Linking Enterprise Data

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“Business model for the Semantic Web” [Berners-Lee]

- **Integrating data sources of a corporation is expensive.**
  - ~N^2 point to point connections between N systems
- **Using SW technologies can cut down these costs.**
  - N RDF views of the N systems

However,
adoption of SW technologies in companies remains slow.

- **SW technologies are often simply overlooked,**
  - Not advertised by solution providers
- **or considered as promising**
  - but not ready to be used right now
- **Even a negative prejudice**
  - yet another technological hype, whose promises have been heard many times before.

- **“We already have XML and Web Services. Why do we need SW?”**

Linking Open Data / Linking Enterprise Data

- **The “Linking Open Data” community initiative:**
  - a major contribution to the concretization of the Web of Data
    - Proof of feasibility
    - Best practices

- **Why not try the same strategy in an enterprise?**
  - to publish enterprise data as linked data
  - to produce guidelines, sample code,
  - to give examples of applications using that data.

Envisioning one company's Information Systems as a space of linked data

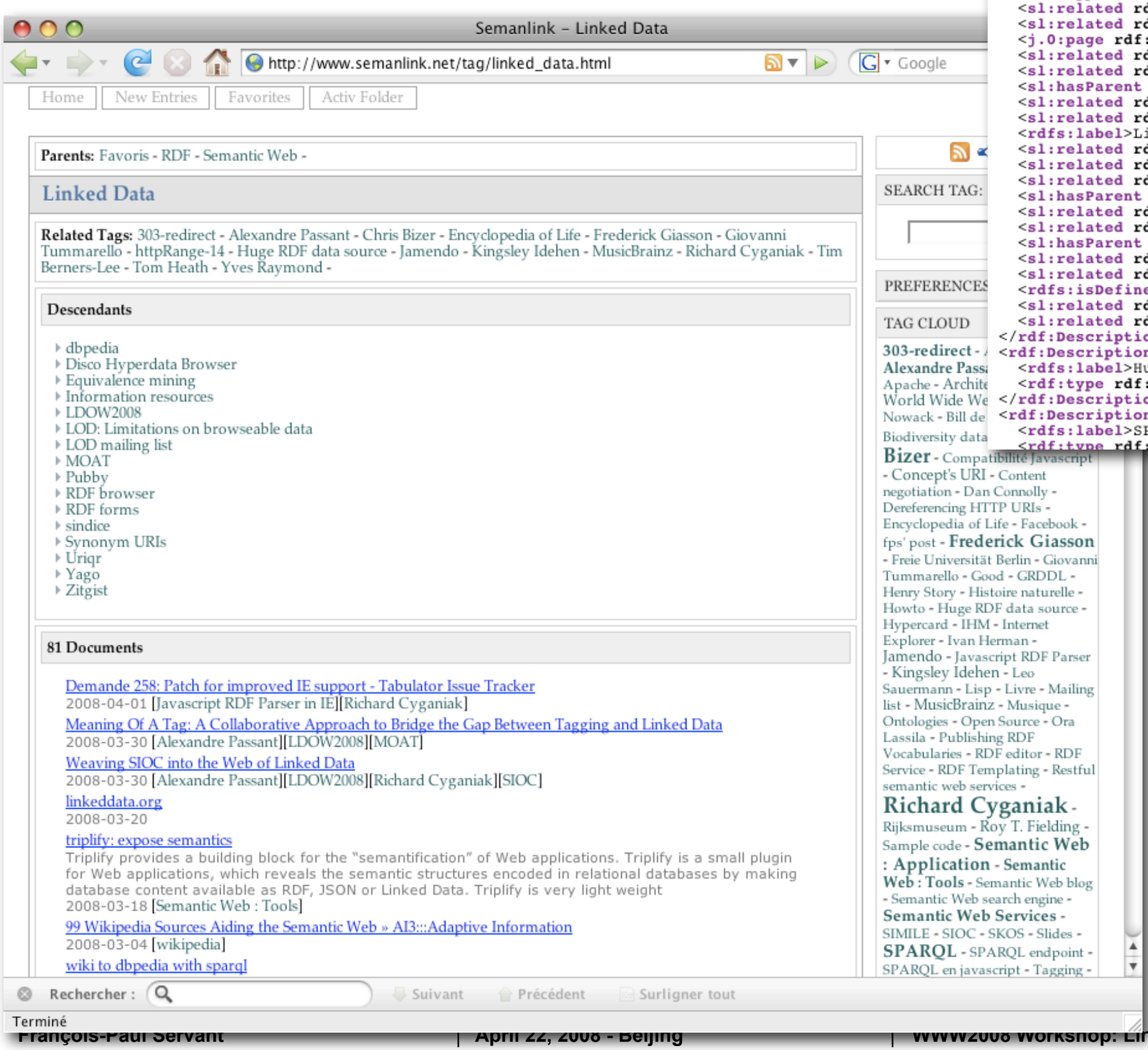
- **Linked Data principles provide effective solutions for 2 questions regarded by Renault as priorities for its IS architecture:**
  - data repositories
  - services

- **Our work was intended to demonstrate that**

Summary of what we did

- **Publishing of a data repository as Linked Data**
  - REST service returning RDF to requests made by programs
- **Implementation of a (very) simple RDF browser**
  - Provides the HTML web application
- **Access to the data from an outer application**

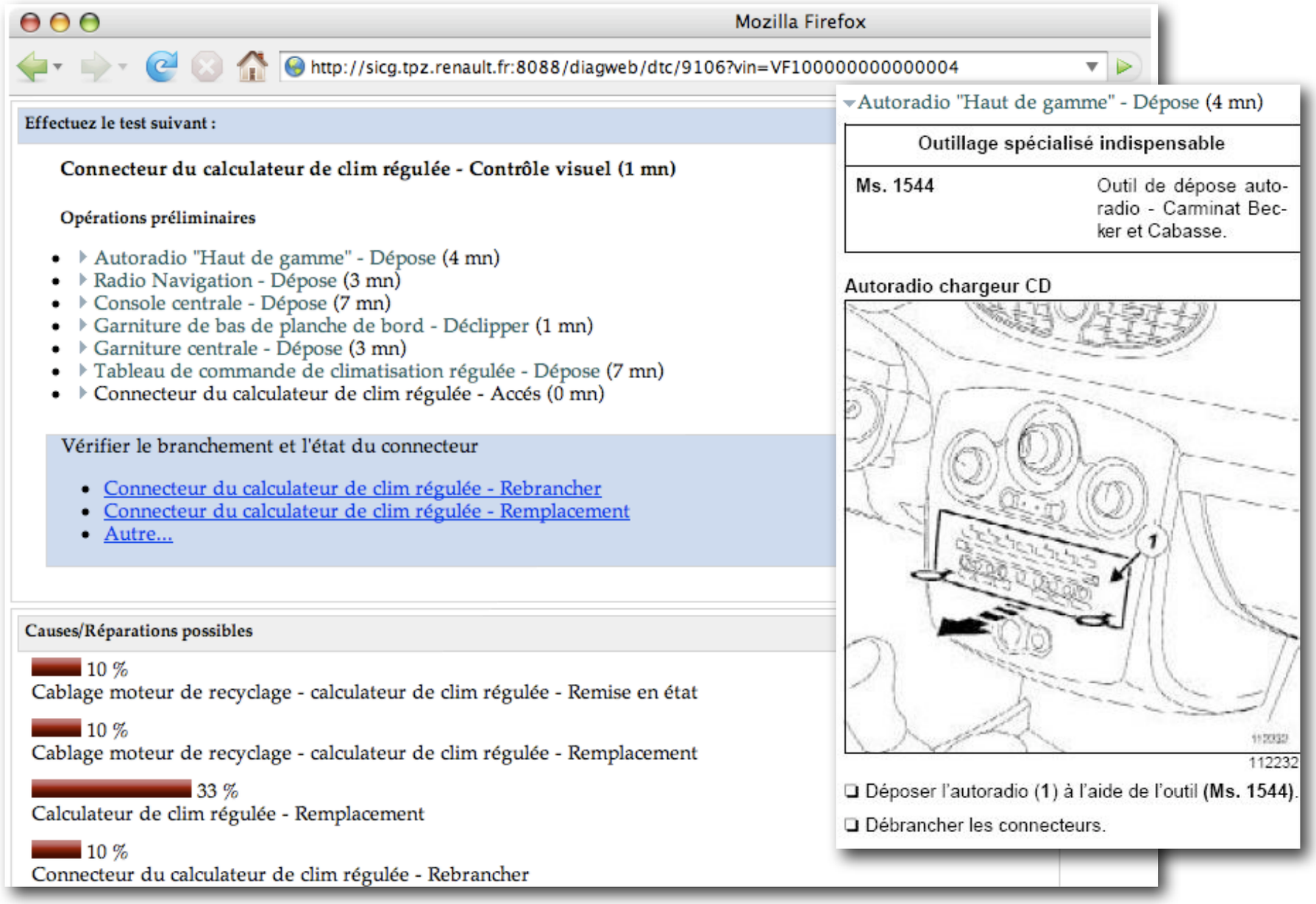
Previous experiences with Linked Data: www.semanlink.net




```
<rdf:Description rdf:about="&tag;linked_data">
  <rdf:type rdf:resource="&sl;Tag"/>
  <sl:related rdf:resource="&tag;tom_heath"/>
  <sl:related rdf:resource="&tag;frederick_giasson"/>
  <j.0:page rdf:resource="&tag;linked_data.html"/>
  <sl:related rdf:resource="&tag;kingsley_idehen"/>
  <sl:related rdf:resource="&tag;giovanni_tummarello"/>
  <sl:hasParent rdf:resource="&tag;favoris"/>
  <sl:related rdf:resource="&tag;huge_rdf_data_source"/>
  <sl:related rdf:resource="&tag;tim_berners_lee"/>
  <rdfs:label>Linked Data</rdfs:label>
  <sl:related rdf:resource="&tag;musicbrainz"/>
  <sl:related rdf:resource="&tag;encyclopedia_of_life"/>
  <sl:related rdf:resource="&tag;httprange_14"/>
  <sl:hasParent rdf:resource="&tag;semantic_web"/>
  <sl:related rdf:resource="&tag;richard_cyganiak"/>
  <sl:related rdf:resource="&tag;chris_bizer"/>
  <sl:hasParent rdf:resource="&tag;rdf"/>
  <sl:related rdf:resource="&tag;alexandre_passant"/>
  <sl:related rdf:resource="http://www.semanlink.net/tag/303_redire
  <rdfs:isDefinedBy rdf:resource="&tag;linked_data.rdf"/>
  <sl:related rdf:resource="&tag;jamendo"/>
  <sl:related rdf:resource="&tag;yves_raymond"/>
</rdf:Description>
<rdf:Description rdf:about="&tag;huge_rdf_data_source">
  <rdfs:label>Huge RDF data source</rdfs:label>
  <rdf:type rdf:resource="&sl;Tag"/>
</rdf:Description>
<rdf:Description rdf:about="&tag;sparql">
  <rdfs:label>SPARQL</rdfs:label>
  <rdf:type rdf:resource="&sl;Tag"/>
```


RENAULT

Previous experiences with Linked Data: Prototype repository of repair and diagnostics operations



The field of the use case

- **Technical after-sales documentation**
  - A typical case for using SW technologies:
    - many objects need to be shared between many different systems,
      - ranging from engineering to repair shops,
      - in a rather complex process.

The repository

- **A dictionary of the terms that documentation writers may use**
  - Used to enforce an homogenous naming scheme throughout the whole documentation
  - Used to index repair and diagnostics methods, and to define links between documents
- **Why this repository ?**
  - Not available as a service
  - XML dump available
  - Well managed
  - Interesting uses
- **Content:**
  - for each term:
    - An identifying code
    - Labels (in 20 languages)
    - List of the corresponding "**Generic Parts**"
      - = link between repair documentation and spare parts catalogs
      - "Generic Parts": codification of the components of a car maintained by the Parts Department.
  - A SKOS-like hierarchy of the terms
    - Routine maintenance : Filters : Oil filter

Development environment

- **Java**
  - Servlet
  - Jena
- **Javascript**

Implementing Linked Data principles

- **Minting URIs for the items of the repository**
  - namespace / item_class / item_code
    - “Slash URI”
      - can be dereferenced one at a time
      - namespace / item_class / item_code ? param=val &...
- **“Non-Information Resources”**
  - “HTTP-range 14” (303 redirect, with content negotiation)
    - namespace / item_class / item_code
    - namespace / item_class / item_code.rdf
    - namespace / item_class / item_code.html

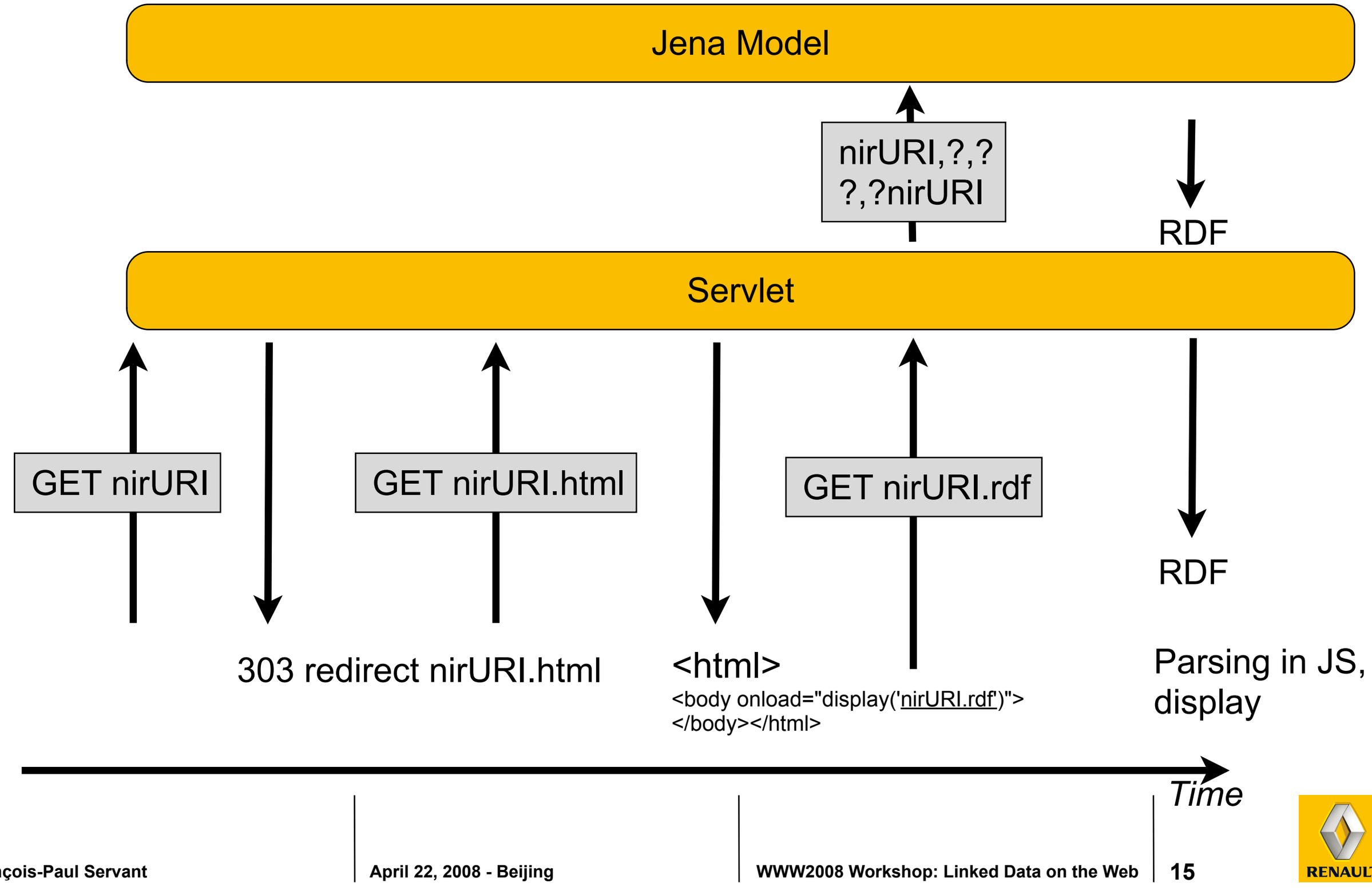
Answering requests for the RDF about an NIR

- **return all statements involving the NIR, either as subject or as object**
  - NIR_URI, ? , ?
  - ? , ?, NIR_URI
  - and a few more, such as
    - the links between nir, nir.rdf and nir.html
    - the labels of the returned resources that belong to the dataset

Answering requests for the HTML about an NIR

- **Several options are possible for HTML generation**
  - server side (JSP)
  - client side (Javascript)
- **Client side generation of HTML**
  - Tabulator's Javascript RDF parser
    - adapted to work with Internet Explorer
      - patch available at http://www.semanlink.net/files/2007/12/js-rdf-parser-ie-modifs2tabulator.zip
  - GET nirURI.html returns a quasi empty HTML page, containing a script that downloads nirURI.rdf and displays it
  - Advantages
    - clean separation of "view" and "model"
    - decreases load on the server
    - possibility to change the display without sending a new request to the server
    - incremental load of RDF data

Generating HTML on the client with Javascript



http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1943.html

insonorisant latéral de tablier

URI of resource: http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1943

Properties

- http://www.w3.org/1999/02/22-rdf-syntax-ns#type : http://sicg.tpz.renault.fr/sw/2007/10/rdc/schema#Element
- http://www.w3.org/2000/01/rdf-schema#label
  - cs : boční protihluková izolace příčky
  - de : seitliche Geräuschdämmmatte Stirnwand
  - el : πλευρικό ηχομονωτικό της ποδιάς
  - en : bulkhead side soundproofing
  - es : insonorizante lateral de tablero
  - fi : rintapellin sivuosan äänieristematto
  - fr : insonorisant latéral de tablier
  - hr : bočna zvučna izolacija pregradne stijene
  - hu : tűzfal oldalsó hangszigetelő burkolata
  - it : insonorizzante laterale del grembiale
  - ja : バルクヘッドサイド防音材
  - nl : geluidsisolatie aan de zijkant van het schutbord
  - pl : boczna wykładzina wygłuszająca przegrodę czołową
  - pt : insonorizante lateral de avental
  - ro : insonorizant lateral tablier
  - ru : боковая шумоизоляция щита передка
  - sl : stranski del protizvočne obloge pregradne stene
  - sv : ljudisolering på mellanbrädans sida
  - tr : göğüs sacı yan ses kesicisi
- http://sicg.tpz.renault.fr/sw/2007/10/rdc/schema#pg
  - http://sicg.tpz.renault.fr:8088/referentiel/rdc/pg/F10004/AF
  - http://sicg.tpz.renault.fr:8088/referentiel/rdc/pg/F10004/AG
- http://www.w3.org/2000/01/rdf-schema#isDefinedBy : http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1943.rdf
- is http://sicg.tpz.renault.fr/sw/2007/10/rdc/schema#son of : Insonorisants

Source de : http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1943.rdf

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE rdf:RDF [
  <!ENTITY rdf 'http://www.w3.org/1999/02/22-rdf-syntax-ns#'>]>
<rdf:RDF
    xmlns:j.0="http://sicg.tpz.renault.fr/sw/2007/10/rdc/schema#"
    xmlns:rdf="&rdf;"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" >
  <rdf:Description rdf:about="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1943"
    <rdf:type rdf:resource="http://sicg.tpz.renault.fr/sw/2007/10/rdc/schema#Element"/>
    <rdfs:label xml:lang="el">πλευρικό ηχομονωτικό της ποδιάς</rdfs:label>
    <rdfs:label xml:lang="nl">geluidsisolatie aan de zijkant van het schutbord</rdfs:label>
    <rdfs:label xml:lang="cs">boční protihluková izolace příčky</rdfs:label>
    <rdfs:label xml:lang="pt">insonorizante lateral de avental</rdfs:label>
    <rdfs:label xml:lang="hu">tűzfal oldalsó hangszigetelő burkolata</rdfs:label>
    <rdfs:label xml:lang="ru">боковая шумоизоляция щита передка</rdfs:label>
    <rdfs:label xml:lang="sv">ljudisolering på mellanbrädans sida</rdfs:label>
    <rdfs:label xml:lang="es">insonorizante lateral de tablero</rdfs:label>
    <j.0:pg rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/pg/F10004/AG"/>
    <rdfs:label xml:lang="en">bulkhead side soundproofing</rdfs:label>
    <rdfs:label xml:lang="fr">insonorisant latéral de tablier</rdfs:label>
```

Ligne 49, Colonne 46

“Generic Parts”

Broader term
(Parent in hierarchy)

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http://sicg.tpz.renault.fr:8088/referentiel/rdc/element_tree/28.html

engine

URI of resource: http://sicg.tpz.renault.fr:8088/referentiel/rdc/element_tree/28

"RDC Tree"

Broader term(s): engine and peripherals

Narrower term(s):

- combustion chamber
- complete engine
- cooling
- cylinder head
- engine block
- engine oil
- lubrication
- rotating parts
- supports
- TDC pressure
- valve timing
- wiring

Properties

- http://sicg.tpz.renault.fr/sw/2007/10/rdc/schema#son
  - combustion chamber
  - complete engine
  - cooling
  - cylinder head
  - engine block
  - engine oil
  - lubrication
  - rotating parts
  - supports
  - TDC pressure
  - valve timing
  - wiring
- http://www.w3.org/2000/01/rdf-schema#label
  - cs : motor

Source de : http://sicg.tpz.renault.fr:8088/referentiel/rdc/element_tree/28.rdf

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE rdf:RDF [
  <!ENTITY rdf 'http://www.w3.org/1999/02/22-rdf-syntax-ns#'>]>
<rdf:RDF
    xmlns:j.0="http://sicg.tpz.renault.fr/sw/2007/10/rdc/schema#"
    xmlns:rdf="&rdf;"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" >
  <rdf:Description rdf:about="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element_tree/
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/191"/>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/192"/>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1425"/>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/72"/>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/69"/>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/131"/>
    <rdfs:label xml:lang="nl">onderkant motor</rdfs:label>
    <rdfs:label xml:lang="it">parte inferiore motore</rdfs:label>
    <rdfs:label xml:lang="cs">dolní část motoru</rdfs:label>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1896"/>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/1741"/>
    <j.0:son rdf:resource="http://sicg.tpz.renault.fr:8088/referentiel/rdc/element/188"/>
    <rdfs:label xml:lang="es">bajos de motor</rdfs:label>
```

combustion chamber
- complete engine
- cooling
- cylinder head
  - camshaft
    - http://sicg.tpz.renault.fr:8088/referentiel/rdc/pg/ASS002488
  - camshaft dephaser sprocket bolt
  - camshaft oil seal, timing end
  - camshaft pulley mounting
  - camshaft sensor
    - http://sicg.tpz.renault.fr:8088/referentiel/rdc/pg/F14061/AA

camshaft sensor seal

Narrower terms

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Turning the solution into a simple, yet generic RDF browser

- With what we described until now, we can only dereference NIR from our own dataset
  - because it is Javascript that gets the RDF
  - Standard Javascript security restriction
  - Changing browser's default settings (as Tabulator does) was not an option
- We implemented the usual trick of the "HTTP proxy"
  - Requests to dereference externals URIs are sent to the servlet,
  - the servlet forwards them to the actual server,
  - and then returns the result.

Semanlink – Linked Data

http://www.semanlink.net/tag/linked_data.html

Home | New Entries | Favorites | Activ Folder

Semanlink page about a tag

Parents: Favoris - RDF - Semantic Web -

Linked Data

Related Tags: 303-redirect - Alexandre Passant - Chris Bizer - Encyclopedia of Life - Frederick Giasson - Giovanni Tummarello - httpRange-14 - Huge RDF data source - Jamendo - Kingsley Idehen - MusicBrainz - Richard Cyganiak - Tim Berners-Lee - Tom Heath - Yves Raymond -

Descendants

- dbpedia
- Disco Hyperdata Browser
- Equivalence mining
- Information resources
- LDOW2008
- LOD: Limitations on browseable data
- LOD mailing list
- MOAT
- Pubby
- RDF browser
- RDF forms
- sindice
- Synonym URIs
- Uriqr
- Yago
- Zitgist

81 Documents

Demande 258: Patch for improved IE support - Tabulator Issue Tracker
2008-04-01 [Javascript RDF Parser in IE][Richard Cyganiak]

Meaning Of A Tag: A Collaborative Approach to Bridge the Gap Between Tagging and Linked Data
2008-03-30 [Alexandre Passant][LDOW2008][MOAT]

Weaving SIOC into the Web of Linked Data
2008-03-30 [Alexandre Passant][LDOW2008][Richard Cyganiak][SIOC]

linkeddata.org
2008-03-20

triplify: expose semantics
Triplify provides a building block for the "semantification" of Web applications. Triplify is a small plugin for Web applications, which reveals the semantic structures encoded in relational databases by making database content available as RDF, JSON or Linked Data. Triplify is very light weight
2008-03-18 [Semantic Web : Tools]

99 Wikipedia Sources Aiding the Semantic Web » AI3:::Adaptive Information
2008-03-04 [wikipedia]

wiki to dbpedia with sparql

SEARCH TAG:

PREFERENCES...

TAG CLOUD

303-redirect - AJAR - Alexandre Passant - Alta... Apache - Architecture of t... World Wide Web - Benjan... Nowack - Bill de hÓra - Biodiversity data - Chris Bizer - Compatibilité Jav... - Concept's URI - Content negotiation - Dan Connolly - Dereferencing HTTP URIs - Encyclopedia of Life - Faceb... fps' post - Frederick Gi... - Freie Universität Berlin - G... Tummarello - Good - GRDI... Henry Story - Histoire natu... Howto - Huge RDF data so... Hypercard - IHM - Internet Explorer - Ivan Herman - Jamendo - Javascript RDF - Kingsley Idehen - Leo Sauermann - Lisp - Livre - ... list - MusicBrainz - Musiqu... Ontologies - Open Source - ... Lassila - Publishing RDF Vocabularies - RDF editor - Service - RDF Templating - semantic web services - Richard Cygania... Rijksmuseum - Roy T. Fiel... Sample code - Semantic : Application - Semant... Web : Tools - Semantic W... - Semantic Web search engi... Semantic Web Service... SIMILE - SIOC - SKOS - Sli... SPARQL - SPARQL end... SPARQL en javascript - Tag...

Rechercher : Suivant Précédent Surligner tout

Terminé

Linked Data

URI of resource: http://www.semanlink.net/tag/linked_data

"RDC Hierarchy"

Broader term(s): Favoris - RDF - Semantic Web

Narrower term(s):

- dbpedia
- Disco Hyperdata Browser
- Equivalence mining
- Information resources
- LDOW2008
- LOD mailing list
- LOD: Limitations on browseable data
- MOAT
- Pubby
- RDF browser
- RDF forms
- sindice
- Synonym URIs
- Uriqr
- Yago
- Zitgist

Same resource displayed by this project's RDF browser

Properties

- http://www.w3.org/1999/02/22-rdf-syntax-ns#type : http://www.semanlink.net/2001/00/semanlink-schema#Tag
- http://www.semanlink.net/2001/00/semanlink-schema#related
  - 303-redirect
  - Alexandre Passant
  - Chris Bizer
  - Encyclopedia of Life
  - Frederick Giasson
  - Giovanni Tummarello
  - httpRange-14
  - Huge RDF data source
  - Jamendo
  - Kingsley Idehen
  - MusicBrainz
  - Richard Cyganiak
  - Tim Berners-Lee
  - Tom Heath
  - Yves Raymond
- http://xmlns.com/foaf/0.1/page : http://www.semanlink.net/tag/linked_data.html
- http://www.semanlink.net/2001/00/semanlink-schema#hasParent
  - Favoris
  - RDF
  - Semantic Web
- http://www.w3.org/2000/01/rdf-schema#label : Linked Data
- http://www.w3.org/2000/01/rdf-schema#isDefinedBy : http://www.semanlink.net/tag/linked_data.rdf

- is http://www.semanlink.net/2001/00/semanlink-schema#tag of
  - 99 Wikipedia Sources Aiding the Semantic Web » AI3:::Adaptive Information

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Access to repository data from outer application

- **The repository, published as Linked Data, is a service**
  - easy to get connected to (HTTP GET)
  - no dedicated code is needed to understand its RDF data
    - a RDF parser is enough
- **Lets' use it!**

Véhicule

Car configurator
Here a partially defined car is shown

Objet : 007

X90

Objet : 008

L90 B90 F90 K90 U90

Objet : 011

CHANOR CHAAUG CHADIM

Objet : 013

One property of the car

E0 E1 E2 E3 E3S E2N

Possible values

Objet : 018

M0 M6 MJ MK MW MY AA AG M8 M9 MA MB MC MD ME MF MG MH ML MM MP MR MS MT MU MV ND1B NM1C NM1D NM2D

Objet : 019

Other property of the car (fuel type)

DIESEL ESS FLEXFL

Diesel is selected

Objet : 020

5PL 2PL 7PL

Objet : 026

ALLE ARGE AUTR BALK BELG BENG BOSN CHIL CROA CSIA CSIB CSIC CSID CSIF CSIG CSIJ CSIN CSIU CZSK DOME ESPA FRAN GREC HOLL HONG INDE ISRA ITAL MAGH MARO PARA PERO POLO PORT ROUM SLVN SLVQ SUIS TCHE TOME TURQ AFS4 AFSU BRES COLO GRBR IRAN IRIK IRLA IRSP MEX4 MEXI NORD PKTN RUSS VENE

Objet : 027

DD DG

Objet : 029

Pièces

"Generic Part" code

Pièce générique

F10004/AA

OK

(Saisir les pr

Part's reference for a generic part depend on car's properties (SAT problem)

Code éléme

OK

Menu RDC

Part references

Références

One reference

8465
DIESEL.
VAR: A=060111
- 6001548915
  - L90 / DIESEL / TLALLE, TLAUTR, TLBALK, TLBELG, TLCOLO, TLCSG2, TLCSIA, TLCSIB, TLCSIF, TLCSIG, TLCSIN, TLCZSK, TLDOME, TLESPA, TLFRAN, TLHOLL, TLHONG, TLISRA, TLITAL.
    VAR: A=060915
  - L90 / DIESEL / TLCROA, TLMAGH, TLMARO, TLPOLO, TLPORT, TLROUM, TLRUSS, TLSLO TLTCH
    VAR: A
  - F90, K9
- 600155068
  - L90 / ES TLBAL TLCRO TLFRA TLHON TLPOL TLSUIS
    VAR: A=060911
  - L90 / ESS / TLBENG, TLCHIL, TLCOLO, TLCSIA, TLCSIB, TLCSIC, TLCSID, TLCSIG,

Boolean formula of the properties of the car that tells whether the reference is used on that car

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Véhicule

Objet : 007

X90

Objet : 008

L90 B90 F90 K90 U90

Objet : 011

CHANOR CHAAUG CHADI

Objet : 013

E0 E1 E2 E3 E3S E2N

Objet : 018

M0 M6 MJ MK MW MY AA A … MM MP MR MS MT MU
MV ND1B NM1C NM1D NM2

Objet : 019

DIESEL ESS FLEXFL

Objet : 020

5PL 2PL 7PL

Objet : 026

ALLE ARGE AUTR BALK BI … C CSID CSIF CSIG CSIJ
CSIN CSIU CZSK DOME ESP … MAGH MARO PARA
PERO POLO PORT ROUM SI … U BRES COLO GRBR
IRAN IRIK IRLA IRSP MEX4 MEXI NORD PKTN RUSS VENE

Objet : 027

DD DG

Objet : 029

- accessories - breakdown - puncture
- bodywork
- chassis
- clutch - gearbox - transmission
- electrical/electronic management
- engine and peripherals
- general information
- heating system - climate control
- instruments
- opening element controls
- passenger compartment - tailgate
  - fittings
    - console
    - dashboard
    - interior trim
    - luggage compartment liner
    - opening element trims
    - rear parcel shelf
    - soundproofing
      - acoustic insert
        - bulkhead central soundproofing
        - bulkhead side soundproofing
        - bulkhead soundproofing
        - gearbox control unit soundproofing
  - interior accessory
  - lighting
  - seats
- routine vehicle maintenance
- safety
- visibility - signalling - exterior lighting
- wiring - connectors

Choose in the hierarchy defined in the repository of repair terms

Pièces

Pièce générique

OK

(Saisir les premiers caractères suffit)

Code élément RDC

1941

OK

Menu RDC

or enter term's code

1941 : INSONORISANT DE TABLIER

Références pour F16585/AC

- *Pas de référence correspondante*

Références pour F10004/AD

- *Pas de référence correspondante*

Références pour F10004/AB

- *Pas de référence correspondante*

Références pour F10004/AA

- 6001548465
  - L90 / DIESEL.
    VAR: A=060111
- 6001548915
  - L90 / DIESEL / TLALLE, TLAUTR, TLBALK, TLBELG, TLCOLO, TLCSG2, TLCSIA, TLCSIB, TLCSIF, TLCSIG, TLCSIN, TLCZSK, TLDOME, TLESPA, TLFRAN, TLHOLL, TLHONG, TLISRA, TLITAL.
    VAR: A=060915
  - L90 / DIESEL / TLCROA, TLMAGH, TLMARO, TLPOLO, TLPORT, TLROUM, TLRUSS, TLSLOV, TLSLVQ, TLSUIS, TLTCHE, TLTOME, TLTURQ.
    VAR: A=060915
  - F90, K90 / DIESEL.
- 6001550681

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Use of the repository for technical documentation

- clutch - gearbox - transmission
  - driveshaft
  - engaging the clutch
  - engine and gearbox assembly
  - final drive - wheel shafts
  - gearbox
    - complete gearbox
    - converter
    - converter lock-up
    - differential
    - fork
    - gearbox
    - gearbox lubricatior
    - housings

→

gearbox

URI of resource: http://127.0.0.1:8080/referentiel/rdc/element/101

Properties

- http://www.w3.org/2000/01/rdf-schema#label
  - cs : převodovka
  - de : Getriebe

Repair methods about gearbox

- Boîte de vitesses mécanique : Dépose - Repose
  - X90/D4D/JH3
  - (v:model==v:X90) AND (v:engine==v:Engine_D4D) AND (v:gearbox==v:Gearbox_JH3)
- Boîte de vitesses mécanique : Dépose - Repose
  - X90/K4M/JR5,JH3
  - (v:model==v:X90) AND (v:engine==v:Engine_K4M) AND ((v:gearbox==v:Gearbox_JR5) OR (v:gearbox==v:Gearbox_JH3))
- Boîte de vitesses mécanique : Dépose - Repose
  - X90/K9K_792/JR5,JH3
  - (v:model==v:X90) AND (v:engine6==v:Engine6_K9K_792) AND ((v:gearbox==v:Gearbox_JR5) OR (v:gearbox==v:Gearbox_JH3))
- Boîte de vitesses mécanique : Dépose - Repose
  - X90/K9K_790/JR5,JH3
  - (v:model==v:X90) AND (v:engine6==v:Engine6_K9K_790) AND ((v:gearbox==v:Gearbox_JR5) OR (v:gearbox==v:Gearbox_JH3))
- Boîte de vitesses mécanique : Dépose - Repose

→ Boolean formula of the characteristics of a car. Document applies for a given car iff this formula is true.

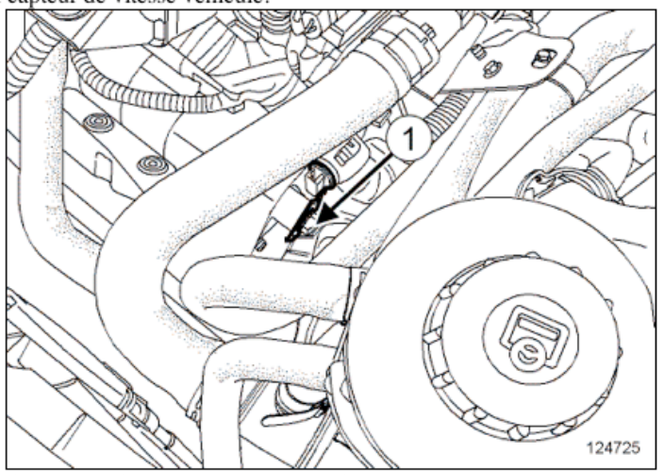
Dépose

1. étape de préparation à la dépose

Mettre le véhicule sur un pont élévateur à deux colonnes (voir Véhicule : Remorquage et levage) (MR 388, 02A, Moyen de levage).

IMPORTANT
Pour éviter une chute du véhicule, arrimer le véhicule au pont élévateur à l'aide d'une sangle.

Déposer :
la batterie (voir Batterie : Dépose - Repose) (MR 388, 80A, Batterie),
le bac à batterie,
l'écrou de la tresse de masse sur le support du calculateur d'injection,
le boîtier de filtre à air (voir Boîtier de filtre à air : Dépose - Repose) (MR 388, 12A, Mélange carburé),
le calculateur d'injection (voir Calculateur d'injection d'essence : Dépose - Repose) (MR 388, 17B, Injection essence),
la fixation du câblage sur le support du calculateur d'injection.
Débrancher :
le connecteur de la sonde à oxygène,
le connecteur du capteur de point mort haut,
le connecteur du capteur de vitesse vehicule.



Déposer le vis (1) du support du câblage sur la boîte de vitesses.
Dégrafer le câblage sur la culasse.

A (current) limitation of linked data principles

- **Attached to each document, there is an "Applicability"**
  - a Boolean formula of the characteristics of a car that defines the set of cars this document is relevant to.
- **When searching information for a repair, you're only concerned with the documents relevant to the car being repaired.**
- **It doesn't make sense to return the documents about all the cars:**
  - the client wouldn't be able to understand the Boolean formulae
  - Only the server can deal with them.
- **A form is needed**
  - Let's suppose that those formulae depend of 3 variables: v:model, v:engine and v:gearbox
  - In a web 1.0 application, a form would be displayed to the user, asking to enter values for those variables.
- **How can we handle that in the context of the web of data?**
  - With Linked Data, there is no standardized equivalent : no way for the server to request some input from the client

RDF Form

```
<rdf:Description
  rdf:about"rdc:gearbox">
  <form:hasForm><form:Form>
      <form:param
        rdf:resource="v:model"/>
     <form:param
        rdf:resource="v:engine"/>
    <form:param
        rdf:resource="v:gearbox"/>
  </form:Form></form:hasForm>
</rdf:Description >
```

Forms in the web of data

- **"The Semantic Web [...] is about making links, so that a person or machine can explore the web of data." [Berners-Lee]**
- **Beside hypertext links, forms are an important feature of the web.**
- **They are needed also in the web of data.**

Conclusion

- **Several other such points need to be discussed among the LOD community**
  - e.g., the question of the amount of data to return when fetching the URI of a NIR
- **Anyway, Linked Data principles proved to be effective in a corporate context:**
  - we published a repository as Linked Data
    - and that turned it into a service
      - easy to get connected to and easy to use
      - that fully respects the web architecture
        - » with immediate and free benefits (caching)
      - (this has to be compared with WS-* services)
    - the repository was simple, but the solution is largely reusable and expandable
- **We will now**
  - improve the prototype of technical documentation based on RDF metadata
  - and take all opportunities to continue working on Linked Data!

- **Thank you!**

Dealing with applicability

- **Use the VIN (“Vehicle Identification Number” - kind of URI for cars)**
  - Constructors manage a database of cars, indexed by VIN, and that stores their technical characteristics
  - We could define the URI of the “gearbox of a given car”, adding the VIN as parameter:
    - http://.../element/1018?vin=VF123...
    - http://.../element/1018 gives the list of all documents about gearbox
    - The VIN database gives the characteristics of car VF123..
    - The server evaluates the applicability of each document
    - returns the filtered list
  - But
    - this URI doesn’t fit well within Linked Data
    - we need a way for the server to answer to a GET http://.../element/1018

      “information for a given car available by passing the VIN as parameter”.
  - Also, cache is of little use for URIs with a parameter such as the VIN
    - the server can know that the applicabilities of the documents about gearbox involve only (for instance), the model of the car, its engine type and its gearbox type
    - So, it would be nice if the server were able to ask the client who dereferenced the URI of the gearbox:

      “please enter model, engine type and gearbox to get the document you’re concerned with.”