KGA

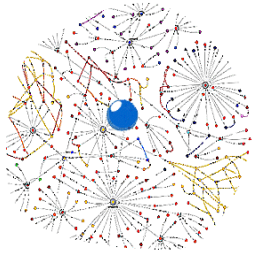
KNOWLEDGE GRAPH ALLIANCE

SLS-KG-WG

2024-05-24

SLS' WORKING GROUP
LAUNCHING WEBINAR

JEAN-CHARLES LECLERC
CLAUDE FAUCONNET



2024-05-04 SLS WG

Agenda

Introduction

- Industrial data challenge and pain points
- Semantic web technologies opportunities for business
- SKG context
- Market

What it is SLS presently ?

- Purpose of SLS
- Motivation and design principles
- Current State
- SLS Current core team
- Strengths and Weaknesses
- What's under the hood
- UI features
- Features overview short videos
- Demos

What comes next ?

- Ambition
- Topics proposal
- WG active members onboarding
- Conclusion

Introduction

Jean-Charles Leclerc (co-author of SLS)

TotalEnergies

Innovation & Standards

Data Strategy, Governance & Culture

IOGP/ISSC & EG

IOGP/JIP36 – CFIHOS

AFNOR IDMI & 3i WG

PCA BoD

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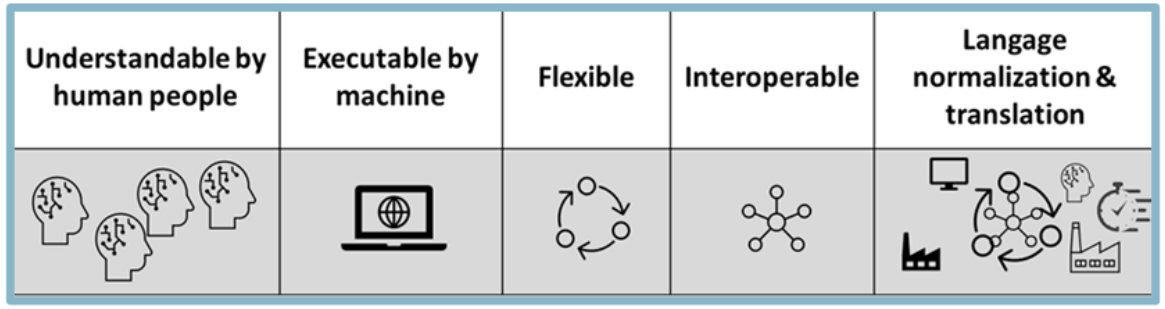
Industrial data challenges & pains points

Addressing better data valorization & exchanges challenges internally **&** with our partners

"meaning and *common sense"* as key developments driver.



"we still can't give protege to our end-users" …

Our common challenges

1-ontology discovery

2- ontologies comparison

3-ontologies linking

4 data exposition

5 data mapping

6 triples generation

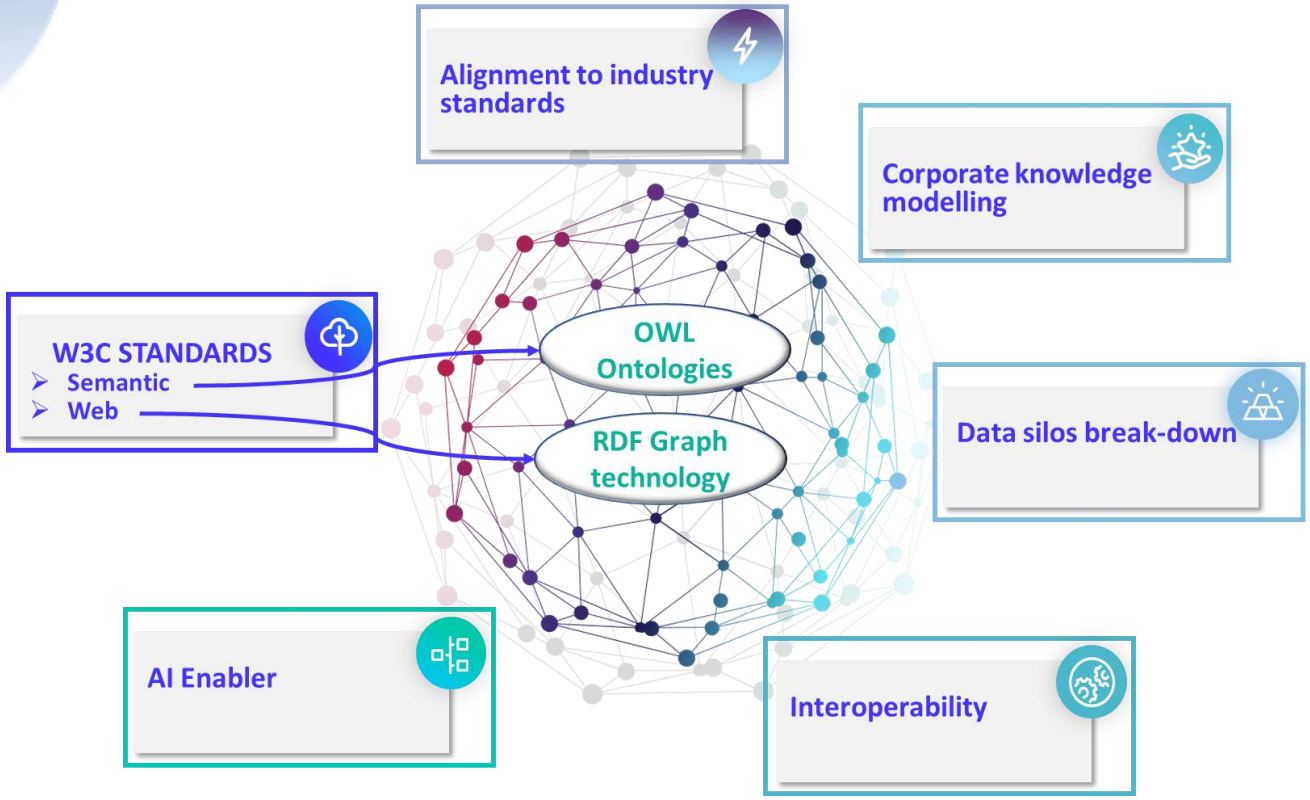
7 graph verification

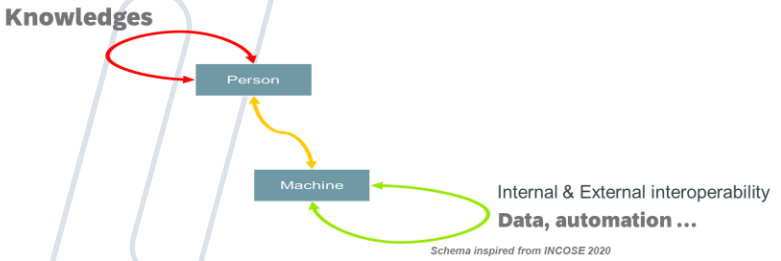
8 graph use

"Enable data exchange between applications, among different functions within organizations, between operators as well as across the supply chain to support further digitization and automation across the supply chain"

said P. Townson IOGP JIP36 during CFIHOS Summit 2022

Semantic web technologies opportunities for business





- Data composition – RDF Graphs
- Interoperability – Semantics

Today, we believe that **interoperability challenges** can be addressed by **ontologies** and **semantic web**.

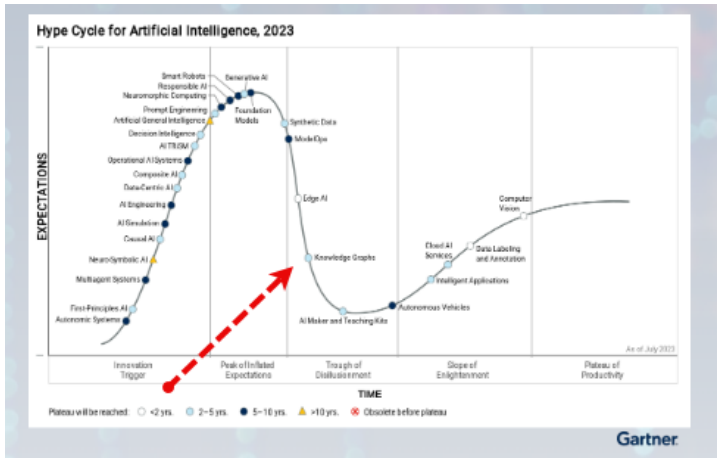
Both looks constituting the best technologies to formalize disambiguated knowledge,

and make machines and humans interact with complex data.

SLS Tools serving TotalEnergies Semantic Use cases

<table>
<tr><td colspan="2">Lineage</td><td colspan="2">KGcreator</td><td>KGquery</td></tr>
<tr><td>Select upper Ontology</td><td>Create Application Ontology</td><td>Create data/ontology mappings</td><td>Generate SKG triples</td><td>Use SKG</td></tr>
<tr><td colspan="2">Interoperability semantized standards based
Data exchange/ requirements checking</td><td colspan="3" rowspan="2"></td></tr>
<tr><td colspan="2">Knowledge management
Enterprise Business Objects semantic structuration</td></tr>
<tr><td colspan="5">NLP/IA
driven by Ontology</td></tr>
<tr><td colspan="5">Data governance
databases portfolio rationalisation</td></tr>
<tr><td colspan="5">Decision support
By Complexand unified data exploration</td></tr>
<tr><td colspan="5">Semantic digital Twin
Multi pupose</td></tr>
</table>

SKG context/observation

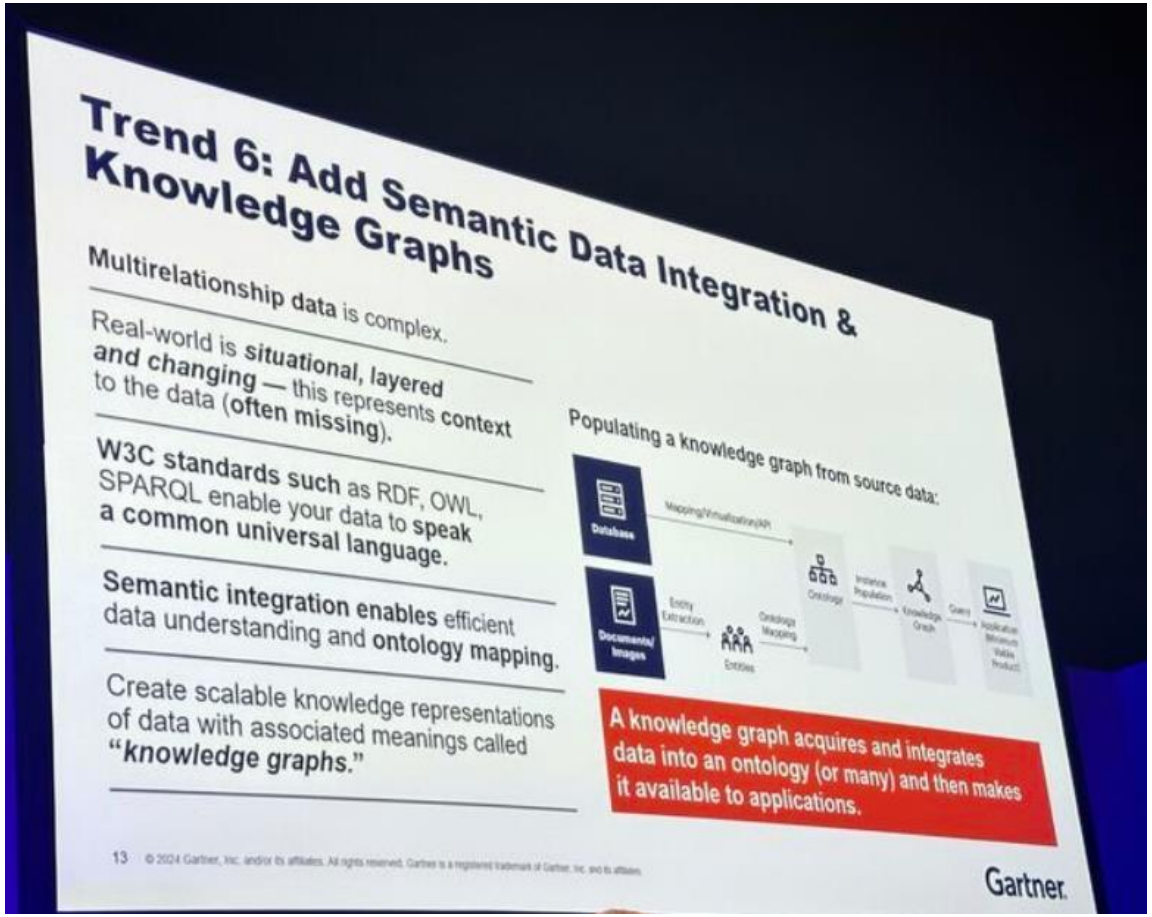


Until recently SKGs were perceived by the industry as a more or less distant dream, phantasmagically associated with digital twins and AI, whose operational value remained too hypothetical to justify the risks and cost of technological disruption.

Things are changing: the growing need to assemble, understand and operate on data from numerous sources makes evident the need to have an interoperable semantic layer above transactional and/or textual data sources allowing their valorization complete and direct

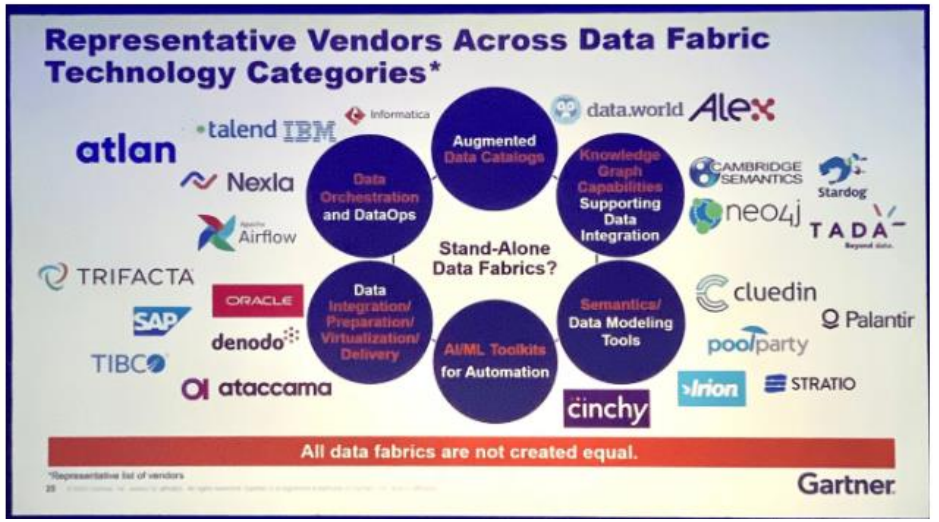
But …

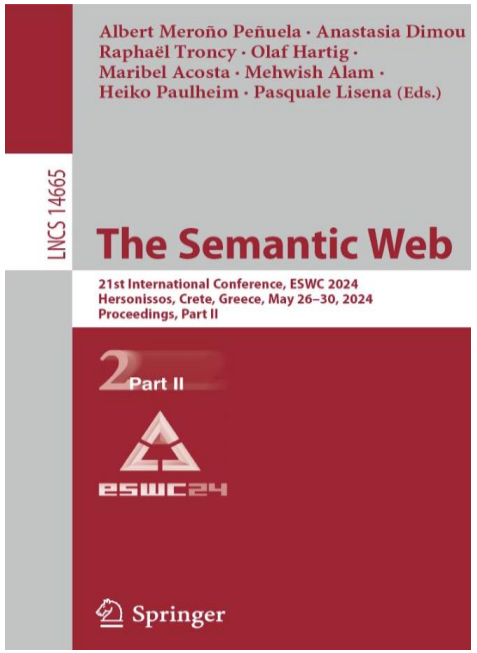
- The tools and expertise for creating domain or application ontologies are often not accessible enough to be used in businesses.
- The creation of SKGs conforming to their reference ontology remains complex despite efforts to equip it (Ontop)
- The use of SKG stumbles on querying and exposure of data



Market conditions

What should our Technological Ambition be to Support our Transition Strategy ?





SousLeSens - A Comprehensive Suite for the Industrial Practice of Semantic Knowledge Graphs

Claude Fauconnet, Jean-Charles Leclerc, Arkopaul Sarkar, Mohamed Hedi Karray

Conference paper | First Online: **19 May 2024** - pp162-177

Existing tools are either incomplete or not specific enough to cover the entire SKG manufacturing/exhibition processes in a homogeneous and integrated manner.

They are often expensive and complex

to implement and operate.

Table 1. Comparison of tools. Columns: A – coverage of KM activities (e – editing ontology, r – reasoning KG, v – visualizing KG, p – population of data in KG, q – query, u – use), B - modularisation/import resolution, C – search and reuse ontology, D – Consistency check, E – reasoning/inference, F – rules, G – mapping, H – model repository, I – conceptualisation, J – data transformation, K – visual query, L – collaboration, M – methodological guide, N – User-friendliness (no-code environment, ease of learning, third-party integration)

Tools	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Protégé	e,r,v	**Y**	N	**Y**	**Y**	**Y**	N	N	N	N	N	N	**Y**	N
WebProtege	e,r,v	**Y**	N	**Y**	N	**Y**	N	**Y**	N	N	N	**Y**	**Y**	N
OntoPic	p,q,v	N	N	N	N	N	**Y**	N	N	**Y**	N	**Y**	N	**Y**
TopBraid	e,r,v,p,q	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	N	N	**Y**	N	**Y**	N	N
Fluent	e,r,v	**Y**	N	**Y**	**Y**	**Y**	**Y**	N	N	N	N	N	**Y**	N
OWLGrEd	e,v	**Y**	**Y**	N	N	N	N	**Y**	**Y**	N	N	N	N	N
OntoEdit	e,r	**Y**	**Y**	**Y**	**Y**	N	N	N	N	N	N	N	N	N
Anzo	p,q,v,u	**Y**	**Y**	**Y**	N	N	**Y**	**Y**	N	**Y**	N	**Y**	N	**Y**
PoolParty	e,v,p,u	**Y**	**Y**	N	**Y**	N	**Y**	**Y**	**Y**	**Y**	N	**Y**	N	**Y**
SLS	e,r,v,p,q,u	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

https://link.springer.com/chapter/10.1007/978-3-031-60635-9_10

Demonstration, Tutorial, and discussion on the WG

Claude Fauconnet (creator of SLS)

Formerly TotalEnergies Petroleum geologist

Formerly TotalEnergies digital innovation project manager

souslesens

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What is SLS presently

Purpose

Give the business access to its data through its **shared knowledge model**

Make ontologies and SKGs accessible to as many people as possible through a web interface based on the visual representation of graphs.

1. Allow the creation of ontologies potentially based on higher-level ontologies while respecting their constraints (OWL-DL compliant)
2. Allow the creation of SKG within a triple store
3. Allow SKG querying in a simple way, including for complex queries, by taking advantage of the potential of the SPARQL language

SousLeSensVocables is a suite of open-source tools (MIT license) willing to make **semantic web** technologies accessible to who wants to **digitalize knowledge** and reconciliate Business and IT using graphs and ontologies.

Our convictions behind SLS's design principles

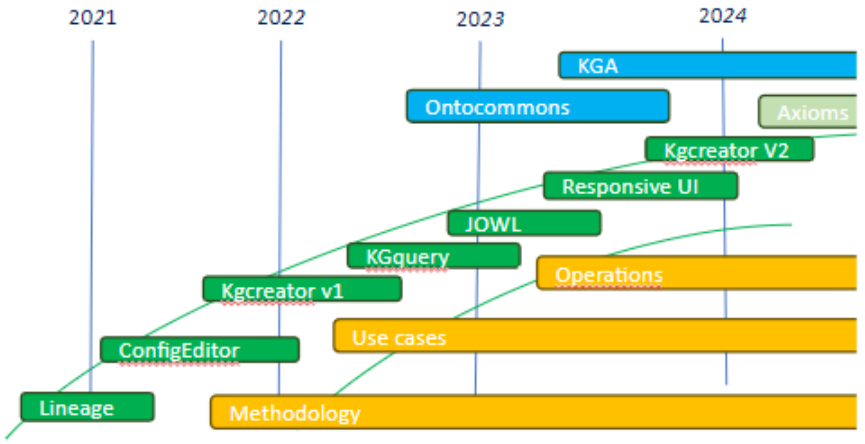
1. Data have to be linked to their underlying Knowledge
2. Visualization for complex data is mandatory
3. Standard Semantic is Key for data integration and interoperablilty
4. Graphs can manage complexity better than tables

SLS is an open source initiative (MIT) from TotalEnergies actual and former employees, funded by TE, having often experienced the limits of data silos when it comes to crossing several as well as the difficulties of traditional systems in resolving this type of problem that has been a bottomless pit for decades

Current State

SLS is currently at the stage of an **advanced prototype** whose relevance is widely recognized in both the academic and industrial world:

- Noticed by ENIT (2022)
- Approved by Ontocommons in (2023)
- Adopted by KGA (co-founder) (2023)
- Published by Springer and ESWC (2024)
- Used in in Several industrial use case
  - TotalEnergies (2022-2024)
  - Michelin (2024)
  - IOGP –CFIHOS semantics
  - …



Several instances are already deployed :
- TotalEnergies private environment
- KGA instance

SLS is available on Github under MIT license
Easy installation thanks to Docker packaging

SLS Current core team

		Roles				
Organization	**People**	**Functional Advice**	**Technical Advice**	**Developer**	**Administration**	
SousLeSens						
	C.Fauconnet *	X		X		
TotalEnergies						
	JC.Leclerc *	X		X		
Logilab						Backend/packaging
	X.Garnier		X	X	X	
	A.Lubert		X	X		
	N.Chauvat	X	X	X		
Akkodis						
	K.Ounnoughi			X	X	
	V.Claron			X		web design
KGA						
	A.Sarkar	X				
	H.Karray	X				
ENIT						
	N.Bouchemel		X	X	X	JOWL
	A.Karoui		X	X		JOWL

* creator

Strengths and Weaknesses

Strengths

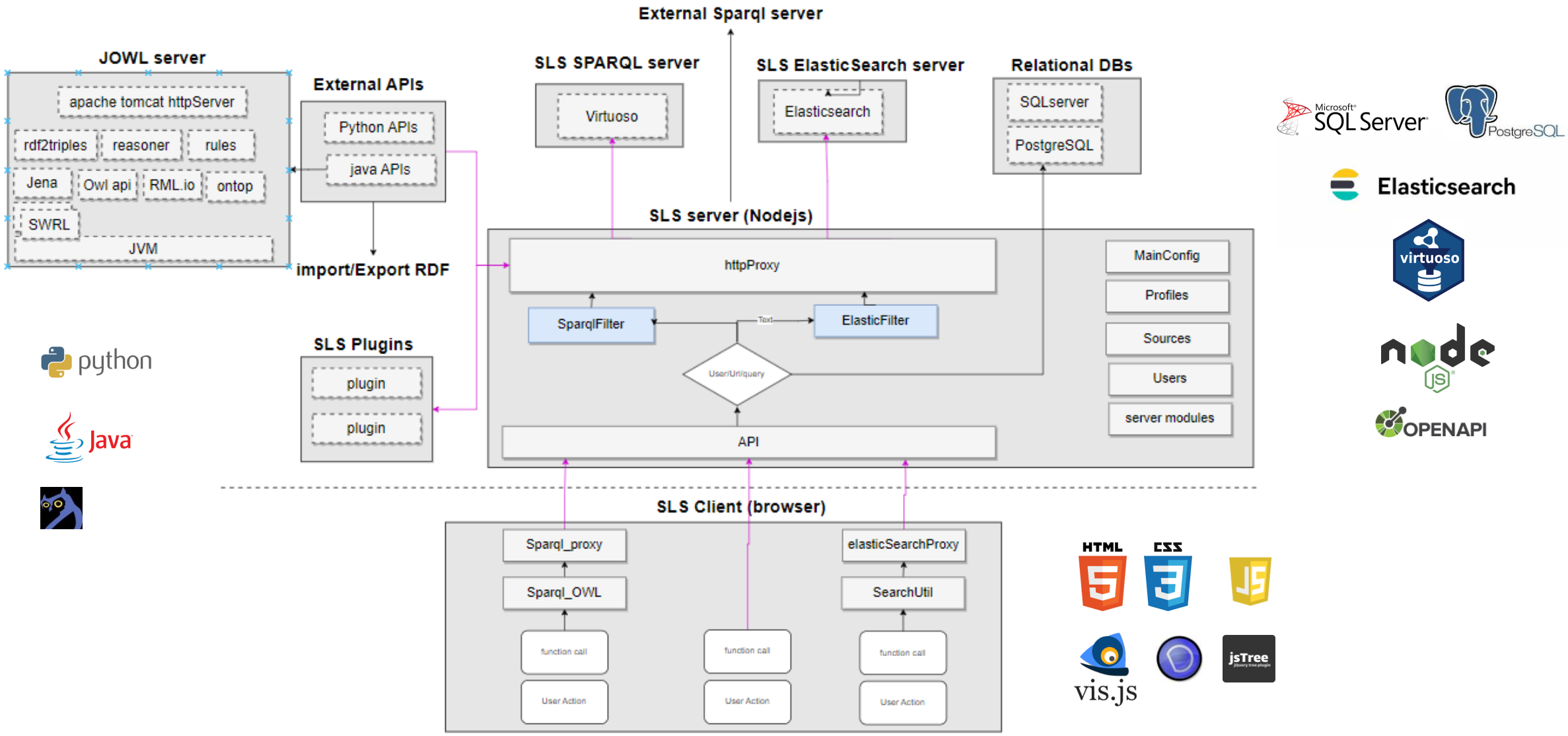
- Based on standards : RDF, OWL, SPARQL
- Open source code : MIT licence
- Collaborative : webApp and credentials management
- Visual, no code needed
- Distributed and extensible architecture
- Data persistance in Triplestore
- Optimized Query System : SPARQL + search engine
- Open platform : Java, Python extensions
- Rich API
- Interoperable : import/export
- Databases connectivity
- Fine tuning of access rigths
- Easy to deploy: GitHub, Docker
- Enthousiatic welcome

Weaknesses

- Community size
- Young product
- **Weak documentation**
- …

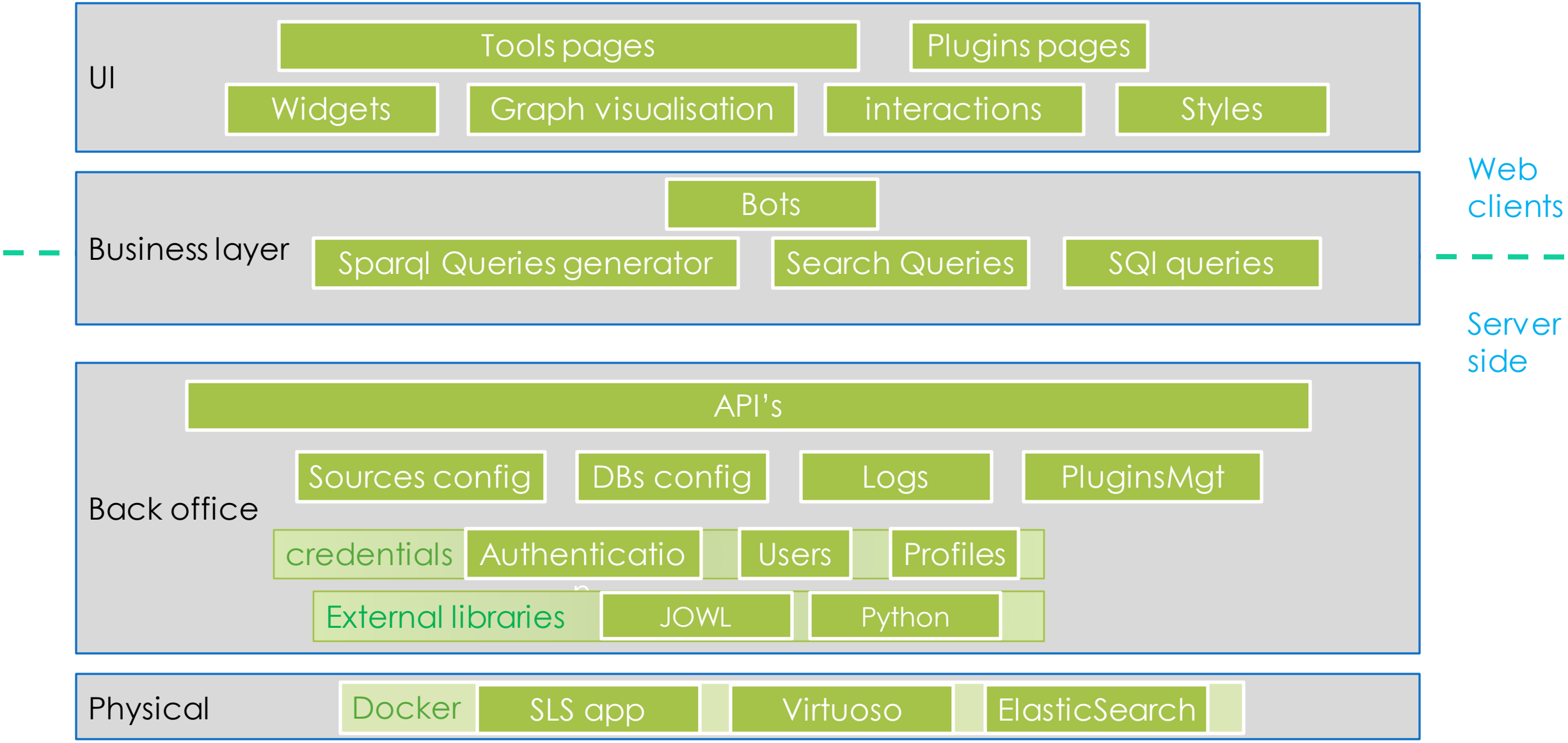
What's under the hood

SLS Tiers


External Sparql server
JOWL server
apache tomcat httpServer
rdf2triples
reasoner
rules
Jena
Owl api
RML.io
ontop
SWRL
JVM
External APIs
Python APIs
java APIs
import/Export RDF
SLS SPARQL server
Virtuoso
SLS ElasticSearch server
Elasticsearch
Relational DBs
SQLserver
PostgreSQL
SLS server (Nodejs)
httpProxy
SparqlFilter
Text
ElasticFilter
User/Url/query
API
MainConfig
Profiles
Sources
Users
server modules
SLS Plugins
plugin
plugin
SLS Client (browser)
Sparql_proxy
Sparql_OWL
function call
User Action
function call
User Action
elasticSearchProxy
SearchUtil
function call
User Action
python
Java
Microsoft SQL Server
PostgreSQL
Elasticsearch
virtuoso
node
OPENAPI
HTML
CSS
vis.js
jsTree

SLS technical stack

Strong Foundations for stability and evolutivity



UI features

User tools stack

	Content	Create	Use
Model	Upper Ontology	OntoCreator Lineage	Lineage
Model	Domain Ontology		
Model	Application Ontology		
	Mappings	KGCreator	
Instances	Semantic Knowledge Graph (SKG)		KGquery Lineage API's
Instances	Data Source (database, csv, text)		

Features overview short videos

The videos are built with a simple example of HR data. SLS works well with much larger and more complex graphs including graph assemblies

task	video	duration
Explore existing ontology	Explore existing ontologies	1'48
Create new ontology	Create ontology	1'30
Create SKG	Create Semantic Knowledge Graph	1'30
Use SKG	Use Semantic Knowledge Graphs	2'40

Demo

Create and edit new ontology (Onto Creator)
- Import
- add triples
- Add Class
- Add relation

Explore existing ontologies (Lineage)
- Taxonomy
- Group
- Search *
- NodeInfos*
- (Axioms) *
- Export CSV and SVG
- Properties
- Properties range and domain *

Create SKG(KGcreator)
- Add source
- Create mapping
- Generate triples (sample)

Use SKG (KGquery)
- KGquery table
- KGquery aggregate
- Plugins
- TimeLinePlugin

working group objectives

- Tooling of KGA methodology
- Offer to KGA members modern and open source tools
  - For ontologies development
  - For semantic knowledge graphs construction and usage
- Be a open, robust and high quality platform as a service
- Be a credible alternative to Protege
- Structure and keep alive dev and user communities
- Provide basic and premium online access to SLS tools

SLS Working Group Themes

- Roadmap
  - Improve existing features
  - New features Axioms, Sparql Services…
  - API's
  - Interoperability with KGA toolbox
- Code
  - Release Packaging
  - Download & install (Docker)
  - Testing
  - Architecture
- Documentation
  - User doc
  - Developer doc
  - Installation doc
  - Configuration doc

- Online version sustainability
  - Credential system
  - Fees Policy (free versus premium)
  - Administration
  - Hosting

- Commercial Strategy
  - Features/Plugins (common or owned)
  - Private instances
  - Services

- Training
  - Tutorials/Videos
  - Sessions

…

WG Organisation proposal

- Plan : Steering comitee
  - Resources management
  - Sustainability
  - Planification
  - General specifications
  - Effort evaluation
  - KGA board interface
- Make :
  - Developers group
  - Documenters group
  - Testing Packaging
- Run :
  - Open source offer
  - Online acces SLS-KGA
    - administration and monitoring
  - Premium offers management

To be Discussed during next session

To join the working group

Send a mail at c.fauconnet@souslesens.org, and specifying your preferred stream :

- Functional advice
- Developer
- Documentation
- Sustainabilty
- Other

You will receive an invitation to join the next session that will be scheduled in June 2024

Working group page : https://www.kg-alliance.org/kga-wg-sls-24-3/