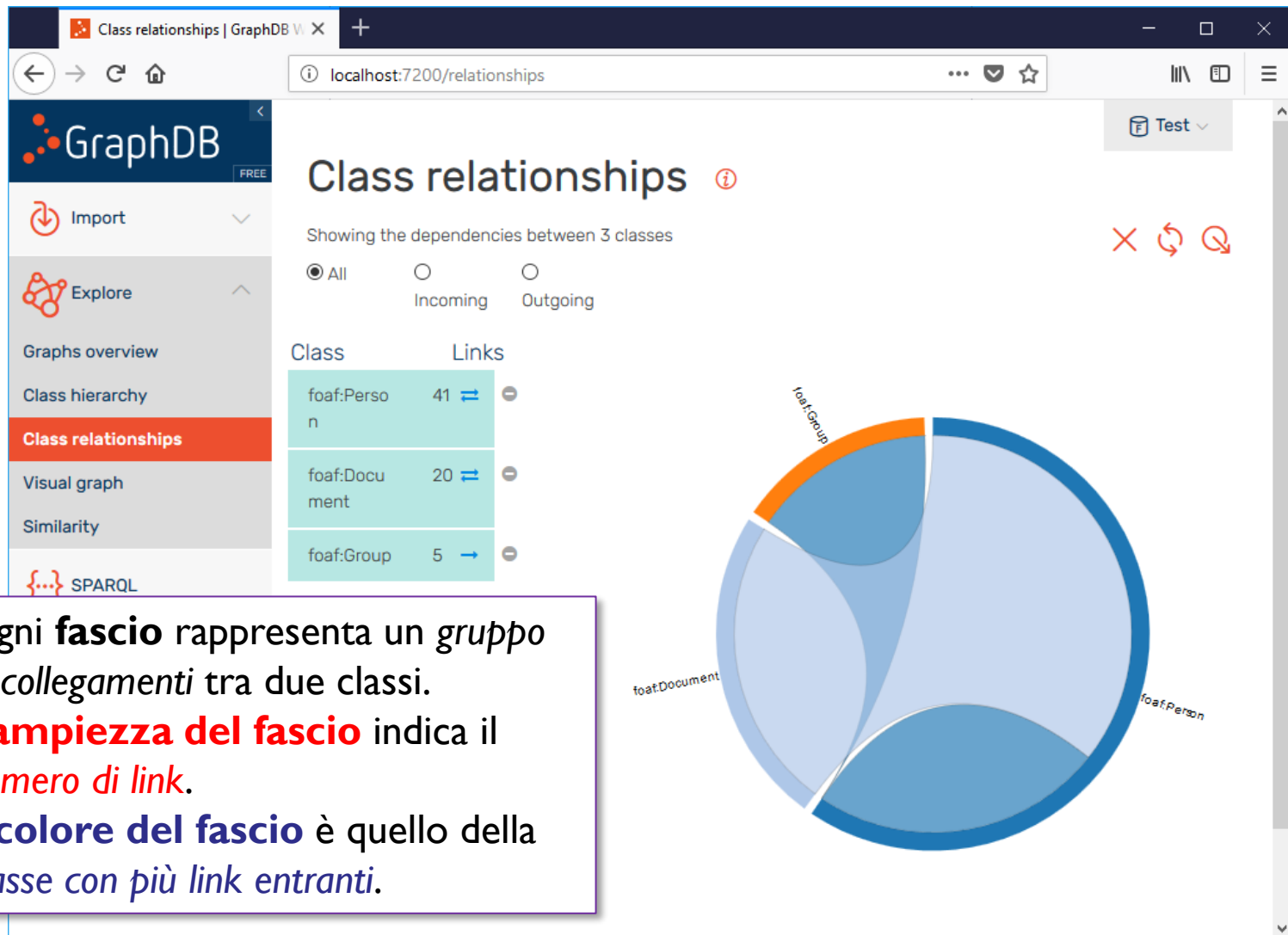
Calcolo incrementale dell'RDF Rank

The screenshot shows the GraphDB web interface for the 'RDF Rank' tool. The browser address bar shows 'localhost:7200/rdfrank'. The left sidebar contains navigation options: Import, Explore, SPARQL, Monitor, Setup, Repositories, Users and Access, My Settings, Connectors, Namespaces, Autocomplete, RDF Rank (highlighted), and Help. The main content area is titled 'RDF Rank' and shows the status for repository 'Test' as 'Outdated'. Two buttons are visible: 'Compute Full' and 'Compute Incremental'. A hand cursor is clicking on the 'Compute Incremental' button. Below this, there is a 'Filtering' section with a toggle set to 'ON'. Under 'Filtering', there are two toggle switches: 'Include Explicit' (set to YES) and 'Include Implicit' (set to YES). There are two tabs: 'Graphs' and 'Predicates'. Under the 'Graphs' tab, there is an 'Included' section with a text input field containing 'http://example.org/' and an 'Add Included Graphs' button. Below that is an 'Excluded' section with an 'Add Excluded Graphs' button.

Explore – Class Relationships - Aggiornamento

The screenshot shows the GraphDB web interface. The browser address bar displays `localhost:7200/relationships`. The main content area is titled "Class relationships" and contains a yellow warning message: "The currently selected repository contains no dependencies data. Please, reload the diagram if you have imported data recently." A blue button labeled "Reload Diagram" with a circular refresh icon is positioned on the right side of the warning. A hand cursor is pointing at this button. The left sidebar contains a navigation menu with the following items: Import, Explore, Graphs overview, Class hierarchy, Class relationships (highlighted in red), Visual graph, Similarity, SPARQL, Monitor, Setup, and Help. The top right of the interface has a "Test" button.

Explore – Class Relationships (1/2)

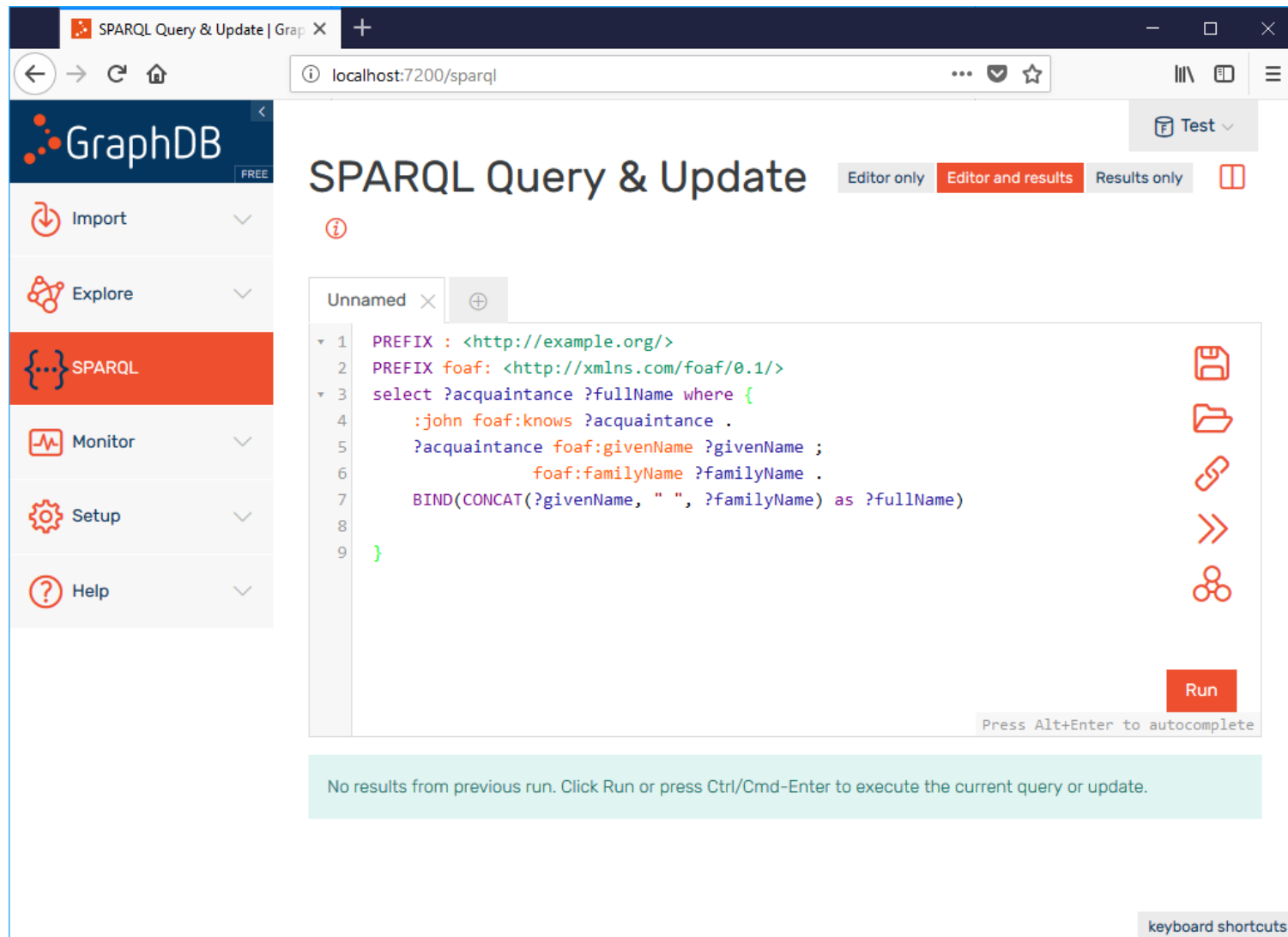


Ogni **fascio** rappresenta un *gruppo di collegamenti* tra due classi.
 L'**ampiezza del fascio** indica il *numero di link*.
 Il **colore del fascio** è quello della *classe con più link entranti*.

Explore – Class Relationships (2/2)

Il diagramma *class relationships* visualizza ed aiuta a comprendere le relazioni tra le classi come sono determinate da collegamenti effettivi tra le loro istanze.

Query SPARQL (1/6)



SPARQL Query & Update | GraphDB

localhost:7200/sparql

GraphDB FREE

Import

Explore

SPARQL

Monitor

Setup

Help

SPARQL Query & Update

Editor only Editor and results Results only

Test

Unnamed

```

1 PREFIX : <http://example.org/>
2 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
3 select ?acquaintance ?fullName where {
4     :john foaf:knows ?acquaintance .
5     ?acquaintance foaf:givenName ?givenName ;
6                 foaf:familyName ?familyName .
7     BIND(CONCAT(?givenName, " ", ?familyName) as ?fullName)
8
9 }

```

Run

Press Alt+Enter to autocomplete

No results from previous run. Click Run or press Ctrl/Cmd-Enter to execute the current query or update.

keyboard shortcuts

Query SPARQL (2/6)

The screenshot shows the GraphDB SPARQL Query & Update interface. The browser address bar shows localhost:7200/sparql. The query editor contains the following SPARQL query:

```

1 PREFIX : <http://example.org/>
2 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
3 select ?acquaintance ?fullName where {
4     :john foaf:knows ?acquaintance .
5     ?acquaintance foaf:givenName ?givenName ;
6                 foaf:familyName ?familyName .
7     BIND(CONCAT(?givenName, " ", ?familyName) as ?fullName)
8
9 }

```

The 'Run' button is highlighted with a hand cursor. Below the query editor, there are tabs for 'Table', 'Raw Response', 'Pivot Table', and 'Google Chart'. The 'Table' tab is selected, showing the following results:

	acquaintance	fullName
1	:mary	Mary Someone else
2	:philip	Philip The One
3	:alice	Alice Cetara

At the bottom right of the interface, there is a 'Download as' button and a 'keyboard shortcuts' dropdown menu.

Query SPARQL (3/6)

SPARQL Query & Update | GraphDB

localhost:7200/sparql

```

4
5
6 PREFIX : <http://example.org/>
7 SELECT ?type {
8   :john a ?type .
9 }

```

Inferenza attivata

Run

Table Raw Response Pivot Table Google Chart Download as

Filter query results Showing results from 1 to 5 of 5. Query took 0.1s, moments ago.

	type
1	foaf:Agent
2	dcterms:Agent
3	foaf:Person
4	http://www.w3.org/2000/10/swap/pim/contact#Person
5	wgs:SpatialThing

keyboard shortcuts

Query SPARQL (4/6)

SPARQL Query & Update | GraphDB

localhost:7200/sparql

Test

Unnamed

```

1 PREFIX : <http://example.org/>
2 SELECT ?type {
3   :john a ?type .
4 }

```

Inferenza disattivata

Run

Table Raw Response Pivot Table Google Chart Download as

Filter query results Showing results from 1 to 1 of 1. Query took 0.1s, minutes ago.

	type
1	foaf:Person

keyboard shortcuts

Query SPARQL (5/6)

SPARQL Query & Update

Editor only Editor and results Results only

```

1 PREFIX : <http://example.org/>
2 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
3 select ?acquaintance ?fullName where {
4     :john foaf:knows ?acquaintance .
5     ?acquaintance foaf:givenName ?givenName ;
6                 foaf:familyName ?familyName .
7     BIND(CONCAT(?givenName, " ", ?familyName) as ?fullName)
8 }
9

```

Salvare query

Aprire query salvata

Link alla query

Run

Enter to autocomplete

or update.

keyboard shortcuts

Import

Explore

SPARQL

Monitor

Setup

Help

GraphDB

localhost:7200/sparql

Test

SPARQL Query & Update

Unnamed

1

2

3

4

5

6

7

8

9

Run

Enter to autocomplete

or update.

keyboard shortcuts

Espandi i risultati su tutti i nodi owl:sameAs, oppure considera soltanto il rappresentante di ciascuna classe di equivalenza

Query SPARQL (6/6)

The screenshot shows a web browser window with the URL `localhost:7200/sparql`. The page title is "SPARQL Query & Update | GraphDB". The query editor contains the following code:

```

1 PREFIX : <http://example.org/>
2 SELECT ?type {
3   :fish a ?type

```

An "Editor grafici" (Graphical Editor) window is open, showing various chart and map options. The "Grafici" tab is active. The "Nome grafico" field contains "type". The "foaf:Person" type is selected in the list. The "Altri" (Others) category is expanded, showing a table with the following data:

A	B	C	D
14	25	36	47
25	36	47	58
36	47	58	69

Other graphical options visible include Linea, Area, Colonna, Barra, A dispe..., Torta, Mappa, and Tendenza. The "Altri" category also includes a "Pets" diagram showing a hierarchy: Pets (Cats, Dogs) and a 2x2 grid labeled A, B, C, D.

È possibile usare Google Chart per visualizzare i risultati di una query usando vari tipi di grafici e mappe

GraphDB implementa il reasoning usando la strategia di **materializzazione completa**:

Applica iterativamente tutte le regole definite nel ruleset selezionato finché non riesce più ad inferire nuove triple.

Il costo del reasoning viene trasferito sulle transazioni in **scrittura** (poiché tutto il processo di inferenza viene eseguito dopo le modifiche), mentre le transazioni in **lettura** sono **avvantaggiate** (poiché le triple inferite si trovano già pronte negli indici)

La semantica sottostante è **monotona**.

L'**aggiunta di una tripla** non può invalidare inferenze precedenti, ma soltanto permetterne di nuove:

è sufficiente proseguire con nuove iterazioni del processo di inferenza (partendo dalle regole attivate dalla nuova tripla)

La **rimozione di una tripla** può invalidare inferenze precedenti, ed una tripla inferita deve essere rimossa se non esiste nessun altro modo per derivarla senza usare la tripla rimossa:

La soluzione naive consiste nel riavviare il processo di reasoning da zero, ma ciò significa che il costo di una rimozione sarà sempre maggiore man mano che la taglia del repository cresce. GraphDB supporta anche qui un approccio incrementale: i) cerca in forward-chaining le triple che si possono inferire dalla tripla che è stata rimossa, ii) poi cerca in backward-chaining derivazioni per queste triple che non usano la tripla cancellata

Nella semantica di OWL **owl:sameAs** è una proprietà riflessiva, simmetrica e transitiva, cioè una **relazione di equivalenza**.

Ciò significa che se ho N risorse *sameAs* tra di loro, avrò N^2 *sameAs* ed ogni statement che coinvolge ciascuna risorsa viene ripetuto per tutte le altre.

GraphDB offre una implementa non rule-based di owl:sameAs, per cui questi gruppi di risorse sono rappresentati esplicitamente come classi di equivalenza, ciascuna dotata di un rappresentate che viene usato come identificatore della classe, e per rappresentare in maniera più compatta tutti gli statement che coinvolgono i membri della classe.

GraphDB supporta query geospaziali e fulltext search, (usando opportuni indici):

- <http://graphdb.ontotext.com/documentation/free/full-text-search.html>
- <http://graphdb.ontotext.com/documentation/free/geosparql-support.html>

Anche nel caso della fulltext search, è possibile aggiornare gli indici in maniera incrementale dopo cambiamenti dei dati.

OntoRefine

OntoRefine | GraphDB Worker

localhost:7200/ontorefine

GraphDB FREE

Import

RDF

Tabular (OntoRefine)

Explore

SPARQL

Monitor

Setup

Help

OntoRefine

Create Project

Create a project by importing data. What kinds of data files can I import?
TSV, CSV, *SV, Excel (.xls and .xlsx), JSON, XML, RDF as XML, and Google Data documents are all supported. Support for other formats can be added with OpenRefine extensions.

Open Project

Import Project

Language Settings

Get data from

Locate one or more files on your computer to upload:

This Computer Nessun file selezionato.

Web Addresses (URLs)

Clipboard

Next >>

Preferences

Help

About

Per importare dati (prevalentemente) in formati tabulari e trasformarli in RDF

References

1. Ontotext GraphDB. <http://graphdb.ontotext.com/>
2. Bishop, B., Kiryakov, A., Ognyanoff, D., Peikov, I., Tashev, Z., & Velkov, R. (2011). [OWLIM: A family of scalable semantic repositories](#). Semantic Web, 2(1), 33-42.