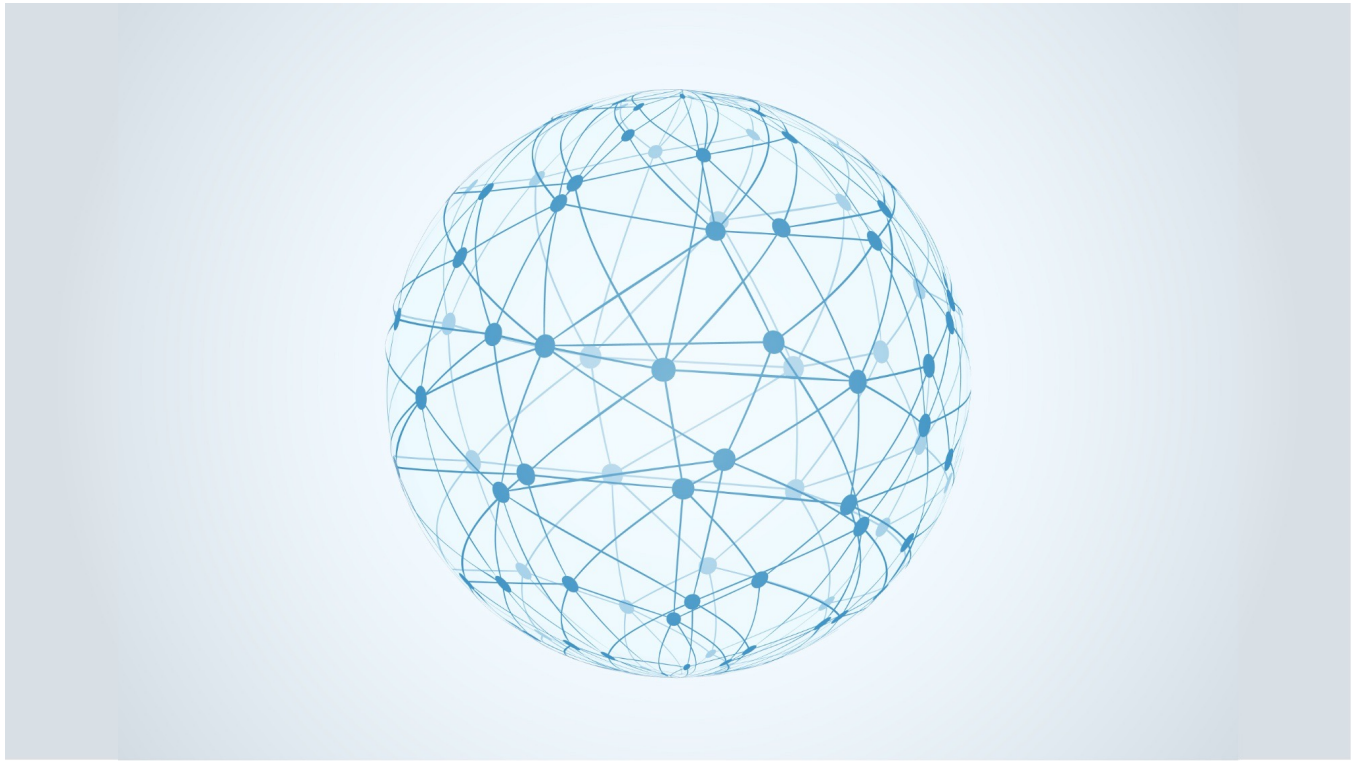
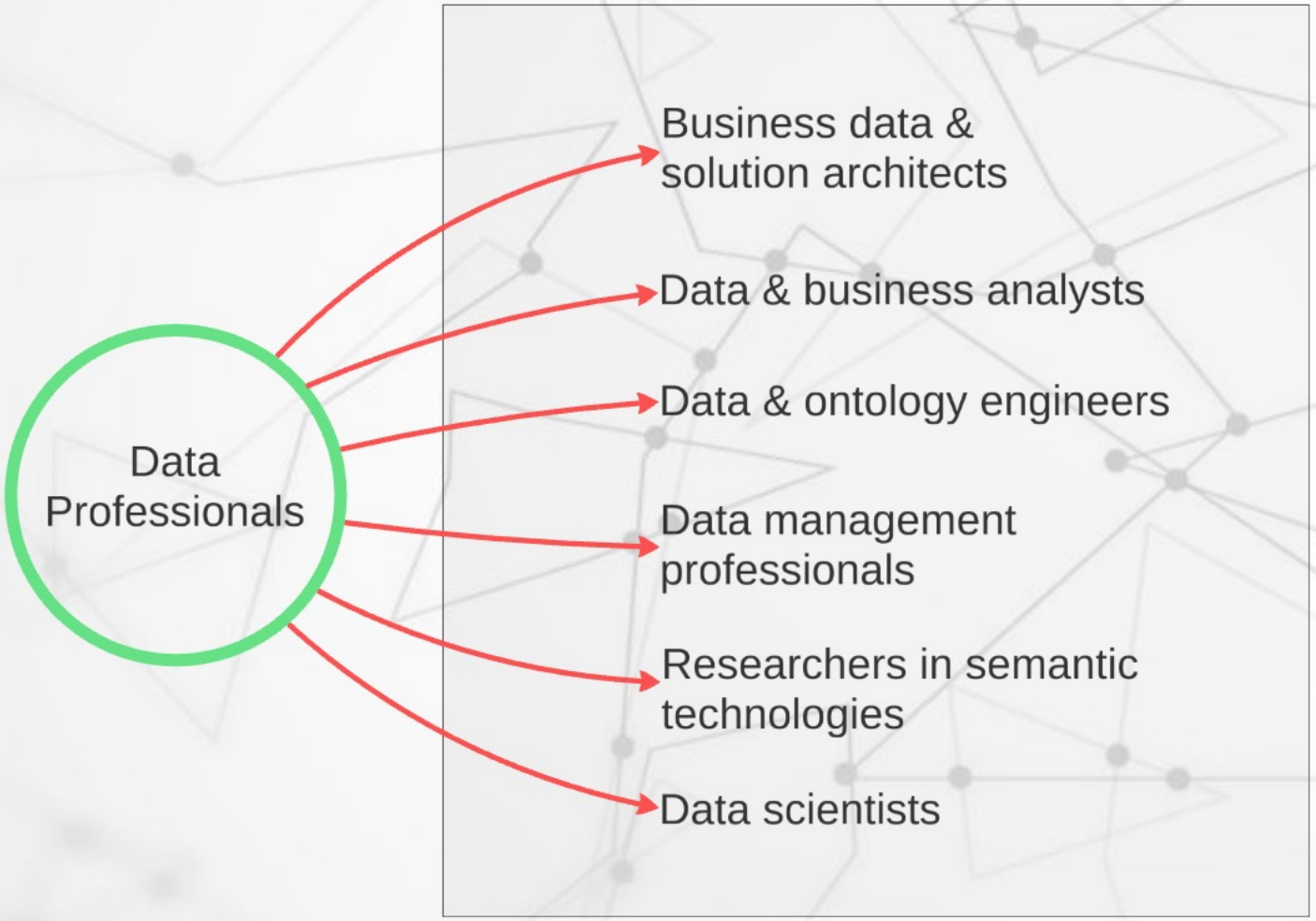
RDF and SPARQL Essentials



01 Introduction

Audience

Without prior hands-on RDF & SPARQL exposure



Learning Objectives

SPARQL exposure

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gineers

mantic

Develop a good understanding of modern semantic data technologies

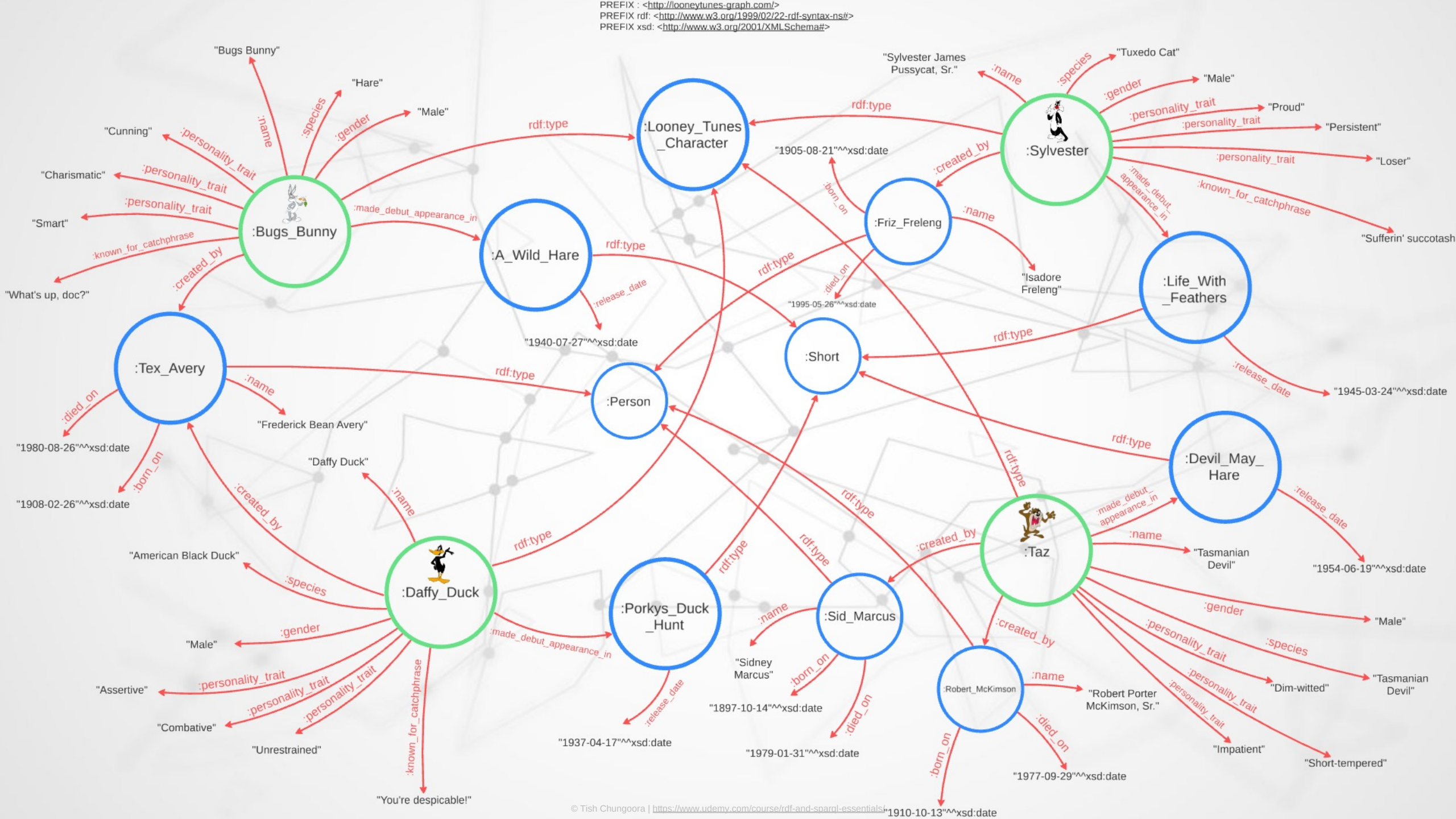
Comfortably speak RDF & SPARQL

Compose RDF data & perform CRUD (create, read, update, delete) operations using SPARQL

Build a rock-solid foundation for more advanced training in semantic approaches

Outcomes

02 Building blocks of an RDF graph



:Bugs_Bunny

[Subject]

:made_debut_appearance_in

[Predicate]

[Object]

:A_Wild_Hare

"1940-07-27"^^

Triple

(a.k.a. statement)

RDF Nodes

There are three kinds of nodes in RDF: IRI, Literal and Blank Node

Internationalized Resource Identifier (IRI)

Literal

“Bugs Bunny”

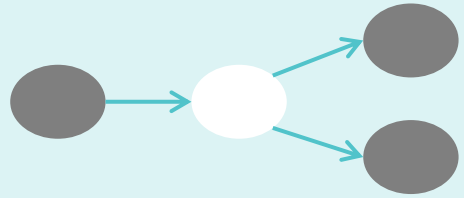
“1940-07-27”^^xsd:date

.

.

.

Blank Node



Optional. Avoid as much as possible

Literal

Datatype values

Serialization	Datatype
“Bugs Bunny”	xsd:string
“Bugs Bunny”^^xsd:string	xsd:string
“Bugs Bunny”@en	rdf:langstring
“1940-07-27”^^xsd:date	xsd:date
101	xsd:integer
2.0	xsd:decimal
True	xsd:boolean

03 Authoring RDF graph data

Blazegraph Workbench

localhost:9999/blazegraph/#update

blazegraph workbench

ultra-scalable, high-performance database from Blazegraph

SEARCH:

WELCOME | QUERY | UPDATE | EXPLORE | NAMESPACES | STATUS | PERFORMANCE

Current namespace: kb

Wiki - SPARQL Update

Namespace shortcuts: Bigdata | W3C | Dublin Core | Social/Other | Custom | Edit

```
PREFIX : <http://looneytunes-graph.com/>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>

# Bugs Bunny
:Bugs_Bunny a :Looney_Tunes_Character ;
  :name "Bugs Bunny" ;
  :species "Hare" ;
  :gender "Male" ;
  :made_debut_appearance_in :A_Wild_Hare ;
  :created_by :Tex_Avery ;
  :personality_trait "Cunning" , "Charismatic" , "Smart" ;
  :known_for_catchphrase "What's up, doc?" .

# A Wild Hare
:A_Wild_Hare a :Short ;
  :release_date "1940-07-27"^^xsd:date .

# Tex Avery
:Tex_Avery a :Person ;
  :name "Frederick Bean Avery" ;
  :born_on "1908-02-26"^^xsd:date ;
  :died_on "1980-08-26"^^xsd:date .
```

Choose file | No file chosen

Type: RDF Data | Format: Turtle

Advanced features

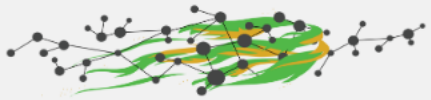
Update

Blazegraph - Wiki

04 Querying with SPARQL: The essentials

Blazegraph Workbench

localhost:9999/blazegraph/#query



blazegraph workbench

ultra-scalable, high-performance database from Blazegraph

SEARCH:

WELCOME | QUERY | UPDATE | EXPLORE | NAMESPACES | STATUS | PERFORMANCE

Current namespace: kb

Wiki - SPARQL Query

Namespace shortcuts: Bigdata | W3C | Dublin Core | Social/Other | Custom | Edit

```
# Using BIND, COALESCE and IF
PREFIX : <http://looneytunes-graph.com/>

SELECT ?n ?result
WHERE {
    ?c :made_debut_appearance_in ?m ;
        :name ?n .
    ?m :release_date ?d .

    BIND(year(?d) AS ?dYear)

    BIND(
    COALESCE(
        IF(?dYear >= 1946 && ?dYear <= 1950, "Released during post-war era", 1/0),
        IF(?dYear >= 1939 && ?dYear <= 1945, "Released during WW2", 1/0),
        IF(?dYear >= 1918 && ?dYear <= 1938, "Released during interwar period", 1/0),
        "Other era"
        ) AS ?result
    )
}
ORDER BY ASC(?n)
```

Advanced features

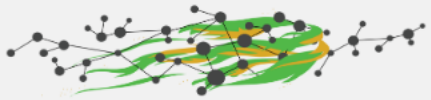
Execute | Clear

Blazegraph - Wiki

05 Querying with SPARQL: Property paths

Blazegraph Workbench

localhost:9999/blazegraph/#query



blazegraph workbench

ultra-scalable, high-performance database from Blazegraph

SEARCH:

WELCOME | QUERY | UPDATE | EXPLORE | NAMESPACES | STATUS | PERFORMANCE

Current namespace: kb

Wiki - SPARQL Query

Namespace shortcuts: Bigdata | W3C | Dublin Core | Social/Other | Custom | Edit

```
## Sequence path - List characters who are related via a path that involves the predicates :enemy_of followed by :rival_of
PREFIX : <http://looneytunes-graph.com/>

SELECT ?c1 ?c2
WHERE {
   ?c1 :enemy_of/:rival_of ?c2
}
```

Advanced features

Execute | Clear

Blazegraph - Wiki

06 SPARQL Update

Blazegraph Workbench

localhost:9999/blazegraph/#update

blazegraph workbench

ultra-scalable, high-performance database from Blazegraph

SEARCH:

WELCOME | QUERY | UPDATE | EXPLORE | NAMESPACES | STATUS | PERFORMANCE

Current namespace: kb

Wiki - SPARQL Update

Namespace shortcuts: Bigdata | W3C | Dublin Core | Social/Other | Custom | Edit

```
# Insert new statements based on certain patterns, e.g. the predicate 'knows' is a reciprocal relation
PREFIX : <http://looneytunes-graph.com/>

INSERT {
    ?c2 :knows ?c1
}
WHERE {
    ?c1 :knows ?c2
}
```

Choose file | No file chosen

Type: SPARQL Update Format: Turtle

Advanced features

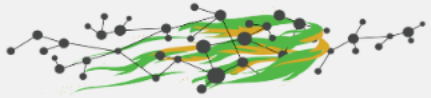
Update

Blazegraph - Wiki

07 Introducing Named Graphs

Blazegraph Workbench

localhost:9999/blazegraph/#query



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SEARCH:

WELCOME | QUERY | UPDATE | EXPLORE | NAMESPACES | STATUS | PERFORMANCE

Current namespace: kb

Wiki - SPARQL Query

Namespace shortcuts: Bigdata | W3C | Dublin Core | Social/Other | Custom | Edit

```
PREFIX : <http://looneytunes-graph.com/>
PREFIX mfg: <http://myfavs-graph.com/>

SELECT *
FROM :Looney_Tunes_Graph
WHERE {
    ?s ?p ?o
}
LIMIT 10
```

Advanced features

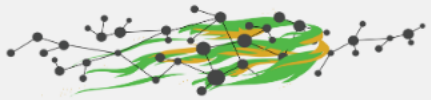
Execute | Clear

Blazegraph - Wiki

08 Exploring the graph schema

Blazegraph Workbench

localhost:9999/blazegraph/#query



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SEARCH:

WELCOME | QUERY | UPDATE | EXPLORE | NAMESPACES | STATUS | PERFORMANCE

Current namespace: kb

Wiki - SPARQL Query

Namespace shortcuts: Bigdata | W3C | Dublin Core | Social/Other | Custom | Edit

```
# What are the types of things that exist in the graph?
SELECT DISTINCT ?t
WHERE {
    ?s a ?t
}
GROUP BY ?t
ORDER BY ASC(?t)
```

Advanced features

Execute Clear

Blazegraph - Wiki

09 Course wrap-up