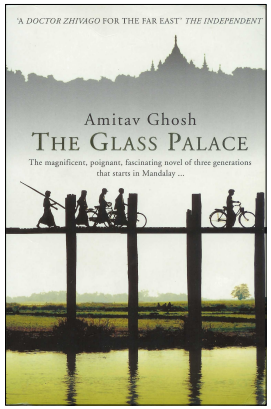
Semantic Web Motivating Example

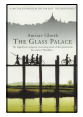
A Motivating example

- Here's a motivating example, adapted from a presentation by Ivan Herman
- It introduces semantic web concepts
- And illustrates the benefits of representing your data using the semantic web techniques
- And motivates some of the semantic web technologies

We start with a book...



A simplified bookstore data

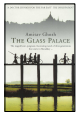


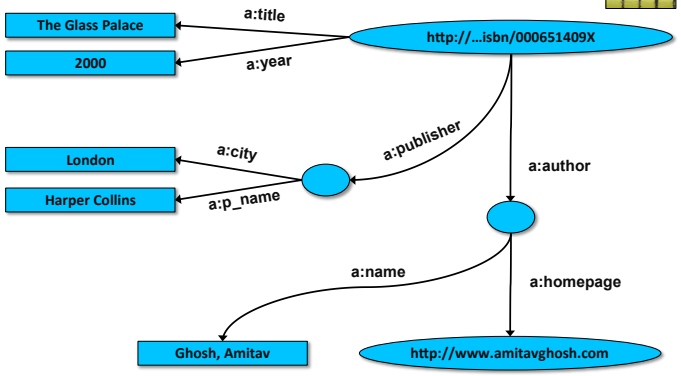
ID	Author	Title	Publisher	Year
ISBN 0-00-6511409-X	id_xyz	The Glass Palace	id_qpr	2000

ID	Name	Homepage
id_xyz	Ghosh, Amitav	http://www.amitavghosh.com

ID	Publisher's name	City
id_qpr	Harper Collins	London

Export data as a set of *relations*

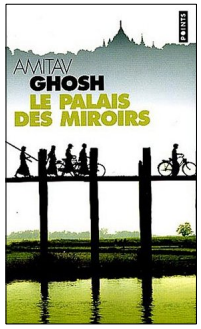




Notes on exporting the data

- Relations form a graph
  - Nodes refer to "real" data or some literal
  - We'll defer dealing with the graph representation
- Data export doesn't necessarily mean physical conversion of the data
  - relations can be generated on-the-fly at query time
- All of the data need not be exported

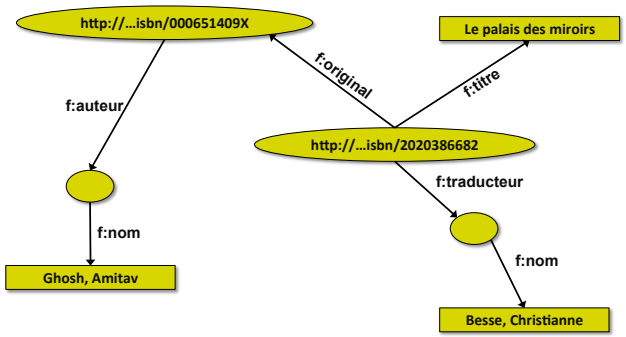
Same book in French…



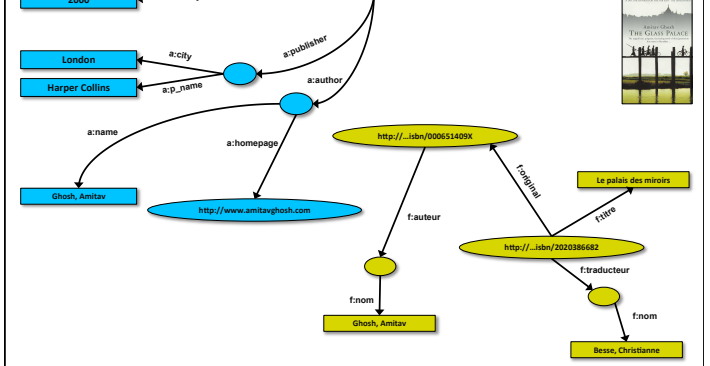
Bookstore data (dataset "F")

	A	B	C	D
1	**ID**	**Titre**	**Traducteur**	**Original**
2	ISBN 2020286682	Le Palais des Miroirs	$A12$	ISBN 0-00-651409-X
3				
4				
5				
6	**ID**	**Auteur**		
7	ISBN 0-00-651409-X	$A11$		
8				
9				
10	**Nom**			
11	Ghosh, Amitav			
12	Besse, Christianne			

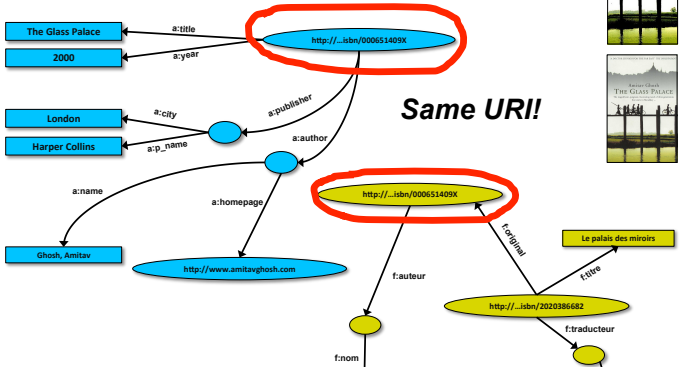
Export data as a set of *relations*



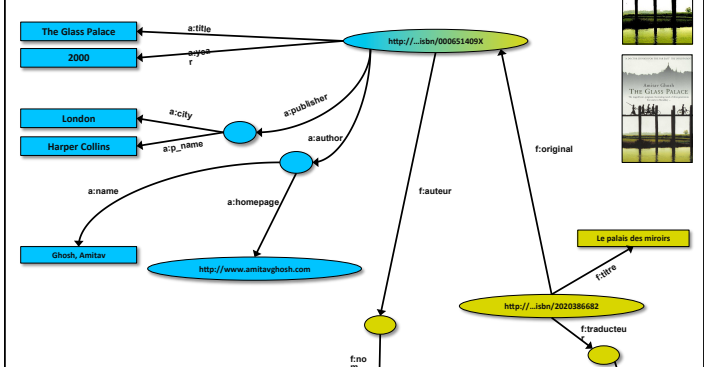
Start merging your data



Merging your data

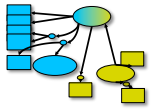


Merging your data



Start making queries…

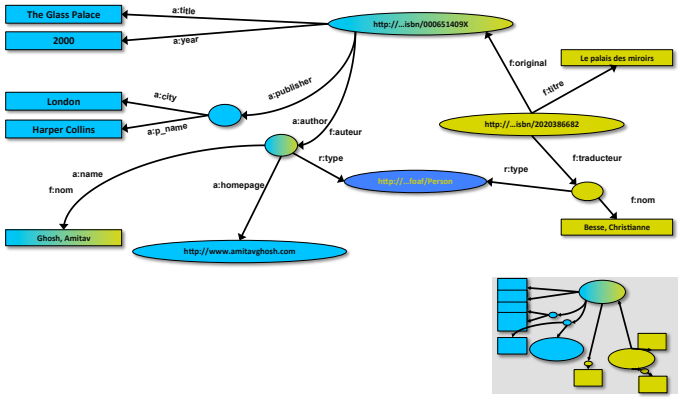
- User of data "F" can now ask about the title of the original
- This information is not in the dataset "F"…
- …but can be retrieved by merging with dataset "A"!



However, more can be achieved…

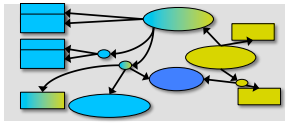
- Maybe a:author & f:auteur should be the same
- But an automatic merge doesn't know that!
- Add extra information to the merged data:
  - a:author *same as* f:auteur
  - both identify a "Person"
  - Where *Person* is a term that may have already been defined, e.g.:
    - A "Person" is uniquely identified by a full name, a homepage, facebook page, G+ page or email address
    - It can be used as a "category" for certain type of resources

Use this extra knowledge



This enables richer queries

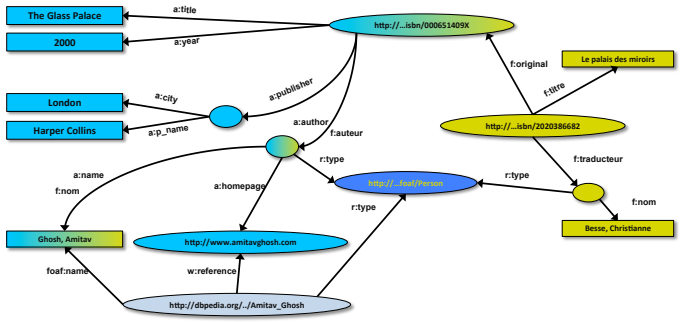
- User of dataset "F" can now query:
  - "donnes-moi la page d'accueil de l'auteur de l'original"
    - well… "give me the home page of the original's 'auteur'"
- The information is not in datasets "F" or "A"…
- …but was made available by:
  - Merging datasets "A" and datasets "F"
  - Adding three simple extra statements
  - Inferring the consequences



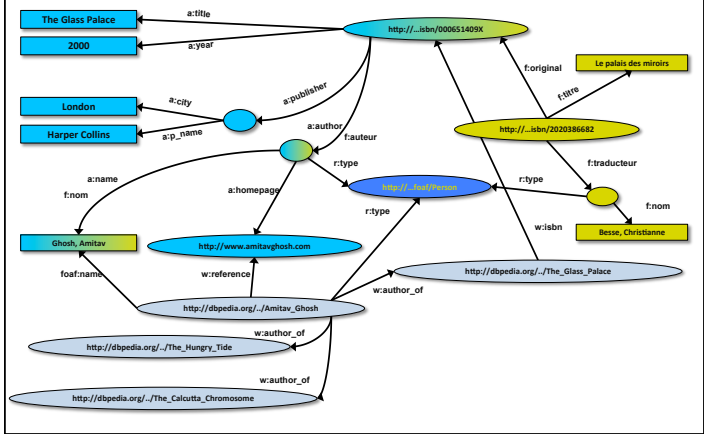
Combine with different datasets

- Using, e.g., the "Person", the dataset can be combined with other sources
- For example, data in Wikipedia can be extracted using dedicated tools
  - e.g., the "DBpedia" project can extract the "infobox" information from Wikipedia already…

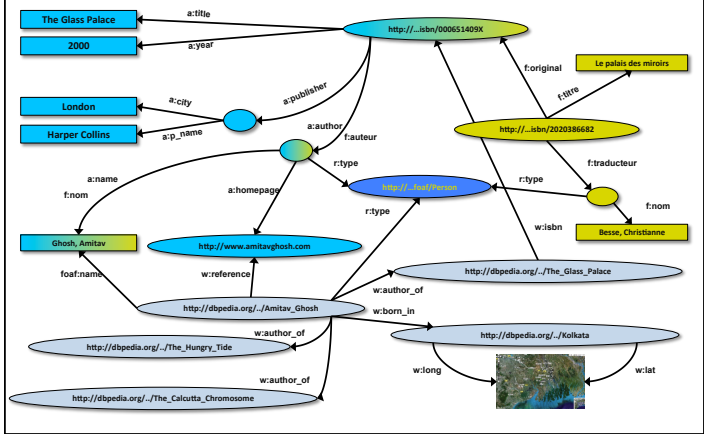
Merge with Wikipedia data



Merge with Wikipedia data



Merge with Wikipedia data



Is that surprising?

- It may look like it but, in fact, it should not be…
- What happened via automatic means is done every day by Web users!
- What is needed is a way to let machines decide when classes, properties and individuals are the same or different

This can be even more powerful

- Add extra knowledge to the merged datasets
  - e.g., a full classification of various types of library data
  - geographical information
  - etc.
- This is where ontologies, rules, etc., come in
  - ontologies/rule sets can be relatively simple and small, or huge, or anything in between…
- Even more powerful queries can be asked as a result

So where is the Semantic Web?

The Semantic Web provides technologies to make such integration possible!

Key integration datasets, like DBpedia, have emerged