

CRI 19 Presents

BUSINESS INTELLIGENCE & SEMANTIC WEB

COLLOQUIUM

2-DECEMBER 2019

Department of Computer Science, Faculty of Science, Yaoundé I
CAMEROON



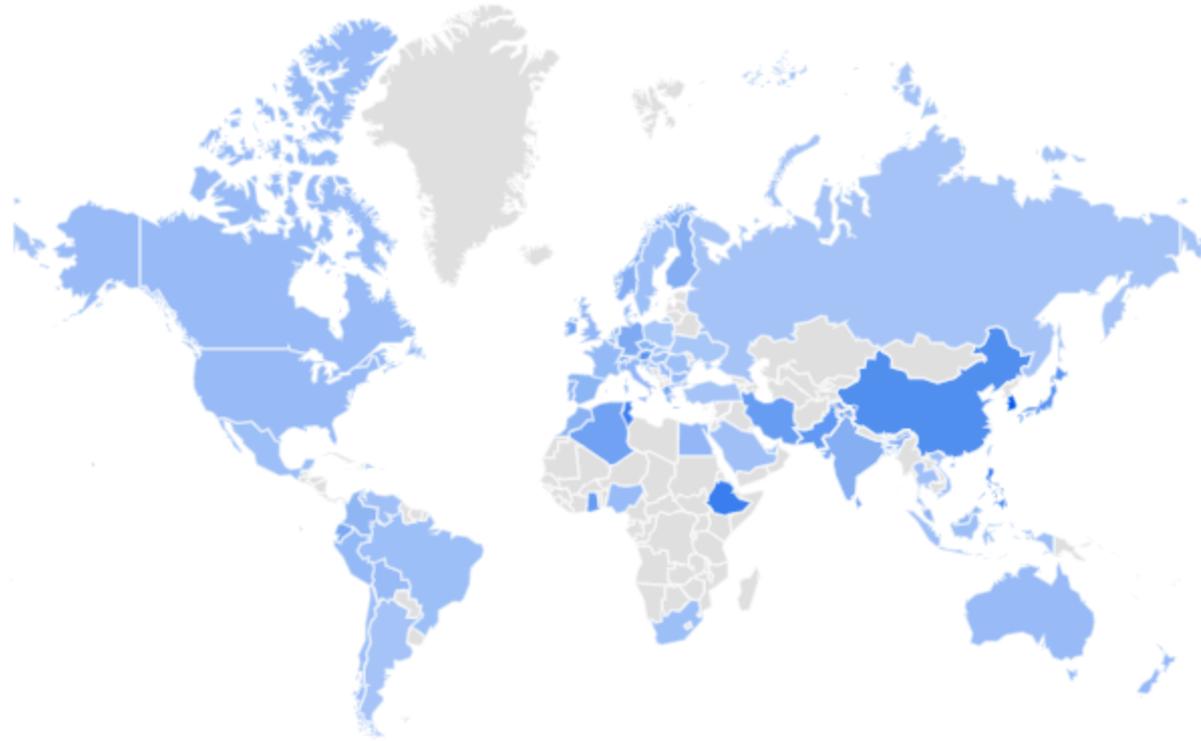
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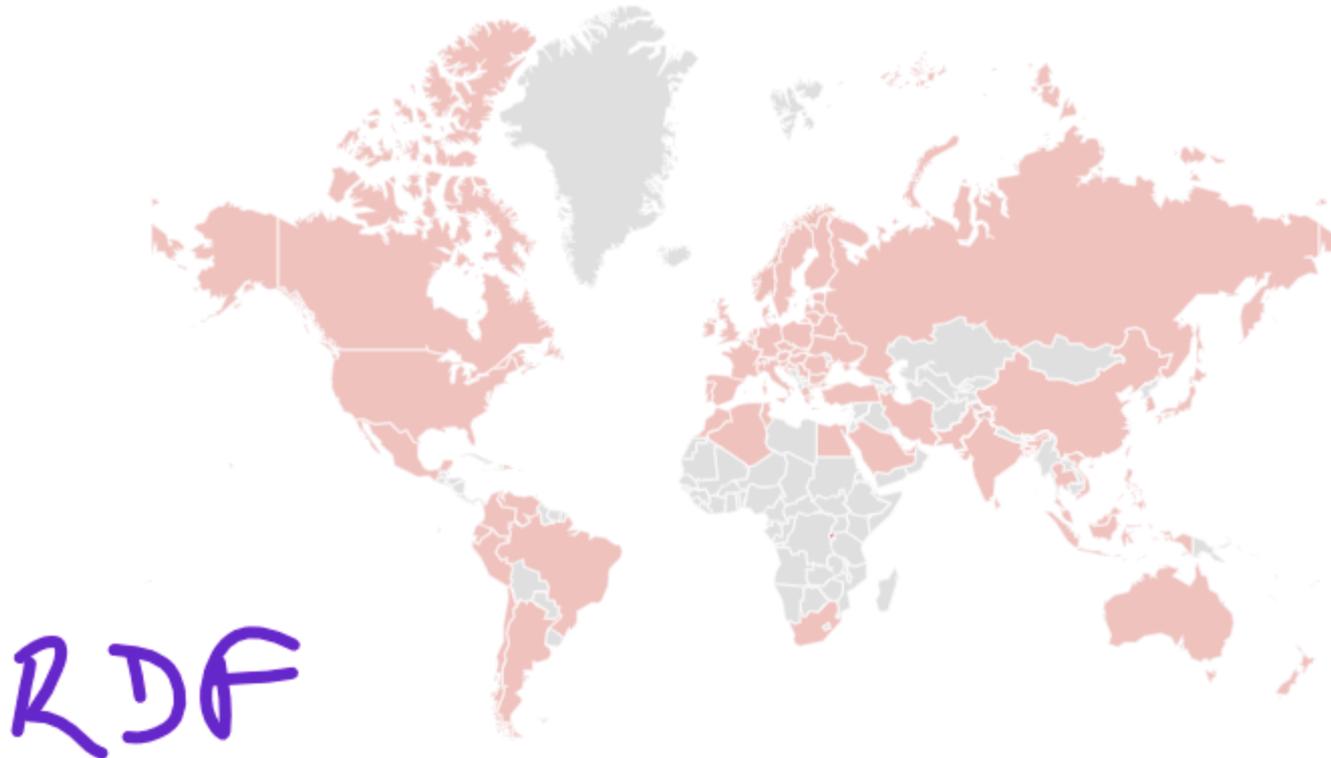
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Why This Colloquium?



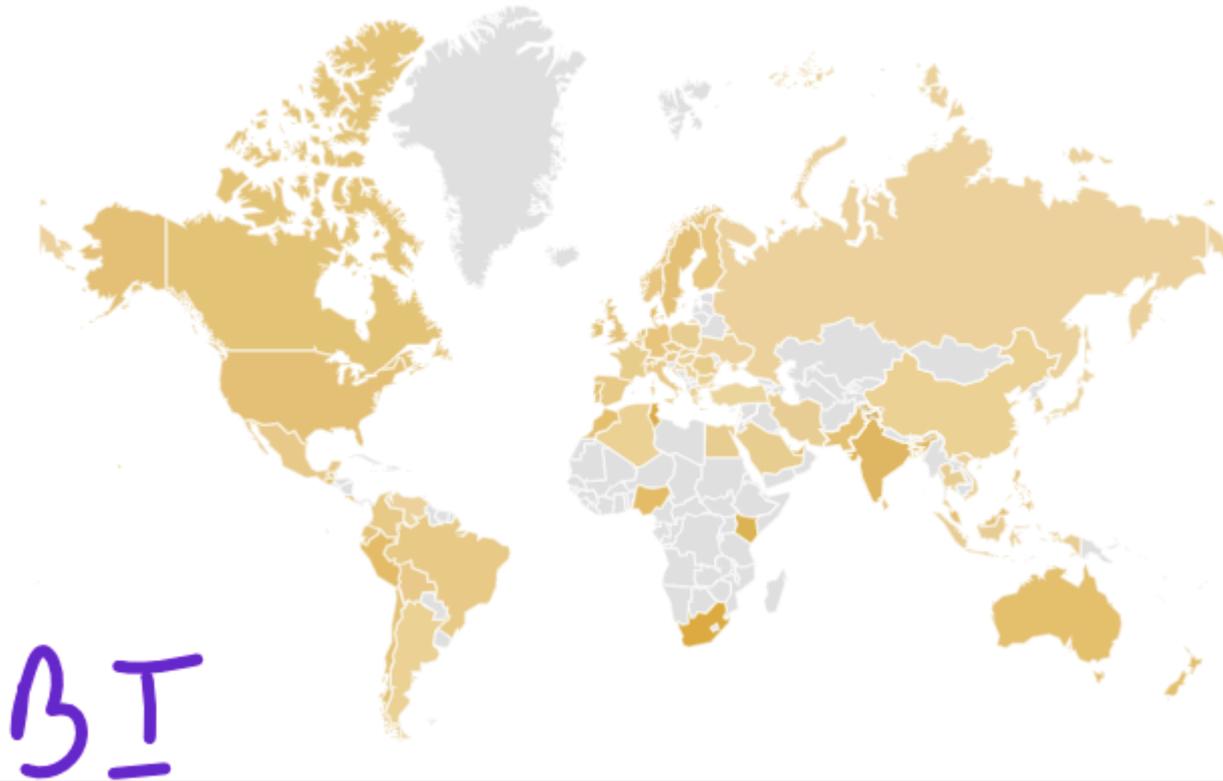
Search for “Web Semantique” - Google Trends (21/11/2019)

Why This Colloquium?



Search for "RDF" - Google Trends (21/11/2019)

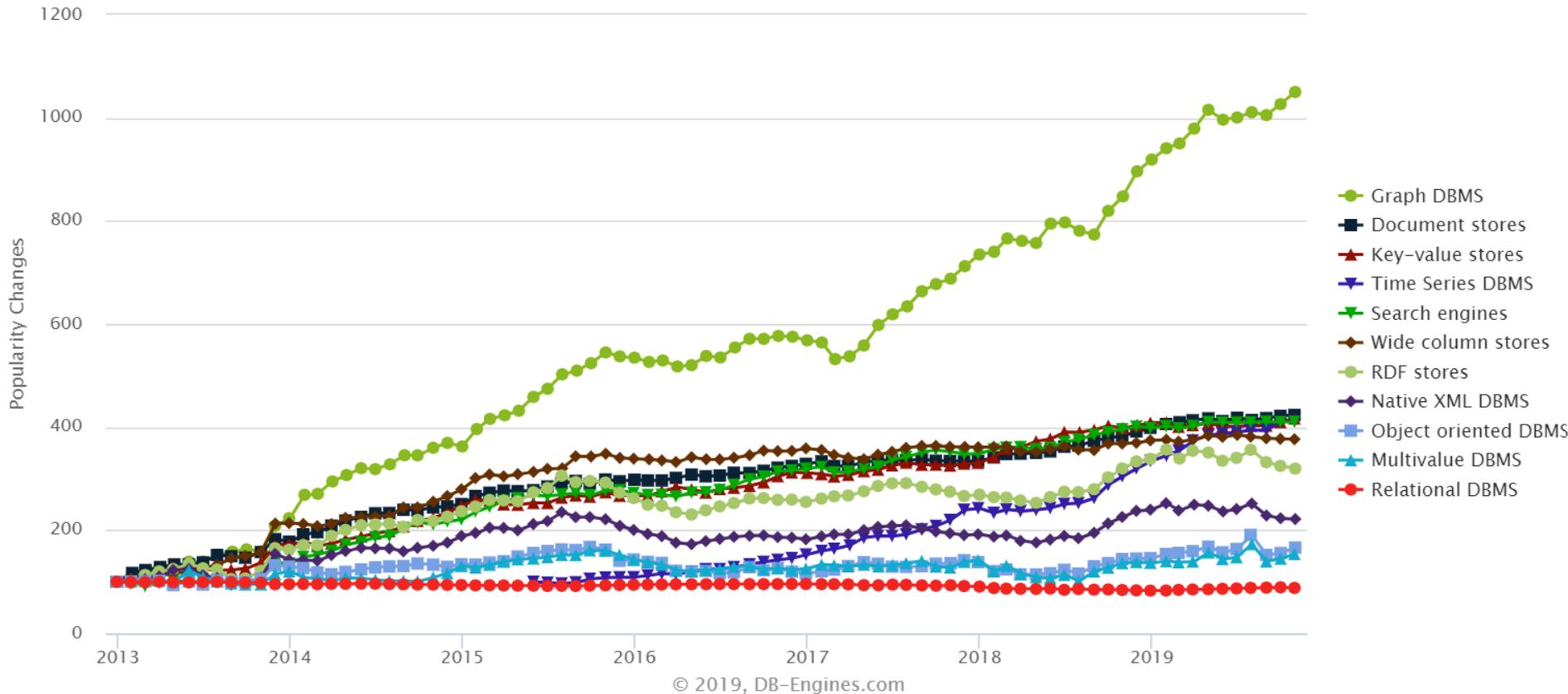
Why This Colloquium?



Search for "Business Intelligence" - Google Trends (21/11/2019)

Why This Colloquium?

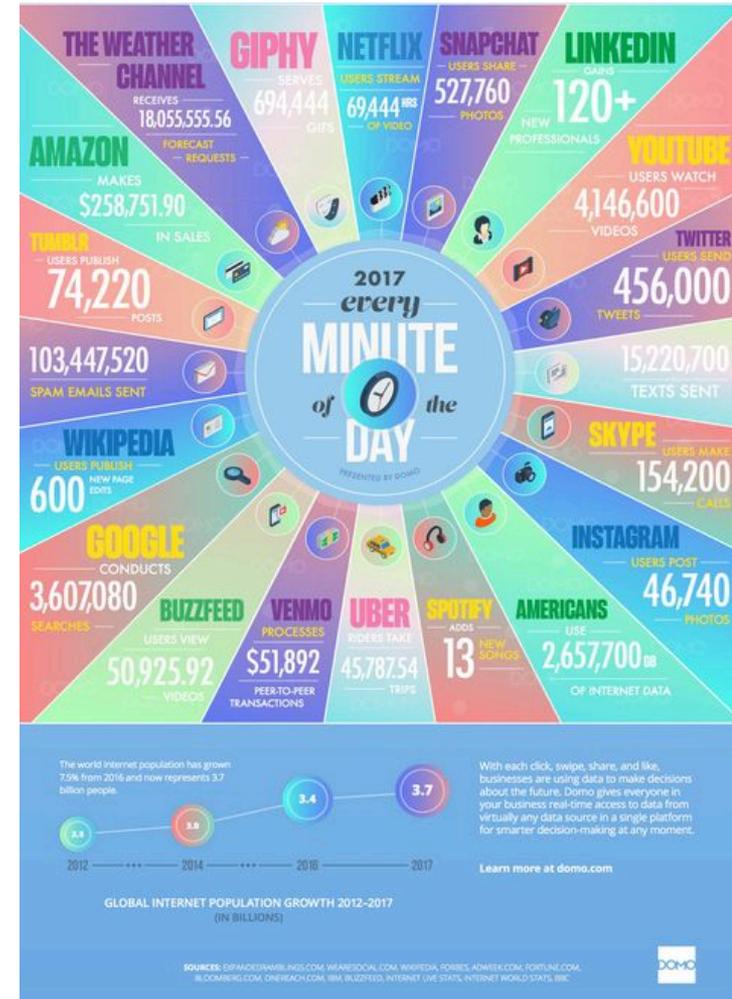
Complete trend, starting with January 2013



Graph Databases are trending, and there is an ongoing if subtle war for domination going on. (Image: [DB engines](#))

Data (R)evolution!

- Industrial Revolution (1780 - 1840) - **First revolution**
- Technical Revolution (1870 - 1920) - **2nd revolution**
- Scientific Technical Revolution (1940 - 1970)
- Digital Revolution (1975 - 2011) - **3rd revolution**
- (Big) Data Revolution (2013 - today) - **4th revolution**



Internet of Things (IoT) refers to billions of “things” connected to the Internet.

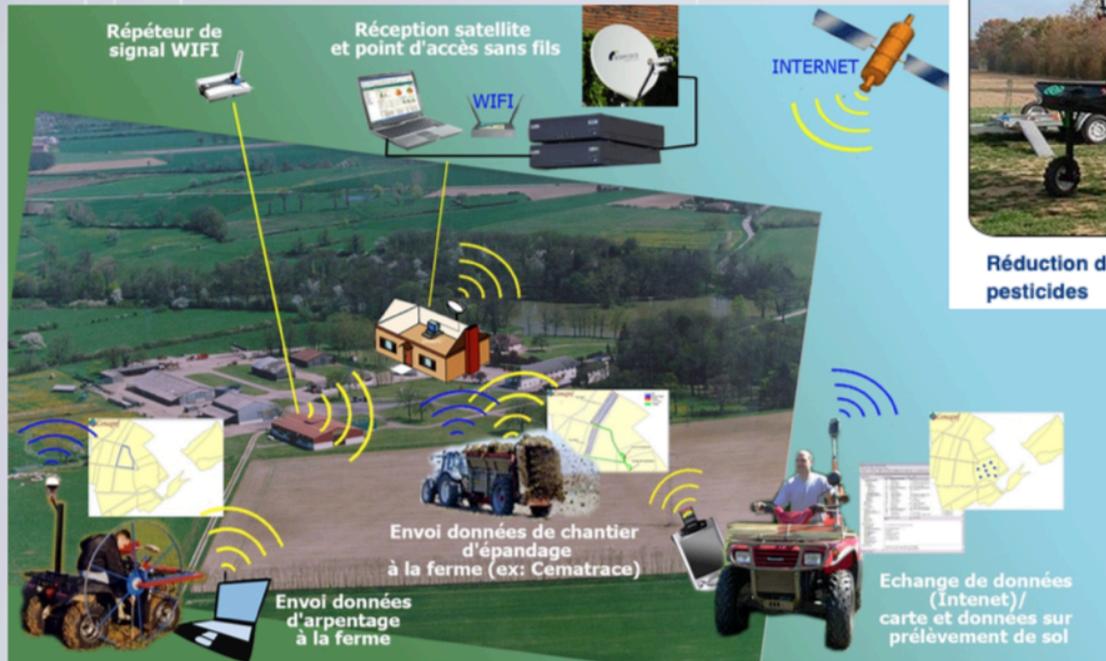
**2 billion in 2006
Expected: 200 billion
objects connected
by 2020**



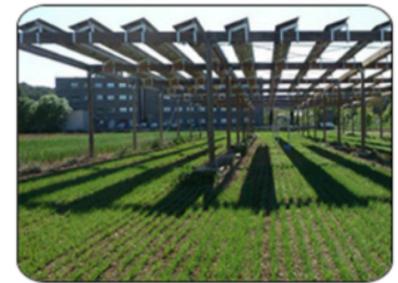
L'agriculture numérique

Les capteurs au cœur de l'agriculture numérique

- Second marché de la robotique en France



Réduction de l'usage des pesticides



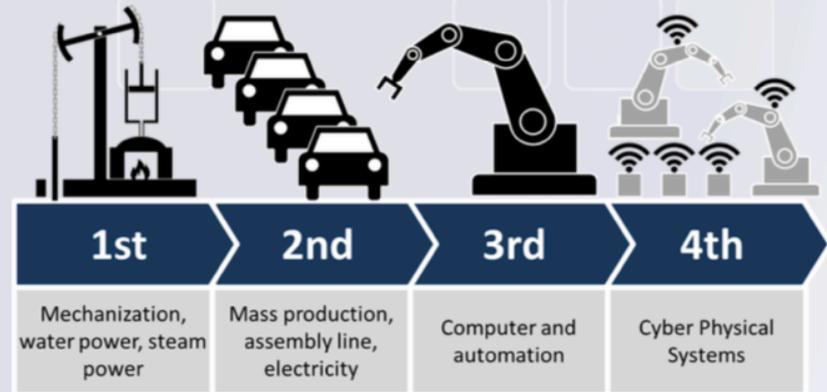
Irrigation – Economies d'eau



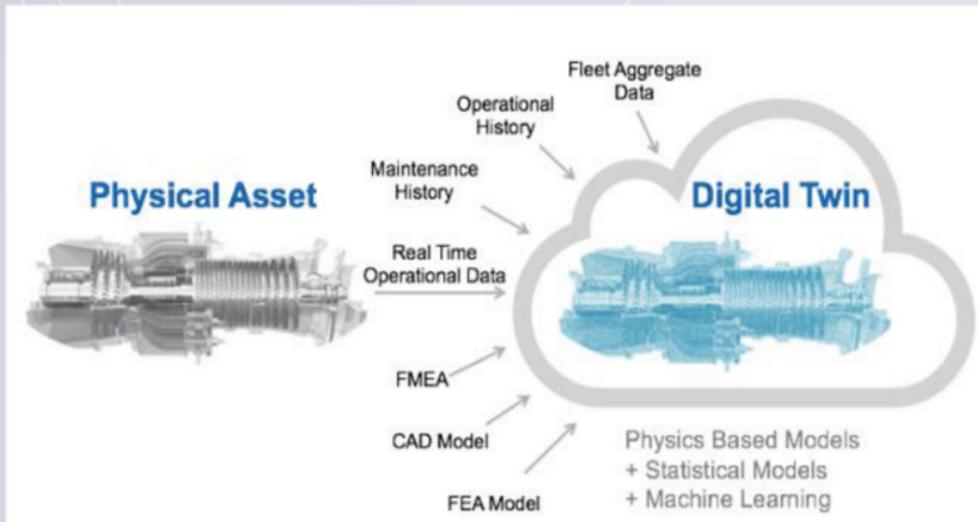
Qualité des sols et de l'eau

L'Industrie 4.0

- Le jumeau numérique
- Maintenance prédictive
- Conception / évolutivité



© Christoph Roser at AllAboutLean.com



© cetim

La ville intelligente



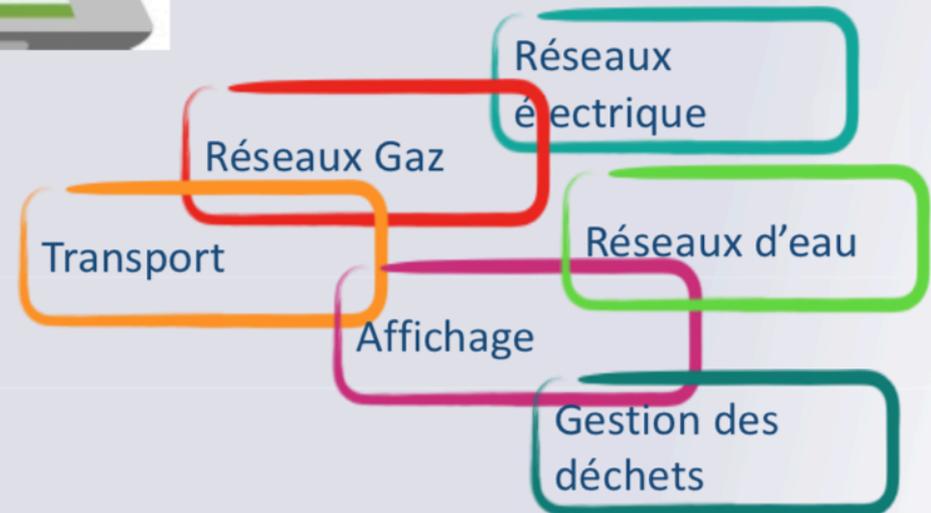
©elenabsl

Business des objets connectés (IoT) :

- Marché estimé à 800B\$
- Croissance mondiale accélérée
- Gros potentiel pour les villes, la santé, l'énergie, le commerce, l'environnement...

Bénéfices potentiels

- Offrir de nouveaux services
- Améliorer la qualité des services
- Réduire les coûts
- Renforcer la sécurité



Data-Centric Manifesto

1. **Data** is a key asset of any organization.
2. The current enterprise software paradigm is “**Application-Centric.**”
3. Most of the **excessive cost and complexity** in Enterprise Apps stems from the relationship of the apps to the data.
4. We are committed to reversing this trend.
5. There is even **more money to be saved** in the data-centric paradigm.

Link: <http://datacentricmanifesto.org/principles/>

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SPEAKERS



Prof. Dr. Axel-Cyrille
Ngonga Ngomo



Dr. Maria
Keet, PhD



Dr. Michel
Kana, PhD



Dr. Ghislain
Ateazing



Dr. Gaoussou
Camara



M. Elie Noël
Malouang



Dr Gayo Diallo



Dr. Paulin
Melatagia



M. Dieudonné
Djofang



M. Louis Ekani

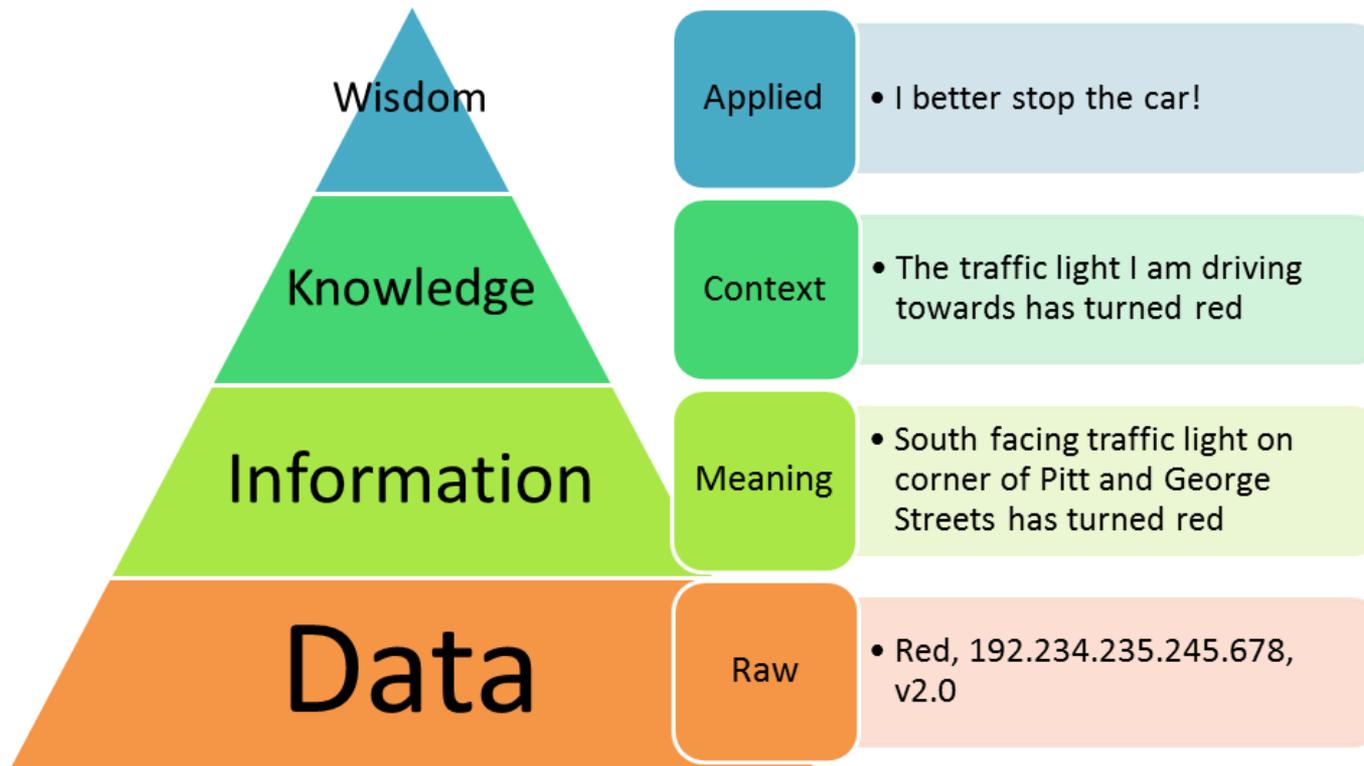


M. Pierre Lotis
Nankep

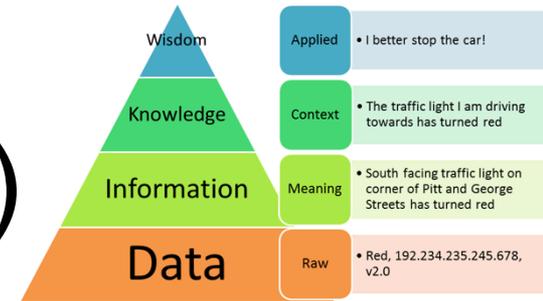
Web: <https://sites.google.com/view/bisemwebcri19/>

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DIK(W) vs DIK(I) model(s)



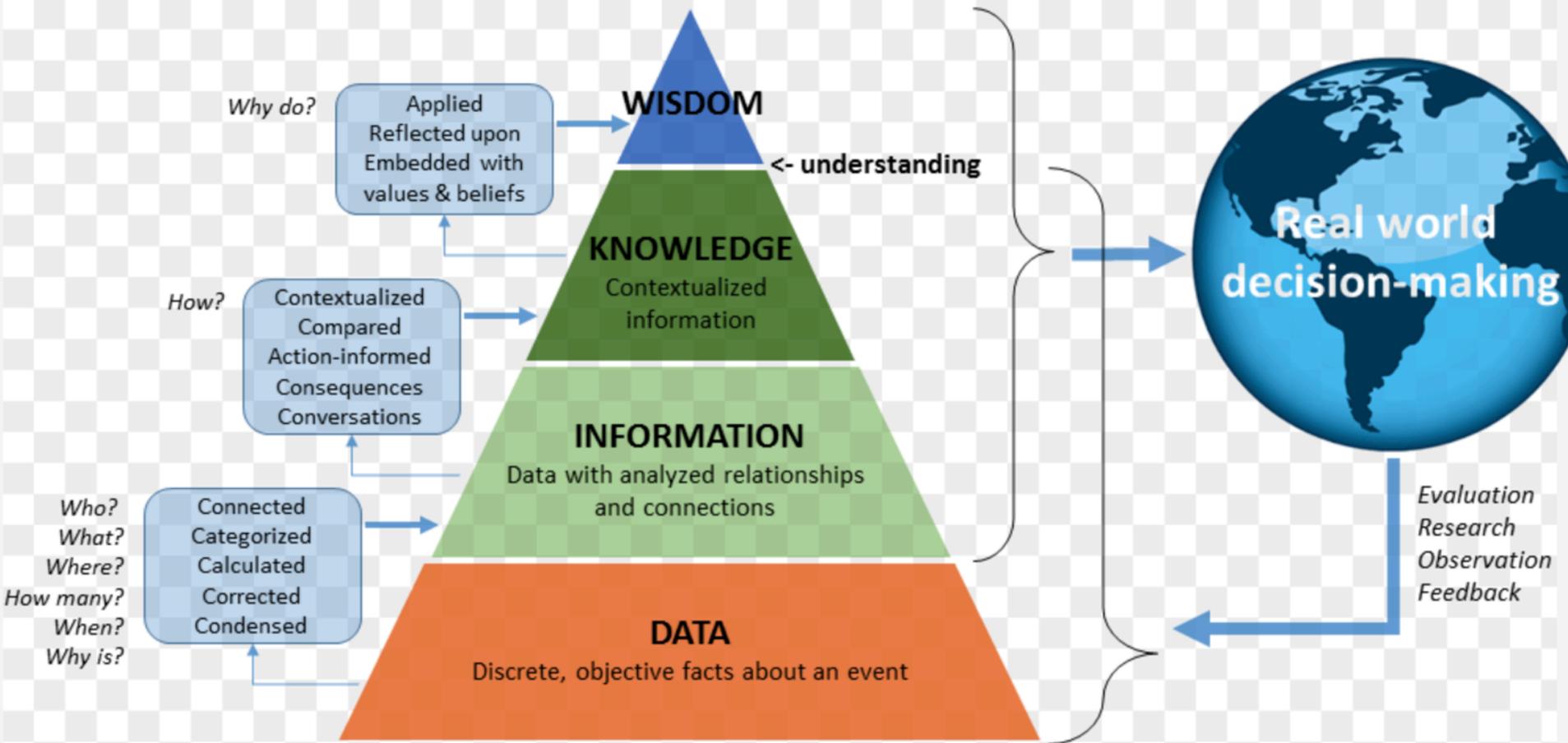
DIK(W) vs DIK(I) model(s)



© 2011 Angus McDonald

- Data= discrete (ex: 37)
- Information = links on data / data with context or data with context
 - body temperature)
- Knowledge = rules (eg: if temp_body(?x) > 37C → Has_fever(?x) or information + meaning
- Wisdom = why? and what for? - insight from knowledge
 - e.g: I go to my doctor
- Intelligence = smart use of wisdom in contextualized environment

DIKW model to solve real world problems



BI Process and Architecture

- **Data acquisition layer:** Consists of components to get data from all the source systems, such as human resources, finance, and billing.
- **Data integration layer:** Consists of integration components for the data flow from the sources to the data repository layer in the architecture.
- **Data repository layer:** Stores data in a relational model to improve query performance and extensibility.
- **Analytics layer:** Stores data in cube format to make it easier for users to perform what-if analysis.
- **Presentation layer:** Applications or portals that give access to different set of users.

Modélisation

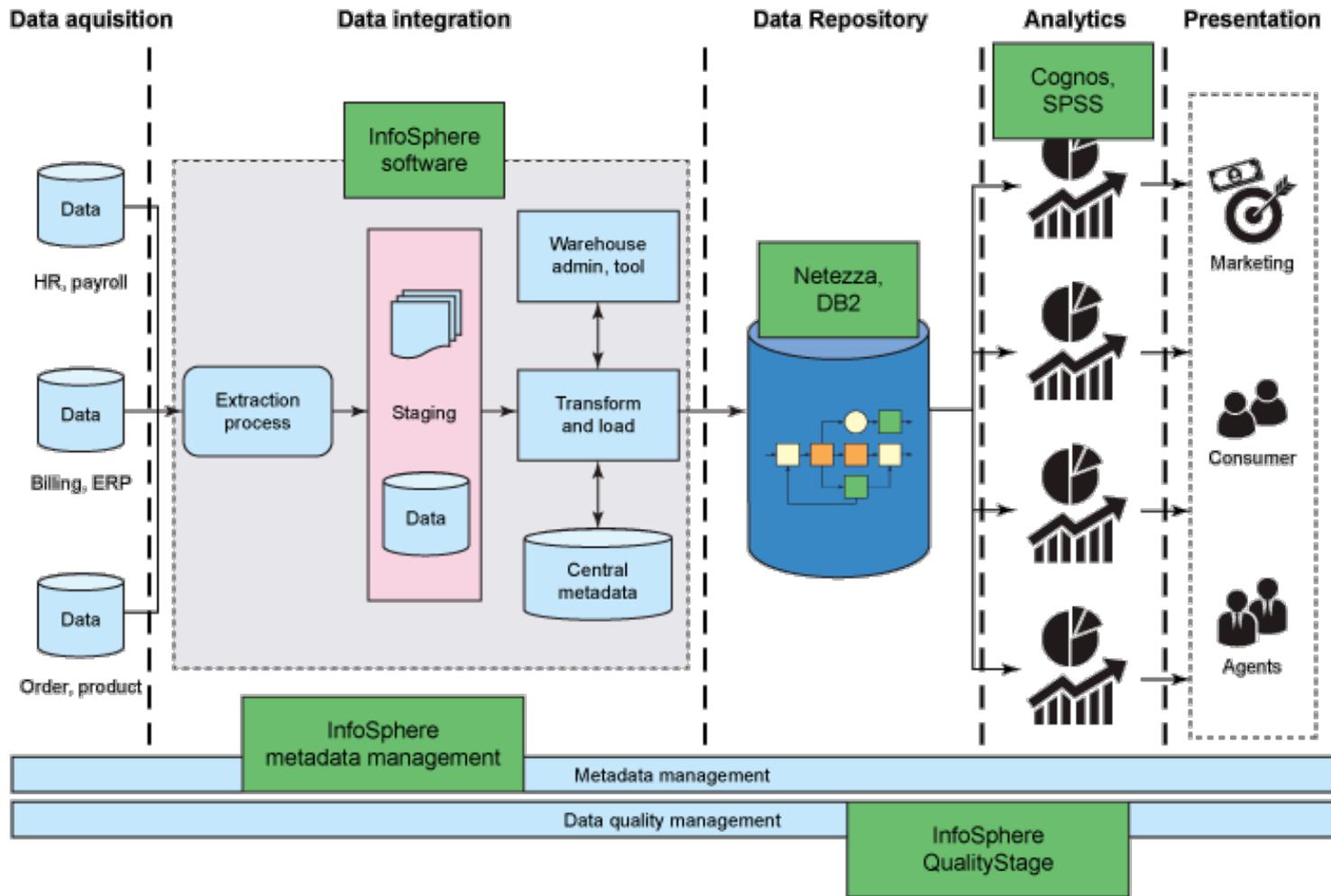
Récolte

Stockage

Traitement
et analyse

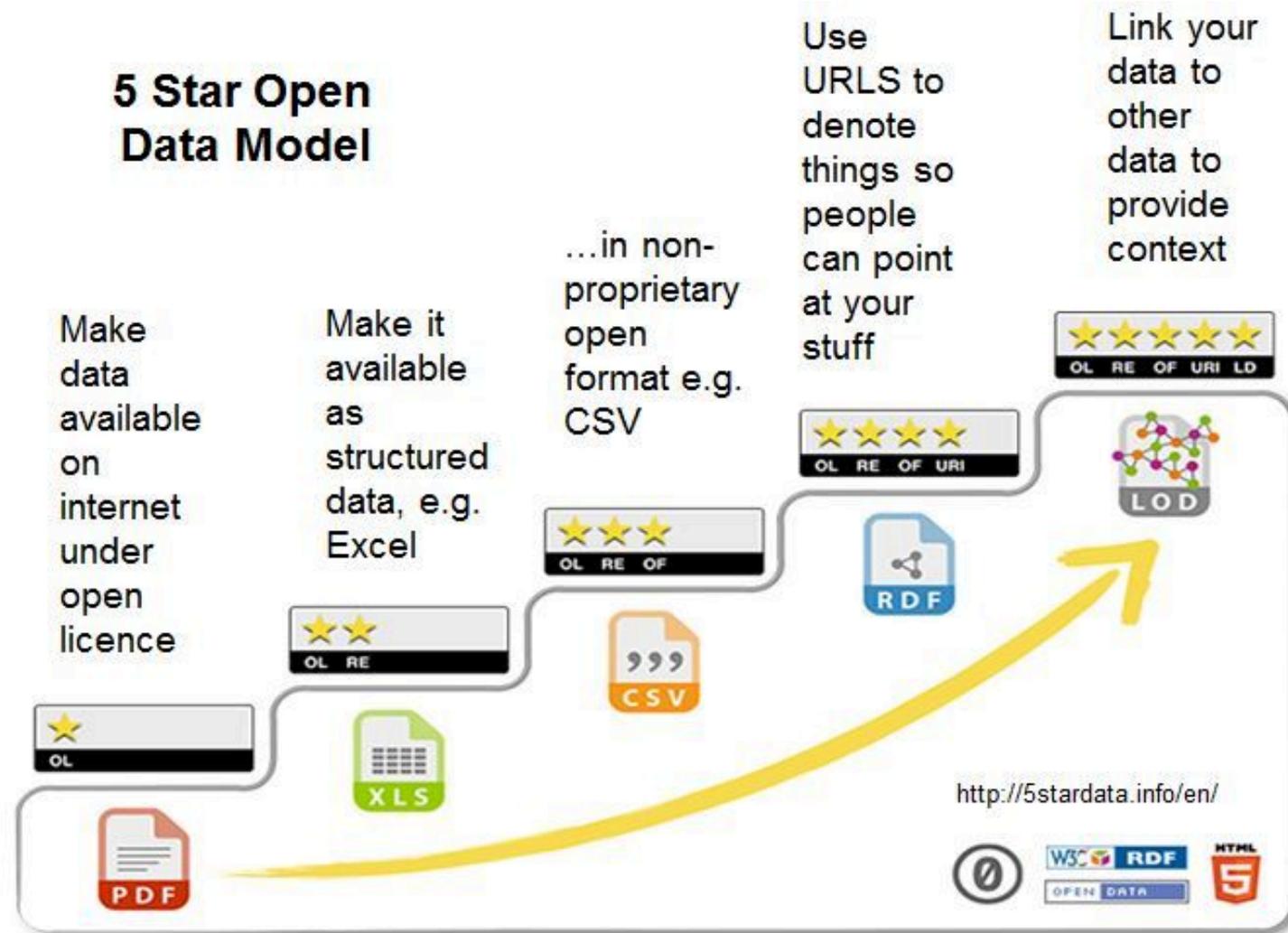
Présentation

BI products - IBM



By Sandip Chowdhury, IBM - 2014

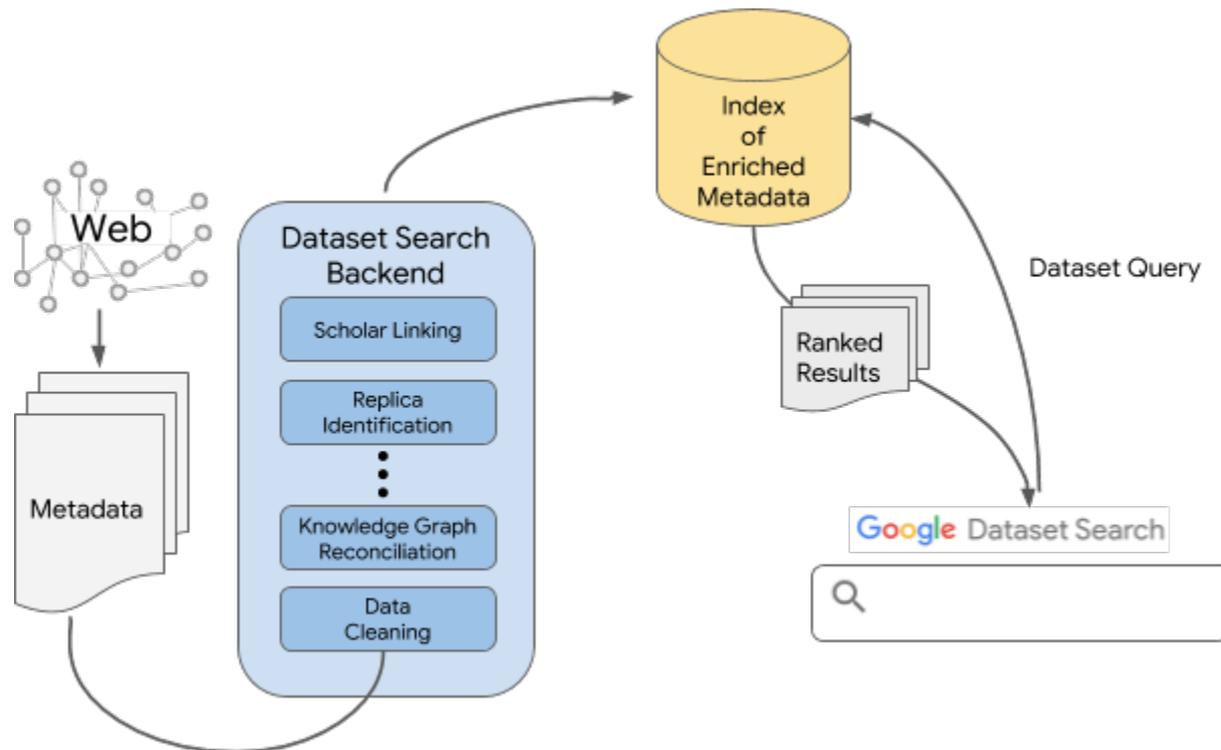
Publish Five-star data on the Web



Source: <https://5stardata.info/en/> / By Sir Tim Berners-Lee

Semantic Tools by Google - Schema.org

- Web Developers: <https://search.google.com/structured-data/testing-tool/u/0/>
- Google Dataset search: <https://toolbox.google.com/datasetsearch>



Some open research challenges in SemWeb

- Entity resolution
- Very large scale ontology / instance data visualization
- Declarative UI generation from Shapes
- Low / no code semantic model driven development
- IoT integration with semantics
- Hybrid AI (combining ML + Cognitive AI)
- Performant real-time reasoning
- Effective graph partitioning
-

Housekeeping

- Main page: <https://sites.google.com/view/bisemwebcri19/>
- Link session: <http://linkedvocabs.org/bisw19/session.html>
- 2 coffee breaks + lunch
- 2 remote presentations
- Collaborative report:
<https://docs.google.com/document/d/17s1nrEnQ9DfmFZ1vagTOqI3vSGUXPii50T2yXaaxols/edit>
- Ask questions as much as you can (interaction):
<https://app.sli.do/event/benwskp5> (sli.do, code: #BISW19)
- Tweet, retweet about the event: #bisemweb19
- We will share all the slides in the web page

Links

1- Fabien Gandon: "A Survey of the First 20 Years of Research on Semantic Web and Linked Data": <https://hal.inria.fr/hal-01935898/>

2- Fabien Gandon: "For everything: Tim Berners-Lee, winner of the 2016 Turing award for having invented... the Web" :<https://hal.inria.fr/hal-01843967>

3- Pizza tutorial with Protégé:

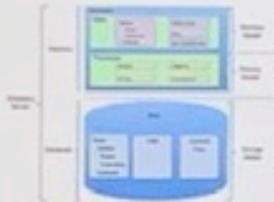
http://mowl-power.cs.man.ac.uk/protegeowltutorial/resources/ProtegeOWLTutorialP4_v1_3.pdf

From Application Thinking to

Keynote Doug Watt

Application Centric Thinking

Relational DB



Problems

- SQL interoperability
- Costly
- Scaling hits a wall
- Data silos
- Limited semantics
- Data complexity causes data proliferation & code proliferation

Enterprise Resource Planning



Problems

- Ever increasing complexity and feature creep
- Costly
- Massive underlying databases (>10,000 tables)
- Implementation failures
- Integration complexity

Enterprise Data Modeling



Problems

- Skills mismatch
- Long implementation timeframes
- 'Ivory tower' syndrome
- Round trip modelling - Conceptual/Logical/Physical
- Massively complex models

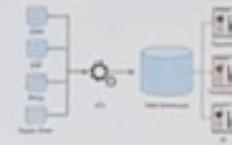
SOA



Problems

- Process centric
- Complex technology stacks
- Shared messages culture
- ESB's were very complex
- Still lots of point to point integration
- Information was missing!!!

Data Warehousing



Problems

- ETL slow
- Data completeness
- Resource intensive
- Complexity
- Schema agreement