

# **Introduction to Semantic Web**

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Darmstadt, Germany  
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**Let's organize a trip to Budapest using  
the Web!**

**You try to find a proper flight with ...**

# ... a big, reputable airline, or ...

The screenshot shows the KLM website interface for booking flights. The browser title is "Book flights - Mozilla Firefox" and the URL is "http://www.klm.com/travel/nl\_nl/apps/ebt/ebt\_home.htm". The page features the KLM logo and navigation links for "Book flights", "nwa", and a search bar. A progress bar indicates five steps: 1. Vlucht zoeken, 2. Datum kiezen, 3. Tijd kiezen, 4. Uw gegevens, and 5. Bekijken & betalen. The current step is "Tijd kiezen".

**Kies uw heen- en terugvlucht.**

Vertrek: Amsterdam (Schiphol) naar Boedapest (Ferihegy Airport)

- Alleen de beste verbindingen (10 van 13)
- Alleen rechtstreekse vluchten tonen (5 van 13)
- Laagste tarieven (9 van 13)
- Alle vluchten (13)

Kies	Prijs	Vertrek	Aankomst	Vlucht
<b>Rechtstreekse vluchten</b>				
<input checked="" type="radio"/>		10:00 Vr 15 Aug 08 Amsterdam (Schiphol) Totale reistijd: 2 uren 0 minuten Uitgevoerd door MALEV Hungarian Airlines Vliegtuigtype :Boeing 737	12:00 Vr 15 Aug 08 Boedapest (Ferihegy Airport)	KL3201
<input type="radio"/>		12:20 Vr 15 Aug 08 Amsterdam (Schiphol) Totale reistijd: 2 uren 0 minuten Uitgevoerd door MALEV Hungarian Airlines Vliegtuigtype :Boeing 737	14:20 Vr 15 Aug 08 Boedapest (Ferihegy Airport)	KL3203

**Kies tarief**

Take Off (25% FB Miles) 300  Geselecteerd

Take Off 341  Selecteer

Take Off (Flexibel) 383, 455, 537

# ... the airline of the target country, or ...

Review - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://booking.malev.com/BookingSite/Review/Review.aspx

BOOK YOUR TRIP  
FLIGHTS, SCHEDULES  
PREPARE FOR FLIGHT  
FLYING WITH MALEV  
DUNA CLUB  
CUSTOMER CARE  
CORPORATE INFO






**MALEV** Hungarian Airlines  
ONE MORE REASON TO TRAVEL

English

1 Search 2 Select 3 Review 4 Traveller data 5 Purchase 6 Confirmation

### SELECT DELIVERY METHOD


Please select ticket delivery method below!

Delivery method	Service fee	Address
<input checked="" type="radio"/>  E-ticket	EUR 10 <a href="#">View service fee breakdown</a>	with e-invoice
<input type="radio"/>  Airport	EUR 30	KLM ticket office, departure hall 2.
<input type="radio"/>  Office	EUR 30	KLM ticket office, departure hall 2.
<input type="radio"/>  Courier		Courier or mail delivery is available only within the country of departure! You will be asked to provide a delivery address on the next page. Please note that in case of courier delivery we will be unable to deliver your ticket(s) to a PO box.
<input type="radio"/>  Mail	EUR 30	

### FLIGHT SUMMARY

Outbound flight		Return flight	
From:	Amsterdam, Schiphol (AMS), Netherlands	From:	Budapest, Ferihegy 2A (BUD), Hungary
	Budaöest. Ferihegy 2A (BUD).	To:	Amsterdam, Schiphol (AMS),

**BOOKING GUIDE**  
Book Cheap!  
Card payment  
About ticket pickup  
If you are not among the travellers  
Online Client Service

  
Check III!

# ... or a low cost one

The screenshot shows the Wizzair website interface in a Mozilla Firefox browser window. The page title is "Online booking | Select Flights - Mozilla Firefox". The address bar shows the URL: <http://wizzair.com/skylights/cgi-bin/skylights.cgi?step=1>. The Wizzair logo and website name are visible in the top left. A banner at the top right announces a "new destination from London Luton: Timisoara (from 17 December)".

The main navigation menu includes: [online booking](#), [useful information](#), [destinations](#), [travel services](#), and [partners](#). A secondary menu on the left lists: [flights](#), [agency login](#), [my account](#), [search bookings](#), and [log in](#).

A notification bar states: "Important changes regarding checked-in baggages - Please click here for more details...". Below this, a progress indicator shows the current step:  search,  select,  contact,  passengers,  purchase, and  confirmation.

The main content area explains that flights are shown for the selected date(s) and provides instructions on how to select flights. It also notes that fares are for one-way flights and include taxes and charges.

The flight search results are for a "going out" flight from Eindhoven to Budapest-Terminal 1. The results table is as follows:

date	fareclass	flight	departs	arrives	price excluding tax	taxes and charges
Fri 15 Aug 08	Web	W6 228	13:25	15:20	<input type="radio"/> Adult 94.99 EUR	26.00 EUR
Sun 17 Aug 08	Web	W6 228	13:25	15:20	<input type="radio"/> Adult 73.99 EUR	26.00 EUR

At the bottom right, there is a "Next Week >" button.

**You have to find a hotel, so you look  
for...**

# ... a really cheap accommodation, or ...

The screenshot shows the HostelTraveler.com website interface. The browser title is "Hostels - online booking at Youth Hostels and Backpackers Hostels - instant online reservations and reviews with HostelTraveler.co...". The address bar shows "http://www.hosteltraveler.com/index.php". The website header includes the logo "HostelTraveler.com" and navigation links for "Hostels", "Reviews", "Best deals", and "Top Cities". A search bar is present with a "Search Hotels/Cities" button. Below the search bar, there are buttons for "Check Reservations" and "Free Membership". The main heading reads "Find Hostels and Lodging at your destinations." followed by the instruction "Look for **iwb** for instant online booking." A sidebar on the right contains a "How it Works" section with "Step 1-Find Lodging" and "Step 2-Make Reservations". The main content area displays "3 accommodations have been found matching your criteria." and a "Make Reservations" button. Below this, there are sorting options: "Sort by: Price (Lo-Hi)", "Price (Hi-Lo)", "Traveler Rating", "Hostel Class", and "Hostel Name". A "View Advanced Display Options" link is also present. The search results are for "Balaton, Hungary" and include a "Make Reservations" button. The first result is "Unity Hostel Balaton" located at "Rakoczi Ut 268", with "8 Units" and a price starting from "€12". The description for this hostel is: "2hours from Budapest, we are located right behind a free beach access to the lake, right opposite a large shopping and dinning court, only few minutes from the best clubs.lots of freebies!!!".

HostelTraveler.com  
Hostels Reviews Best deals Top Cities  
everything for travelers:  
Search Hotels/Cities  
Check Reservations  
Free Membership

Find Hostels and Lodging at your destinations.  
Look for **iwb** for instant online booking.

How it Works  
Step 1-Find Lodging  
Step 2-Make Reservations

Secure online hostel booking at worldwide youth hostels, backpackers, and budget hotels.  
Home  
Start Over  
Members  
Lodging Operators  
About this Site  
Selection Status

3 accommodations have been found matching your criteria.  
Select your accommodations and click **Make Reservations** for rates, availability, and reservations.  
Click on names to see photos, reviews, and more information.  
Tip: Click **Instant** for rates and instant secure confirmations.

Sort by:  Price (Lo-Hi)  Price (Hi-Lo)  Traveler Rating  Hostel Class  
 Hostel Name  
View Advanced Display Options

Balaton, Hungary **Make Reservations**

<input type="checkbox"/>	<b>Unity Hostel Balaton</b> Rakoczi Ut 268 Hostel 8 Units Write a Review		<b>Instant Booking</b>	From <b>€12</b> 2hours from Budapest, we are located right behind a free beach access to the lake, right opposite a large shopping and dinning court, only few minutes from the best clubs.lots of freebies!!!
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... or a really luxurious one, or ...

The screenshot shows a Mozilla Firefox browser window displaying the Hilton website's search results. The browser's address bar shows the URL: `http://www.hilton.com/en/hi/hotels/search/newresults.jhtml?searchType=city&stai`. The page features the Hilton logo and a navigation menu with items like 'Specials & Packages', 'Reservations', 'Meetings', 'Social Gatherings', 'Hilton HHonors', 'Things to Do', 'eBrochures', and 'My Favorites'. A 'Sign in' section is visible with fields for 'Username or HHonors #' and 'Password or PIN', along with a 'Remember Me' checkbox. Below the navigation, the 'Search Results' section is active, showing a search for 'Budapest' in Hungary. The search criteria are: City: Budapest, Search Within: 40 mi, State/Province: Hungary. The results list 'Hilton Budapest WestEnd' as available, with the address 'Vaci ut 1-3, Budapest, Hungary, 1062' and phone number '36-1-288-5500'. A 'Compare Hotel' checkbox is present next to the hotel name.

# ... an intermediate one ...

Szállás Utazás Magyarországon - Wellness-Szállás, Nyaralás, Utazás, Programok - Magyarországon - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.travelsinhungary.hu/view\_kat.php?katid=1&megye=budapest

MAGYAR ENGLISH DEUTSCH

Keresés Az összes kategóriában OK

**TRAVELS HUNGARY**  
www.travelsinhungary.hu

**TÖRZSVENDÉG KEDVEZMÉNYEK**

**REGISZTRÁCIÓ**

**ELÉRHETŐSÉG**

**VENDÉGKÖNYV**

Szállás (Wellness, Aktív pihenés, Gyógyturizmus)

Étterem

Programok, Látnivalók

Szórakozás (Élményfürdők, Kalandparkok)

Rendezvényszervezés (konferenciák-tréningek)


**AJÁNLATOK**

**Szálláshely \ Budapest**

Válasszon megyét:  
Válasszon!

Válasszon várost:  
Válasszon!

Ajánlatok száma a kategóriában: 1.



**Airport Hotel Budapest\*\*\*\*** ★★★★★

**SZÁLLÁSHELY Budapest(Vecsés)**  
Ferihegyi repülőtéri szálloda és konferencia központ

[részletesen...](#)

**oops, that is no good, the page is in  
Hungarian that almost nobody  
understands, but...**

# ... this one could work

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The screenshot shows a Mozilla Firefox browser window displaying the Best Western website. The address bar shows the URL: <http://book.bestwestern.com/bestwestern/selectHotel.do?iata=00158210>. The page title is "Bestwestern.com, the World's Largest Hotel Chain - Mozilla Firefox".

The website header includes the Best Western logo and navigation links: "Customer Service", "Rewards Program", "Gift Card", and "Groups & Meetings". A "My Profile" section is visible with fields for "Email or Member#" and "Password", and a "SIGN-IN" button. Links for "Forgot Password", "Create Password", and "Enroll Now" are also present.

The main navigation bar contains buttons for "HOME", "FIND A HOTEL", "CHECK RESERVATIONS", "TRIP PLANNER", "PROMOTIONS & PROGRAMS", and "PACKAGES". Below this, a secondary navigation bar lists "RESERVATIONS", "HOTEL LOCATIONS", "BEST WESTERN PREMIER HOTELS", "NEW HOTELS", and "QUESTIONS & ANSWERS".

The current page is titled "Find a Hotel - Select Hotel" and is on "Page: 1". The search results show "5 Hotels Found within 50 Mi / 80 Km of the Budapest Area". The search filters are set to "City: Budapest", "Select State or Province: All", "Select Country: Hungary", "Check-In: 08/15/2008", and "Check-Out: 09/03/2008". The "Show" filter is set to "All Hotels" and "By" is set to "Distance". A "Display Currency In:" dropdown is also visible.

The featured hotel is "Best Western Hotel Hungaria". It is a 4-star hotel located at Rákoczi Ut 90, Budapest, H-1074, Hungary, with a distance of 0.86m / 1.38km from the city center. The hotel description states: "Stay at this 4-star Budapest hotel offering guests deluxe accommodations near some of Budapest's popular attractions and business locations. Visitors... More >". A "Photo Gallery" link is provided. A "Pet Policy" icon is also visible.

A warning box indicates: "Hotel not available on selected dates." with a "Check Alternate Dates" button.

The "Features & Amenities" section includes checkboxes for "High Speed Internet" and "Complimentary Breakfast".

**Of course, you could decide to trust a specialized site...**

# ... like this one, or...

Create your package from Amsterdam to Budapest (and vicinity) - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.expedia.com/pub/agent.dll?qscr=cms&subm=1&CMBTX\_0\_rgnm=Bud

Welcome - Already a member? [My Itineraries](#) | [My Account](#) | [Customer Support](#)

Search Expedia

Home Flights Hotels Cars **Vacation Packages** Cruises Activities DEALS & OFFERS Maps Business Travel Rewards

Start search over

Change your search

Departing: 8/18/2008

Returning: 9/3/2008

Star Rating: Show all

Lodging Type: Show All

Name contains:

Go

Change Travelers

2 Adults  
1 Room

Change travelers

## Create your package from Amsterdam to Budapest (and vicinity)

Maps: [Area map view](#) [Hotel map view](#) [Hotel amenities: Narrow your search](#)

Show hotels in this area:  
Budapest (and vicinity) (all areas) **Go**

Not what you're looking for? [Choose a different destination](#)

View packages: 1 - 25 26 - 50 51 - 75 76 - 97 [Previous](#) | [Next](#)

Sort by:  Expedia Picks  Price  Hotel Name  City  Star Rating  Traveler Opinion

**Corinthia Grand Hotel Royal**

Impressive landmark building with imposing Neo-classical façade and soaring glass atrium, set on Pest's busy Erzsébet Avenue, and housing shops, a spa, ... [More lodging info](#)

**Hotel promotion - Stay 3 Nights and Save 20% on Your Stay!**

★★★★★ Budapest, PEST

Executive Double-Executive lounge usage Check in: 8/18/08

Includes: Free Wireless Internet, Spa Check out: 9/03/08

Credit, Breakfast Buffet

Avg/person: **\$2889**

Total: [Price details](#) \$5778

[Get ThankYou® Points](#)

Traveler Opinion  
**4.7** out of 5  
15+ reviews

Amsterdam (AMS) to Budapest (BUD) Depart: 8/18/08 6:00 PM - 8:00 PM Malev Hungarian Airlines

# ... or this one

The screenshot shows a Mozilla Firefox browser window displaying the TripAdvisor website for Budapest Hotels. The browser's address bar shows the URL: <http://www.tripadvisor.com/Hotels-g274887-Budapest-Hotels.html>. The page features the TripAdvisor logo with the tagline "get the truth. then go.\*" and a navigation menu with options like Home, Destinations, Fun & Games, and Just For Members. A search bar is visible on the left side.

The main content area is titled "Budapest Hotels" and includes a breadcrumb trail: Home → Europe → Hungary → Budapest. Below the title, there are tabs for "Hotels (272)", "B&Bs / Inns (24)", and "Specialty Lodging (83)". A section titled "Find Hotels Travelers Trust" contains search filters for Check-in, Check-out, Price, Hotel class, Adults, and Recommended For. A "Find Hotels" button is located below these filters.

On the right side, there is a "Best deals: Budapest hotels" section with several promotional offers, including "Budapest: Boek en bespaar tot 75%", "Great Budapest Hotels", "Budapest easyHotel Deals", and "Cheap Hotels Budapest". Below this, there is a "Free Budapest Guide" section with a "Download pdf" button.

At the bottom, a "Recommended Hotels" section is visible, showing a "Sort by: Popularity" dropdown menu and a "next >>" link. The page also includes a sidebar with various navigation options like "Budapest Overview", "Budapest Hotels", "Flights to Budapest", and "Budapest Deals".

**You may want to know something  
about Budapest; look for some  
photographs...**



# ... on flickr ...

Flickr: Budapest - Mozilla Firefox


File Edit View History Bookmarks Tools Help

http://www.flickr.com/groups/budapest/













Signed in as Ivan Herman Help Sign Out

Home You Organize Contacts Groups Explore

Search this group's pool Search

 **Budapest** [Group Pool](#) | [Discussion](#) | [1,418 Members](#) | [Map](#) | [Invite Friends](#) [Share This](#)

**Group Pool** ( 19,017 items | [Add photos or video](#) )

 <b>NEW</b> From apuc	 <b>NEW</b> From André Fromont	 <b>NEW</b> From carlogambino	 <b>NEW</b> From carlogambino	 <b>NEW</b> From Crashbandi	 <b>NEW</b> From Crashbandi
 <b>NEW</b> From Crashbandi	 <b>NEW</b> From Crashbandi	 <b>NEW</b> From Crashbandi	 <b>NEW</b> From Crashbandi	 <b>NEW</b> From Crashbandi	 <b>NEW</b> From Crashbandi

[» More](#)

**Discussion** ( 33 posts | [Post a new topic](#) )

# ... on Google ...

budapest - Google Image Search - Mozilla Firefox












File Edit View History Bookmarks Tools Help

http://images.google.nl/images?hl=en&q=budapest&btnG=Search+Images&gbv=: ☆ est tourist ABP

Web Images Maps News Video Gmail more Sign in

Google™ budapest Search Images Search the Web Advanced Image Search Preferences  
Moderate SafeSearch is on

Images Showing: All image sizes Results 1 - 18 of about 19,900,000 for **budapest** [definition]. (0.25 seconds)

 <p>E-mail this photo E-mail. <b>Budapest</b> 550 x 412 - 40k - jpg www.tripadvisor.com</p>	 <p><b>Budapest, Hungary</b> 450 x 338 - 43k - jpg www.transitionsabroad.com</p>	 <p><b>Budapest looks its most beautiful at ...</b> 1024 x 768 - 161k - jpg web.kvif.bgf.hu</p>	 <p><b>Beautiful-Budapest</b> 430 x 320 - 34k - jpg www.budapesthotels.com [ More from www.budapesthotels.com ]</p>	 <p><b>Hotel Victoria Budapest</b> 575 x 473 - 92k - jpg www.victoria.hu</p>	 <p><b>Fly to Budapest and experience one ...</b> 909 x 682 - 347k - jpg www.sterling.dk</p>
 <p><b>Danube Bridge Elisabeth in Budapest ...</b> 1024 x 768 - 194k - jpg budapest5.freeblog.hu</p>	 <p><b>Budapest had 2421831 inhabitants in ...</b> 422 x 425 - 29k - jpg www.squidoo.com</p>	 <p><b>budapest night</b> 575 x 352 - 206k - jpg www.wayfaring.info</p>	<p><b>Budapest - Things to Do with a Day ...</b> 400 x 300 - 32k - jpg cruises.about.com</p>	 <p><b>Jewish Cultural Heritage in Budapest</b> 452 x 360 - 67k www.budapesthotels.com</p>	 <p><b>Hungary, Budapest, Parliament</b> 640 x 480 - 199k - jpg www.hungary.travelphotoguide.com</p>

... or you can look at mine 😊


Mozilla Firefox

File Edit View History Bookmarks Tools Help


http://www.ivan-herman.net/Photos/JAlbum/Budapest/

distributed hash

View Theme Print Download (103 photos)



19 of 103



Táncsis Mihály utca, Budapest

(19 of 103 photos) delay=5

Published by Digital Photo Librarian

# but you can also look at a (social) travel site <sup>20</sup>

The screenshot shows a Mozilla Firefox browser window displaying the RealTravel website. The page title is "Budapest Travel Guide | Budapest Tourism - RealTravel - Mozilla Firefox". The address bar shows the URL "http://realtravel.com/budapest-hungary-travel-guide-d13081-1.html". The website header features the RealTravel logo with the tagline "Real People. Real Advice. Real Experiences." and navigation links for "Free Travel Blog", "Free Trip Planner", and "Sign". A secondary navigation bar includes "Travel Guides", "Hotels", "Attractions", "Things To Do", "Editor's Picks", and "Deals", along with a search box. The breadcrumb trail reads "You are here: Destinations > Europe > Hungary > Budapest > Travel Guide". The main content area is titled "BUDAPEST TRAVEL GUIDE AND TOURISM" and has sub-tabs for "Introduction", "Guides", "Trips", "Photos", "Flights", "Hotels", "Restaurants", "Attractions", and "Deals". The "Guides" tab is active, showing a section titled "Budapest Travel Guide" with a photograph of a statue and a building. The text describes Budapest as the "Paris of Eastern Europe" and highlights its history and culture. To the right, there is a "Price Compare Tool" section with buttons for "COMPARE FLIGHTS" and "COMPARE HOTELS". The footer area is titled "Travel Guide Information From Our Partners".

Budapest Travel Guide | Budapest Tourism - RealTravel - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://realtravel.com/budapest-hungary-travel-guide-d13081-1.html

realtravel™ Real People. Real Advice. Real Experiences.™

Free Travel Blog Free Trip Planner Sign

Travel Guides Hotels Attractions Things To Do Editor's Picks Deals Search

You are here: Destinations > Europe > Hungary > Budapest > Travel Guide

**BUDAPEST TRAVEL GUIDE AND TOURISM**

Introduction Guides Trips Photos Flights Hotels Restaurants Attractions Deals

**Budapest Travel Guide**

This capital city - made up of two parts, Buda and Pest - sits on one of the most beautiful areas of the Danube River and it shows. Often dubbed the "Paris of Eastern Europe", it is a combination of Old World grandeur and a thriving cultural scene. Budapest has a vibrancy and vitality that never slows and the numerous sights can occupy travelers for weeks. With so much history and culture to explore, no traveler leaves unsatisfied.

photo by Taisteal

more Budapest photos ▶  
Destinations near Budapest ▶

**Price Compare Tool**

Search multiple sites for the best rate in Budapest

COMPARE FLIGHTS

COMPARE HOTELS

Travel Guide Information From Our Partners

# What happened here?

- You had to consult a large number of sites, all different in style, purpose, possibly language...
- You had to mentally *integrate* all those information to achieve your goals
- We all know that, sometimes, this is a long and tedious process!

- All those pages are only tips of respective icebergs:
  - the real *data* is hidden somewhere in databases, XML files, Excel sheets, ...
  - you have only access to what the Web page designers allow you to see

- Specialized sites (Expedia, TripAdvisor) do a bit more:
  - they gather and combine data from other sources (usually with the approval of the data owners)
  - but they still control how you see those sources
- But sometimes you want to personalize: access the original data and combine it yourself!

# Here is another example...

**CoCoDat - Collation of Cortical Data - Mozilla Firefox**

File Edit View History Bookmarks Tools Help

http://www.cocomac.org

CoCoMac DATABASES ORT EXAMPLES

**CoCoDat: Collation of Cortical [Soma and dendritic compartment] Data**

CoCoDat is a microcircuitry database that collates published experimental reports. The data include morphological and cellular compartment (soma and dendritic compartment), as well as the following properties:

- Morphology
- Firing properties
- Ionic currents
- Ionic conductances
- Synaptic currents
- Connectivity

The database is available for download of the data tables but also a Search Board with manual or automatic relaxation of the search criteria.

- Brain region
- Layer
- Neuron type

http://www.cocomac.org/cocodat/catalyzer/index.html

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**Cell Centered Database - Mozilla Firefox**

File Edit View History Bookmarks Tools Help

http://ccdb.ucsd.edu/sand/main?event=gallery&action=show&dpl=y

**Cell Centered Database™**  
National Center for Microscopy and Imaging Research

*Gallery*

Data | Search | Gallery | Dictionary | Publications | MyCCDB | Data Download | Contact us | Help

2D image Reconstruction Segmentation Animation

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**NeuronDB = Thalamic relay neuron - Overview (A) () - Mozilla Firefox**

File Edit View History Bookmarks Tools Help

http://senselab.med.yale.edu

**NeuronDB**

Back **Thalamic relay neuron**

Mode: **Overview** Data/Search plus Connectivity plus Classical References/Notes Models

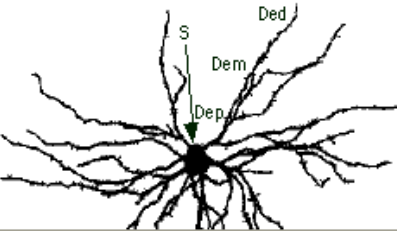
Region: **Distal equivalent dendrite** Middle equivalent dendrite Proximal equivalent dendrite Soma Axon hillock Axon fiber Axon terminal All Compartments

Properties: **Receptors** Channels Transmitters **All Properties**

Interoperation: **Gene and Chromosome** Experimental Data (neurodatabase.org) Microscopy Data (CCDB)

Neuron type: principal  
Organism: Vertebrates

1. Equivalent dendrite Show other  
2. Distal equivalent dendrite Show other  
3. Middle equivalent dendrite Show other  
4. Proximal equivalent dendrite Show other  
5. Soma Show other



Done

W3C Semantic Web



- Companies may have to hire a person to answer questions based on those (public!) databases!

**Another example: social sites. I have a list of “friends” by...**


# ... Dopplr,

DOPPLR: Ivan Herman's fellow travellers - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.dopplr.com/traveller/IvanHerman/fellows

W easy jet

DOPPLR  FOR IVAN

Find and Invite | Your connections | Your trips | Your account | Sign out


Visit our blog for updates

Where Next? { **Gent, Boston, Vienna...**

+ Add a trip

Type the name of a city or a traveller

Find people and places



## Welcome, Ivan

In the last 2 weeks,  
one of your fellow travellers added a trip that coincides with you. [Find out more in your journal...](#)

You are at home in [Amsterdam](#).






You can [invite](#) people to Dopplr to see your trips, find them on [other networks](#) you use or look for [travellers you already know](#) to encourage more coincidences.

You have a [public profile](#). [Edit it?](#)

You can now create a public profile to display to the whole internet if you want, not just Dopplr users — and take any of the information to embed on your own website. [Give it a try!](#)

Your trips | **Fellow travellers** | Your journal | Your carbon

List or Map

-  Peter Brown is in [Montréal](#) until August 16th. [Boston](#) soon. [Montréal](#) later.
-  Daniel Appelquist is in [Washington](#) until August 23rd. [Aspen](#) soon. [Washington](#) later.
-  Eva Méndez is in [Maraña](#) until August 17th. [Santo Domingo](#) later.
-  Danny Weitzner is in [Bergen](#) until September 5th. [Los Angeles](#) later.
-  Charlton Barreto is in [Vienna](#) until August 18th. [Sacramento](#) soon. [Vienna](#) later.

# ... LinkedIn,

LinkedIn: My Contacts: Connections - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.linkedin.com/connections?trk=hb\_side\_cnts

Account & Settings | Help | Sign Out | Language

Advanced Search People Search

Home Groups Profile Contacts Inbox (19)

Add Connections

Ivan Herman  
Semantic Web Activity Lead, World Wide Web Consortium  
What are you working on?  
Your profile is 80% complete [Edit]

## Contacts

Connections Imported Contacts Network Statistics Add Connections

### Connections

Show contacts with new connections advanced options

Showing 311 of 311 connections. 15 outstanding sent invitations

Letter	Name	Company	Connections
A	<b>Aasman, Jans</b> Ja@franz.com <a href="#">View &amp; edit details »</a>	CEO at Franz Inc	252
E	<b>Abramatic, Jean-François</b> jfa@iloq.fr <a href="#">View &amp; edit details »</a>	Chief Product Officer at ILOG	163
I	<b>Adida, Ben</b> ben@adida.net <a href="#">View &amp; edit details »</a>	Software Security Researcher and Entrepreneur	148
L	<b>Allemang, Dean</b> dino-link@happydino.com <a href="#">View &amp; edit details »</a>	Chief Scientist at TopQuadrant Inc.	179
O	<b>Allison, Kevin</b> kevin.allison@ft.com <a href="#">View &amp; edit details »</a>	San Francisco Correspondent at The Financial Times	152
R	<b>Alonso, Jose Manuel</b> jalonso@w3.org <a href="#">View &amp; edit details »</a>	eGovernment Lead at W3C	106

# ... and, of course, the ubiquitous Facebook

The screenshot shows the Facebook 'All Friends' page in a Mozilla Firefox browser window. The browser's address bar displays the URL: `http://www.new.facebook.com/friends/#/friends/?fid=0&view=everyone&`. The page header includes the Facebook logo, the user's name 'Ivan Herman', and navigation links for 'Friends', 'Applications', and 'Inbox'. A search bar is located in the top right corner.

The main content area is titled 'All Friends' and features a sidebar on the left with 'Friend Lists' (All Friends, CWI, Family, IW3C2, W3C Team) and 'Find Friends' options. The main list shows 137 friends, with the first few being Shadi Abou-Zahra, Ross Ackland, Ben Adida, Anupriya Ankolekar, and Daniel Appelquist (with a status update: 'is hanging out in Aspen. 15 hours ago').

On the right side, there are advertisements for 'Make mo' and 'Do You T Photos?'. The browser's status bar at the bottom shows the W3C logo and the text 'Semantic Web'.

- I had to type in and connect with friends again and again for each site independently 😞
- This is even worse than before: / feed the icebergs, but I still do not have an easy access to data...

# What would we like to have?

- Use the data on the Web the same way as we do with documents:
  - be able to link to data (independently of their presentation)
  - use that data the way I want (present it, mine it, etc)
  - agents, programs, scripts, etc, should be able to *interpret* part of that data

# Put it another way...

- We would like to *extend* the current Web to a “Web of data”:
  - allow for applications to exploit the data directly



**But wait! Isn't what mashup sites are already doing?**


# A “mashup” example:

Triplt | Organize your travel - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.tripit.com/trip/show/id/858966


View Change Log

Thursday, July 24, 2008  Budapest, Hungary (Edit)  
Avg: Sunny / Hi 28°C / Lo 14°C [Add Plans](#)

**FLIGHT**

14:55 CEST

**Flight from Amsterdam (AMS) to Zurich (ZRH)** [edit](#) [delete](#) [copy](#) [move](#)

<b>Swiss International Airlines 729</b>	Depart: Amsterdam (AMS), 14:55 CEST	nonstop 1h 25min aircraft Airbus A320-100/200 374 miles	Conf. # JFFRAL
 Connects to: LX 2258 at 17:20 CEST	<b>Passengers</b> Ivan Herman Eva Boka ep Herman	<b>Booking Information</b> Booked on 18/4/2008 <a href="http://www.swiss.com">http://www.swiss.com</a>	

**FLIGHT**

17:20 CEST

**Flight from Zurich (ZRH) to Budapest (BUD)** [edit](#) [delete](#) [copy](#) [move](#)


<b>Swiss International Airlines 2258</b>	Depart: Zurich (ZRH), 17:20 CEST	nonstop 1h 35min aircraft Fokker 100 500 miles	Conf. # JFFRAL
Passenger(s): Ivan Herman, Eva Boka ep Herman.			

**MAPS**

19:05 CEST

**Map of Budapest, Hungary** [delete](#)

Budapest, Hungary



Map Satellite Hybrid

- In some ways, yes, and that shows the huge power of what such Web of data provides
- But mashup sites are forced to do very ad-hoc jobs
  - various data sources expose their data via Web Services
  - each with a different API, a different logic, different structure 😞
  - these sites are forced to reinvent the wheel many times because there is no standard way of doing things

# Put it another way (again)...

- We would like to extend the current Web to a standard way for a “Web of data”

# But what does this mean?

- What makes the current (document) Web work?
  - people create different documents
  - they give an address to it (ie, a URI) and make it accessible to others on the Web

# An example: Steven's site on Amsterdam <sup>38</sup> (done for some visiting friends)

The Internet Guide to Amsterdam - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://homepages.cwi.nl/~steven/amsterdam.html

Yahoo



## The Internet Guide to Amsterdam

### Contents

- Introduction
- Time
- Weather
- Language
- Money
- Tipping
- Electricity
- Safety and Health
- Hotels
- Eating and Drinking
- Transport
- Shopping
- News
- Communications
- Places to See
- What's On
- The Amsterdam Year
- Maps
- Books
- Other Resources

**Designed to be printed out and taken with you.**

Written by Steven Pemberton, CWI, Amsterdam, and Astrid Kerssens, Amsterdam.

Linked to by more than 450 other sites; more than **3,500,000** grunted readers!

*The top Amsterdam travel guide according to Google. If you know how Google works, you know that that says something about this site!*

See also [London](#)

### A Review of this Guide

The Internet Guide To Amsterdam:  
WebUser Gold Award  
Rating: ★★★★★  
Reviewed By: Jane Hoskyn

**Sometimes, it's the simple things in life that make your heart skip a beat.**

This is especially true when you're abroad and you need a guide that loads really fast on your mobile phone or PDA (check), doesn't involve clicking from page to page to find what you want (check), isn't written in fluffy tourist-board-speak (check), has all the links you need and none of the ones you don't (check), and is put together by someone who loves your destination and knows it better than the insides of his own eyelids (check). Step forward Steven Pemberton, creator of this exemplary guide to having a damn good time in the 'Dam.

### Introduction

Amsterdam is an unusual city in that it has all the advantages of a big city – culture, history, food, entertainment, good

# Then some magic happens...

- Others discover the site and they link to it
- The more they link to it, the more important and well known the page becomes
  - remember, this is what, eg, Google exploits!
- This is the “Network effect”: some pages become important, and others begin to rely on it *even if the author did not expect it...*

# This could be expected...

WWW9 Organizers - Opera

File Edit View Bookmarks Widgets Feeds Chat Tools Help

QuickP... Diigolet Pyt... Boo... W3... Sem... RDF... Validate! Mobical Favikis Twi... Netvibes World ...

WWW9 Organizers

http://www9.org/w9-organizers.html

ido-masochism website

## WWW9 Organizers

May 15-19, 2000, Amsterdam

### WWW9 Conference Committee

**Conference Co-Chairs:**

- Ivan Herman, CWI, The Netherlands
- Albert Veza, CNRI, USA

**Program Committee Chair:**

- Dick Bulterman, Oratrix, The Netherlands

**Program Committee Vice Chairs:**

Practice and Experience	<ul style="list-style-type: none"><li>Ann Bassetti, Boeing, USA</li></ul>
Content and Coding	<ul style="list-style-type: none"><li>Stephan Fischer, Technical University, Darmstadt, Germany</li></ul>
Hypermedia	<ul style="list-style-type: none"><li>Lynda Hardman, CWI, The Netherlands</li></ul>
Performance	<ul style="list-style-type: none"><li>Ann Jansen, IBM Research, USA</li></ul>

WWW9 HOME

PROGRAM INFO

SPONSORING

EXHIBITING

VOLUNTEERS

ORGANIZERS

PAST CONFERENCES

AMSTERDAM

CONTACT US

120%



# but this one, from the other side of the Globe, was not...

41

Netherlands - Spring Break Information - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://msass.case.edu/international/SPNetherlandsFAQ.html

CASE.EDU: HOME | DIRECTORIES | SEARCH

**CASE WESTERN RESERVE UNIVERSITY**  
MANDEL SCHOOL OF APPLIED SOCIAL SCIENCES

**INTERNATIONAL COURSES/PROGRAMS**

MSASS | About | Admissions | Programs | Students | Faculty | Research | Library | Calendar | Departments

**International Courses**

- General Information
- Descriptions by Country
- Passport Application
- Dutch Visa Application
- Previous Trips
- Testimonials

**Netherlands - Spring Break Information**

**Please also see the following links for information on the trip to the Netherlands**

- General FAQ
- Applying for a Dutch Visa
- A Students Photo Journal of the Netherlands

**What Forms do I need for this Program?**

All of the forms you will need are linked from the Forms page.

## More information? Check out these links:

### Amsterdam Links

Spring Break Trip participants to Amsterdam may familiarize themselves with Amsterdam by visiting the following web sites. On website address nl refers to the Netherlands.

Information on travel outside the United States, including instructions on getting a passport:  
<http://travel.state.gov>

A must see website <http://homepages.cwi.nl/~steven/amsterdam.html>

United States Consulate, Amsterdam: <http://www.usemb.nl>

Virtual Tour of Amsterdam: <http://www.channels.nl>

# What would that mean for a Web of Data?<sup>42</sup>

- Lessons learned: we should be able to:
  - “publish” the data to make it known on the Web
    - standard ways should be used instead of ad-hoc approaches
    - the analogous approach to documents: *give URI-s to the data*
  - make it possible to “link” to that URI from *other* sources of data (not only Web pages)
    - ie, applications should not be forced to make targeted developments to access the data
    - generic, standard approaches should suffice
  - and let the network effect work its way...

# Example: combine data from experiments

- A drug company has huge amount of old experimental data on its Intranet
- Data in different formats (XML, databases, ...)
- To reuse them:
  - make the important facts available on the Web via standards
  - use *off-the-shelf* tool to integrate, display, search

**Internal Compound Repurposing Example**

Welcome, Allergy & Respiratory Team Member

This tool allows you to identify opportunities for additional uses of compounds from other teams within your project. It combines internal data, public data and the results of your own experiments to provide testable hypotheses.

Control Panel & Item Filtering

Area	5/2	Approach	3/2	Term+Reason	1/2	Max_Stage_Reached	1/2	Literature Links
2/9 Pain	<input checked="" type="checkbox"/>	7 Antibody	<input type="checkbox"/>	3/ ACTIVE	<input type="checkbox"/>	5/ Candidate	<input checked="" type="checkbox"/>	0 - 50
1/0 Metabolic Disease	<input checked="" type="checkbox"/>	1 Recombinant	<input type="checkbox"/>	1/ BIOMARKER	<input type="checkbox"/>	1/0 Discovery	<input type="checkbox"/>	
1/ Cancer	<input type="checkbox"/>	18 SM_Agonist	<input checked="" type="checkbox"/>	5/ EFFICACY	<input checked="" type="checkbox"/>	4/ Exploratory	<input type="checkbox"/>	
3/ Sexual Health	<input checked="" type="checkbox"/>	12 SM_Antagonist	<input checked="" type="checkbox"/>	1/ MARKET	<input type="checkbox"/>	1/9 HTS	<input type="checkbox"/>	
2/ Infectives	<input checked="" type="checkbox"/>	21 SM_Inhibitor	<input checked="" type="checkbox"/>	1/ REORG	<input type="checkbox"/>	1/ Phase I	<input type="checkbox"/>	
1/ Urogenitals	<input checked="" type="checkbox"/>		<input type="checkbox"/>	1/ TOXIC	<input type="checkbox"/>	1/3 Phase III	<input type="checkbox"/>	
						4/ Screening	<input type="checkbox"/>	

51 items filtered from 710 originally (Reset All Filters)

Area	Original+Indication	Target_Name	Approach	Start	Term+Reason	Max_Stage_Reached	Owner	OMIM	LR_All	LR_2007	LR_Mech	DMA	GED	Pathway	Compounds
Metabolic Disease	Diabetes	Liver glycogen phosphorylase	SM_Inhibitor	2007-Q2	EFFICACY	Candidate	P. Person								SW-030072
Sexual Health	Erectile Dysfunction	Integrin alpha-3 (Galactoprotein B3)(VLA-3) (CD49C)	SM_Antagonist	2006-Q3	EFFICACY	Candidate	P. Person						1		SW-029782
Sexual Health	Erectile Dysfunction	Leukotriene C4 synthase	SM_Agonist	2006-Q3	EFFICACY	Candidate	M. Manager			1	1				SW-029638
Sexual Health	Erectile Dysfunction	transcription elongation factor A (SII)-like 4	SM_Inhibitor	2005-Q2	EFFICACY	Candidate	P. Person								SW-029626
Infectives	HEV	Putative four repeat ion channel (I)	SM_Inhibitor	2006-Q2	EFFICACY	Candidate	L. Leader								SW-029994
Infectives	HEV	Voltage-gated potassium channel protein KV1.2 (I)	SM_Agonist	2007-Q1	EFFICACY	Candidate	A. Scientist							1	SW-029653
Urogenitals	Incontinence	Human RNA binding motif (RBM) gene, partial cds.	SM_Agonist	2007-Q3	EFFICACY	Candidate	L. Leader							1	SW-029684
Pain	Migraine	Monocarboxylate transporter homolog uc2194064CD1 (I)	SM_Inhibitor	2007-Q3	EFFICACY	Candidate	L. Leader	18							SW-030085

# But it is a little bit more complicated 🤔

- On the traditional Web, humans are implicitly taken into account
- A Web link has a “context” that a person may use

# Eg: address field on my page:

Ivan Herman - Mozilla Firefox


File Edit View History Bookmarks Tools Help

http://www.w3.org/People/Ivan/

W3C

## Ivan Herman

[My Work at W3C](#) | [Contact information](#) | [Short CV](#) | [Upcoming trips](#) | [Public presentations](#)



### My Work at W3C

I am [Semantic Web Activity Lead](#); that is my main work at W3C. I am member of [IW3C2](#) (International World Wide Web Conference Committee) (the committee coordinating the yearly WWW conference series), serving as a liaison for W3C, and of [SWSA](#) (Semantic Web Science Association), the committee responsible for the International Semantic Web Conferences series.

As part of my work, I also participate in lots of outreach activities, and I regularly make presentations, tutorials, etc. You can consult my [list of presentations](#) for further details.

### Contact information

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Phone numbers:  
 phone: +31-20-5924163  
 mobile phone: +31-641044153  
 fax: +31-20-5924312

PGP/GPG:  
 My [GnuPGP key and signature](#) is available on-line.

FOAF:  
 You can either extract a short FOAF information from this page, or consult my more complete, public FOAF file.

Misc:

# ... leading to this page

Centrum Wiskunde & Informatica | CWI - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.cwi.nl/


home | contact | nl | intranet | nl Search...

**CWI** Centrum Wiskunde & Informatica


about cwi events library news research scientists

## Centrum Wiskunde & Informatica


Centrum Wiskunde & Informatica (CWI) performs fundamental scientific research in mathematics and computer science. CWI transfers the acquired knowledge to society and industry. The institute's strategy for the period up to 2012 is to concentrate research on four broad, societally relevant themes:




Earth &  
life  
sciences



The data  
explosion



Societal  
logistics




Software  
as  
service

## News

13-10-08

**PhD defence Jarek Byrka**



22-09-08

**Best Paper Award for SMIL State research**

At the ACM DocEngineering Symposium in Sao Paulo, Brazil, from 16 till 19 September, CWI researchers Jack Jansen and Dick Bulterman received the Best Paper Award.

[read more](#)

## Agenda

18-10-08

**Science Day at the Science Park Amsterdam**

At Science Day the Science Park Amsterdam will be open for. This year the theme of Science Day is 'Crack the code'. CWI workshops and demonstrations within this theme for every age

[read more](#)

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21-10-08

**MAS Seminar, speaker Svetlana Dubinkina**

Two speaker session

Tea starting at 10.00

Room: M279

Speakers:

1. Svetlana Dubinkina, CWI MAS 1, tba
2. James Glazier, University of Indiana Bloomington, tba

[read more](#)

---

28-10-08

**MAS Seminar, speaker Peter Sonneveld**

- A human understands that this is my institution's home page
- He/she knows what it means (realizes that it is a research institute in Amsterdam)
- On a Web of Data, something is missing; machines can't make sense of the link alone

- New lesson learned:
  - extra information (“label”) must be added to a link: “this links to my institution, which is a research institute”
  - this information should be machine readable
  - this is a *characterization* (or “classification”) of *both* the link *and* its target
  - in some cases, the classification should allow for some limited “reasoning”



# Let us put it together

- What we need for a Web of Data:
  - use URI-s to publish data, not only full documents
  - allow the data to link to other data
  - characterize/classify the data and the links (the “terms”) to convey some extra meaning
  - and use standards for all these!

# So What *is* the Semantic Web?

**It is a collection of standard technologies to realize a Web of Data**

# In what follows...

- We will use a simplistic example to introduce the main technical concepts of the Semantic Web

# The rough structure of data integration

1. Map the various data onto an abstract data representation
  - make the data independent of its internal representation...
2. Merge the resulting representations
3. Start making queries on the whole!
  - queries that could not have been done on the individual data sets

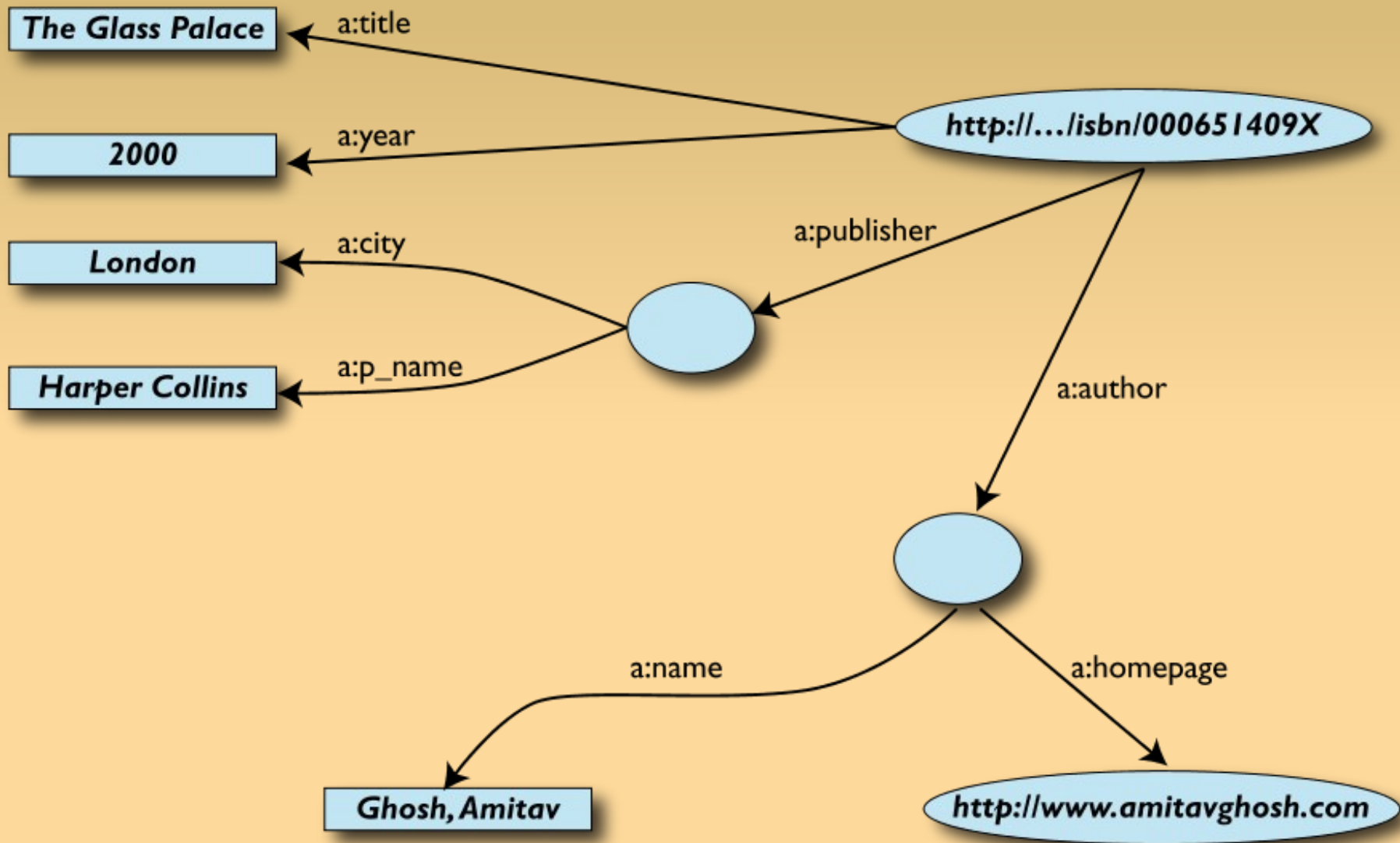
# A simplified bookstore data (dataset “A”)

<b>ID</b>	<b>Author</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>
ISBN0-00-651409-X	id_xyz	The Glass Palace	id_qpr	2000

<b>ID</b>	<b>Name</b>	<b>Home Page</b>
id_xyz	Ghosh, Amitav	<a href="http://www.amitavghosh.com">http://www.amitavghosh.com</a>

<b>ID</b>	<b>Publ. Name</b>	<b>City</b>
id_qpr	Harper Collins	London

# 1<sup>st</sup>: export your data as a set of relations



# Some notes on the exporting the data

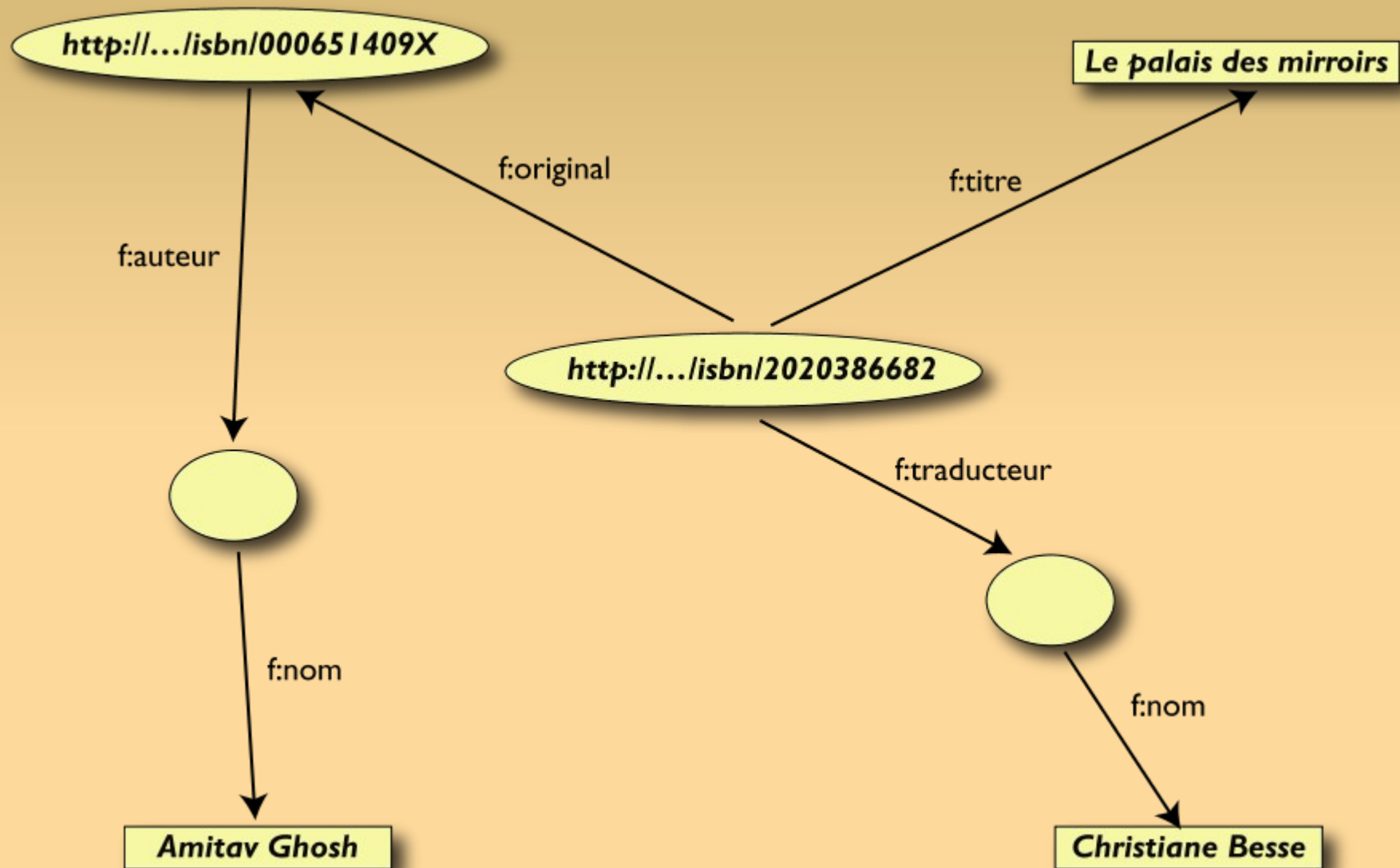
- Relations form a graph
  - the nodes refer to the “real” data or contain some literal
  - how the graph is represented in machine is immaterial for now
- Data export does *not* necessarily mean physical conversion of the data
  - relations can be generated on-the-fly at query time
    - via SQL “bridges”
    - scraping HTML pages
    - extracting data from Excel sheets
    - etc.
- One can export *part* of the data



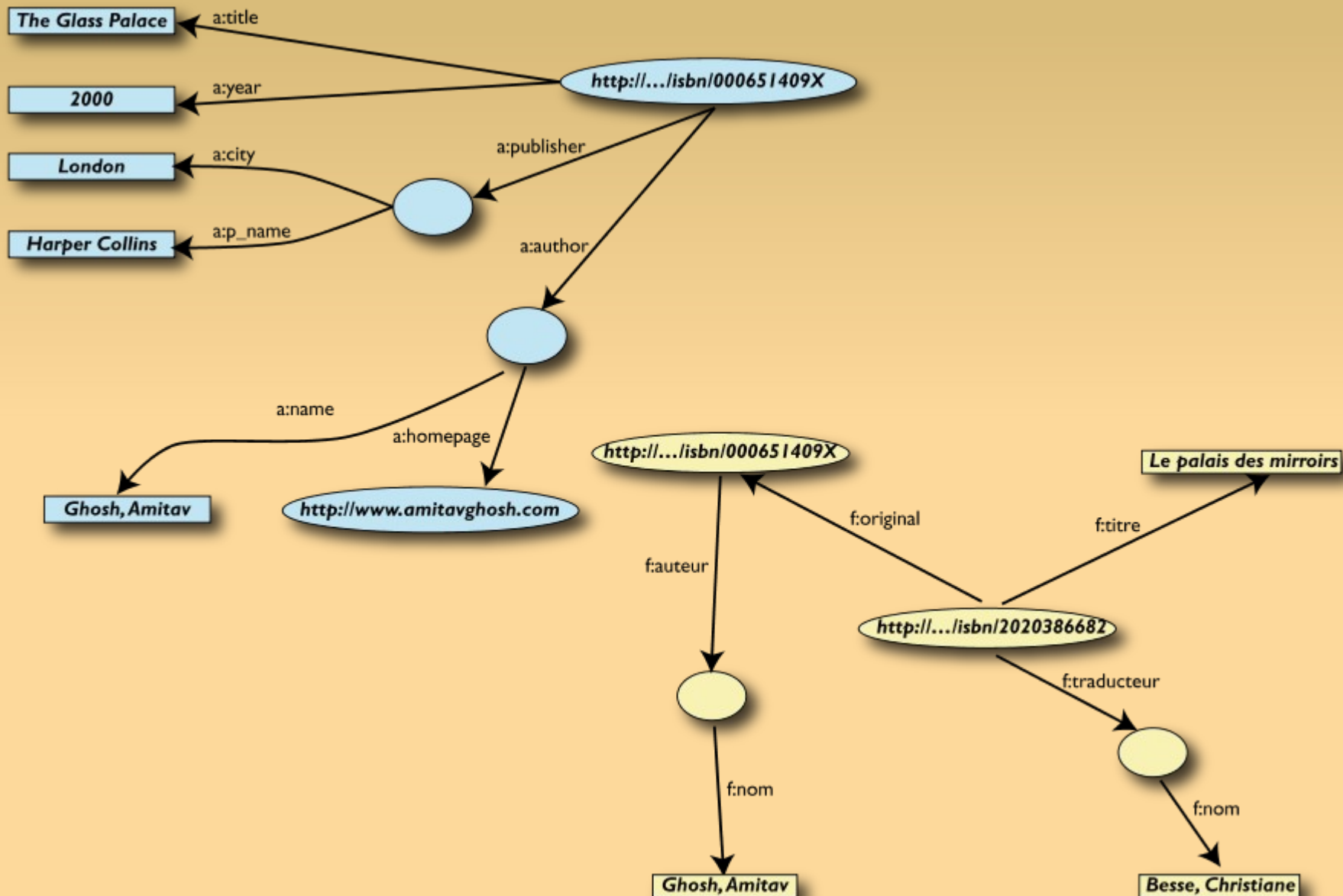
# Another bookstore data (dataset “F”)

	A	B	D	E
1	<b>ID</b>	<b>Titre</b>	<b>Traducteur</b>	<b>Original</b>
2	ISBN0 2020386682	Le Palais des miroirs	A13	ISBN-0-00-651409-X
3				
6	<b>ID</b>	<b>Auteur</b>		
7	ISBN-0-00-651409-X	A12		
11	<b>Nom</b>			
12	Ghosh, Amitav			
13	Besse, Christianne			

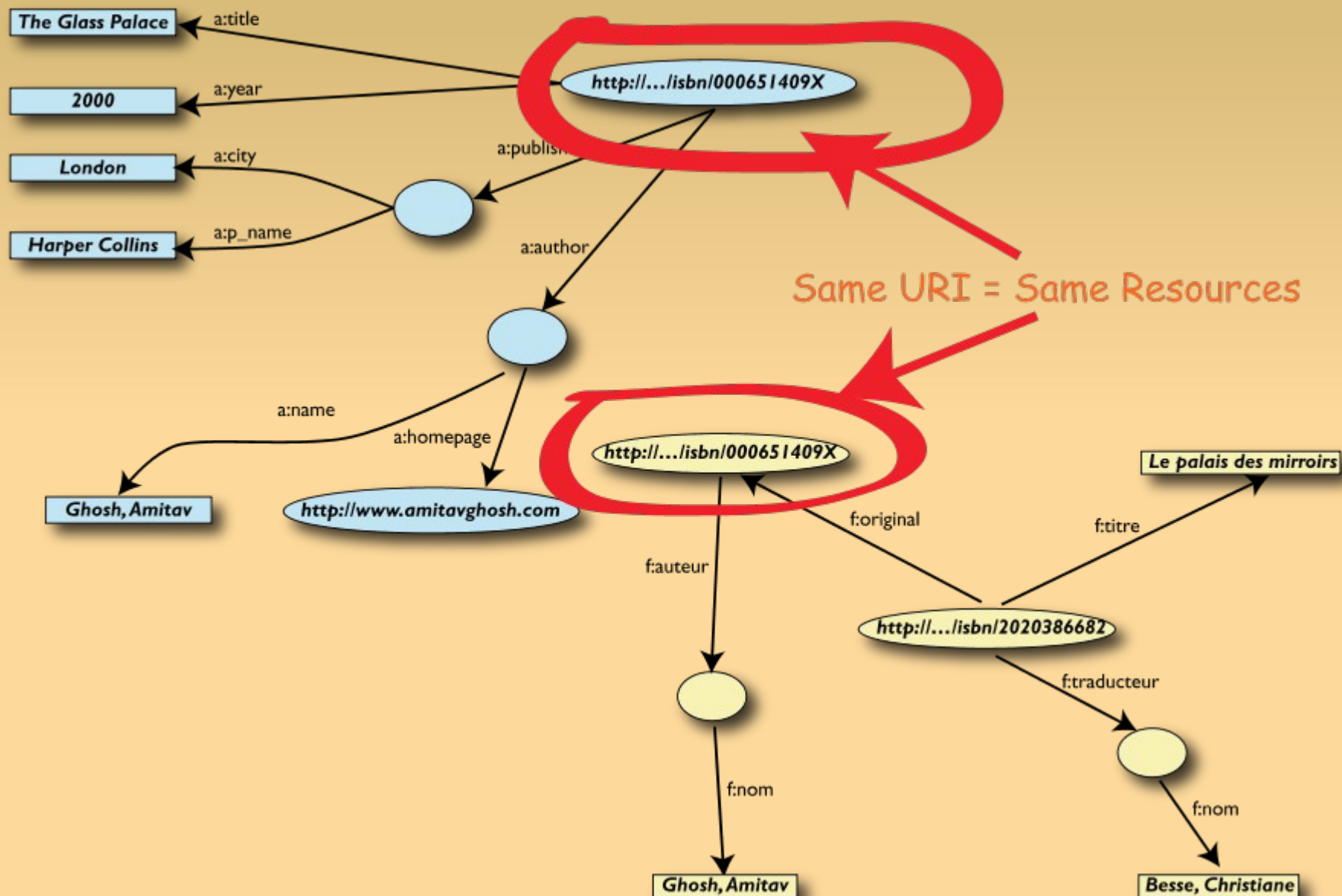
# 2<sup>nd</sup>: export your second set of data



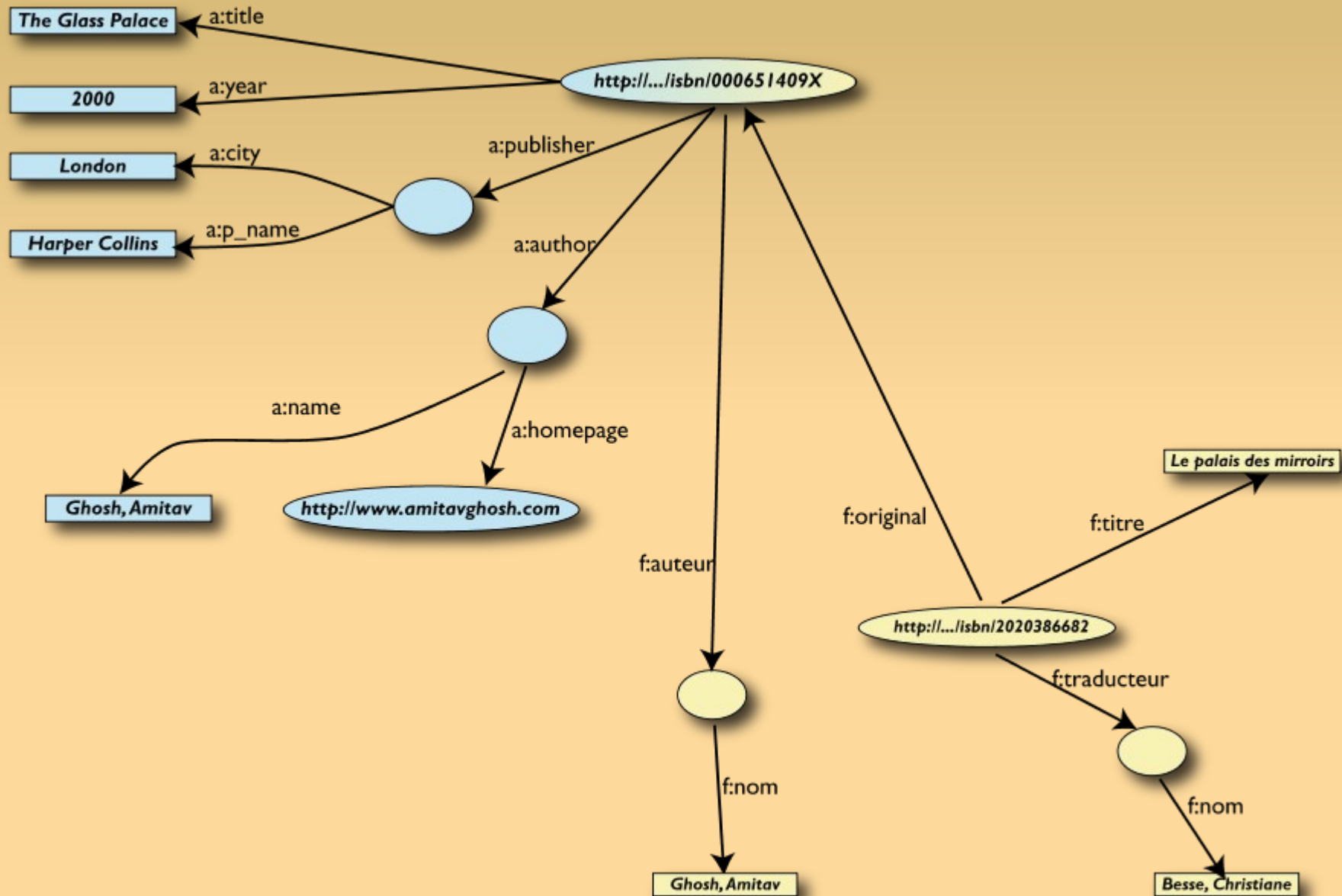
# 3<sup>rd</sup>: start merging your data



# 3<sup>rd</sup>: start merging your data (cont.)

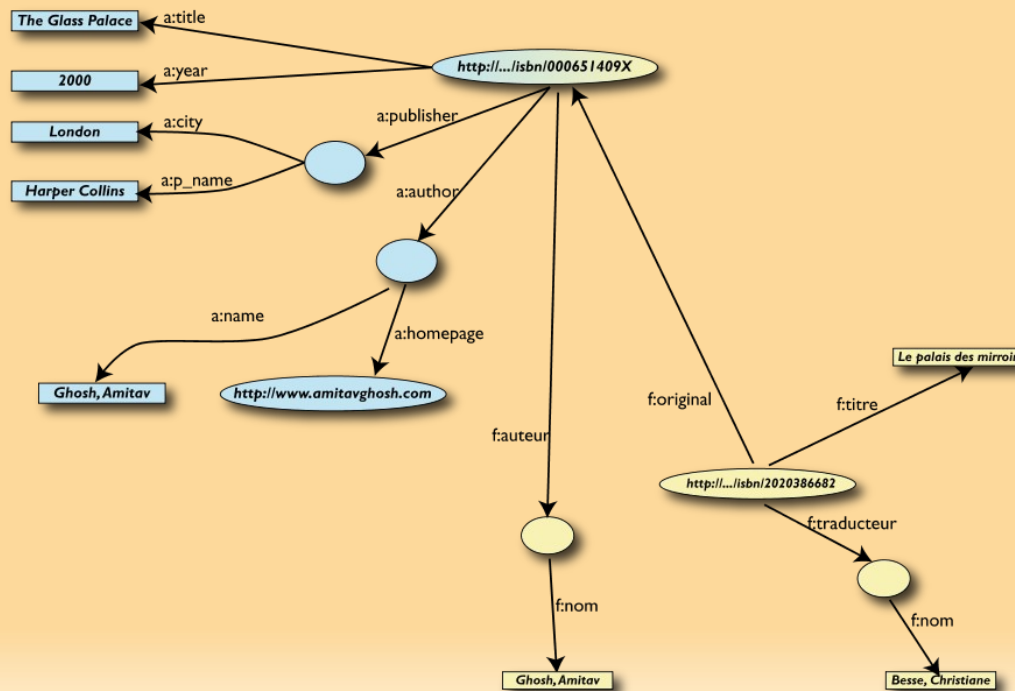


# 3<sup>rd</sup>: merge identical resources



# Start making queries...

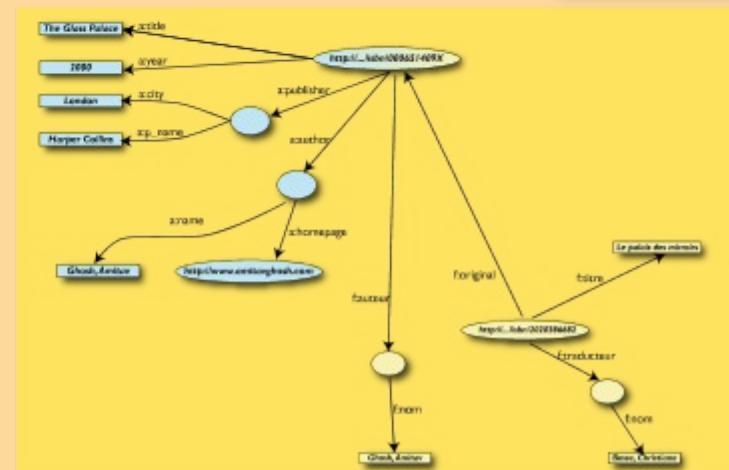
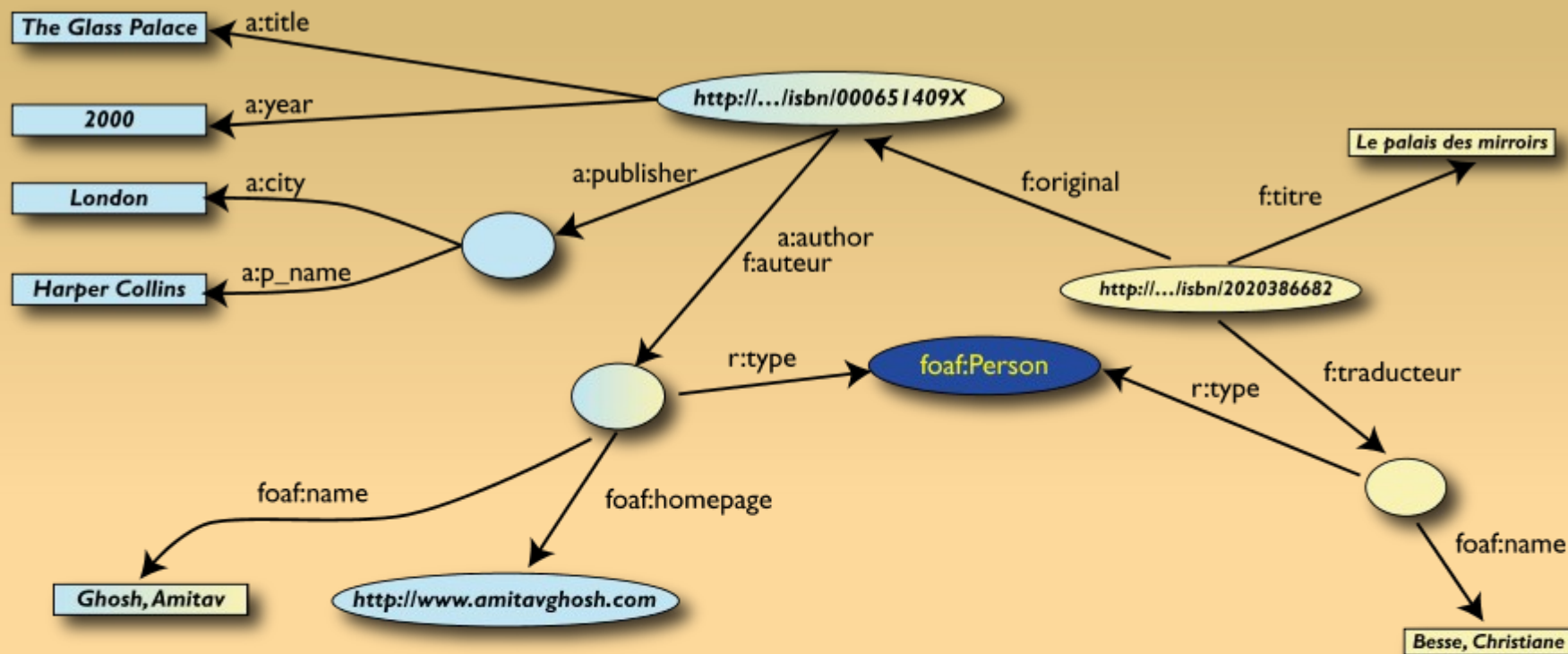
- User of data “F” can now ask queries like:
  - “give me the title of the original”
    - well, ... « donnez-moi le titre de l’original »
- This information is not in the dataset “F” ...
- ...but can be retrieved by merging with dataset “A”!



# However, more can be achieved...

- We “feel” that **a:author** and **f:auteur** should be the same
- But an automatic merge does not know that!
- Let us add some extra information to the merged data:
  - **a:author** same as **f:auteur**
  - both identify a “Person”
  - a term that a community may have already defined:
    - a “Person” is uniquely identified by his/her name and, say, homepage
    - it can be used as a “category” for certain type of resources

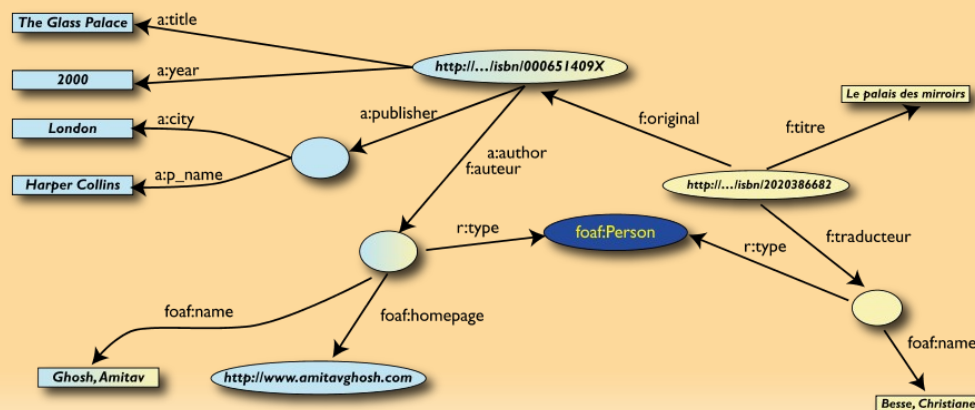
# 3<sup>rd</sup> revisited: use the extra knowledge





# Start making richer queries!

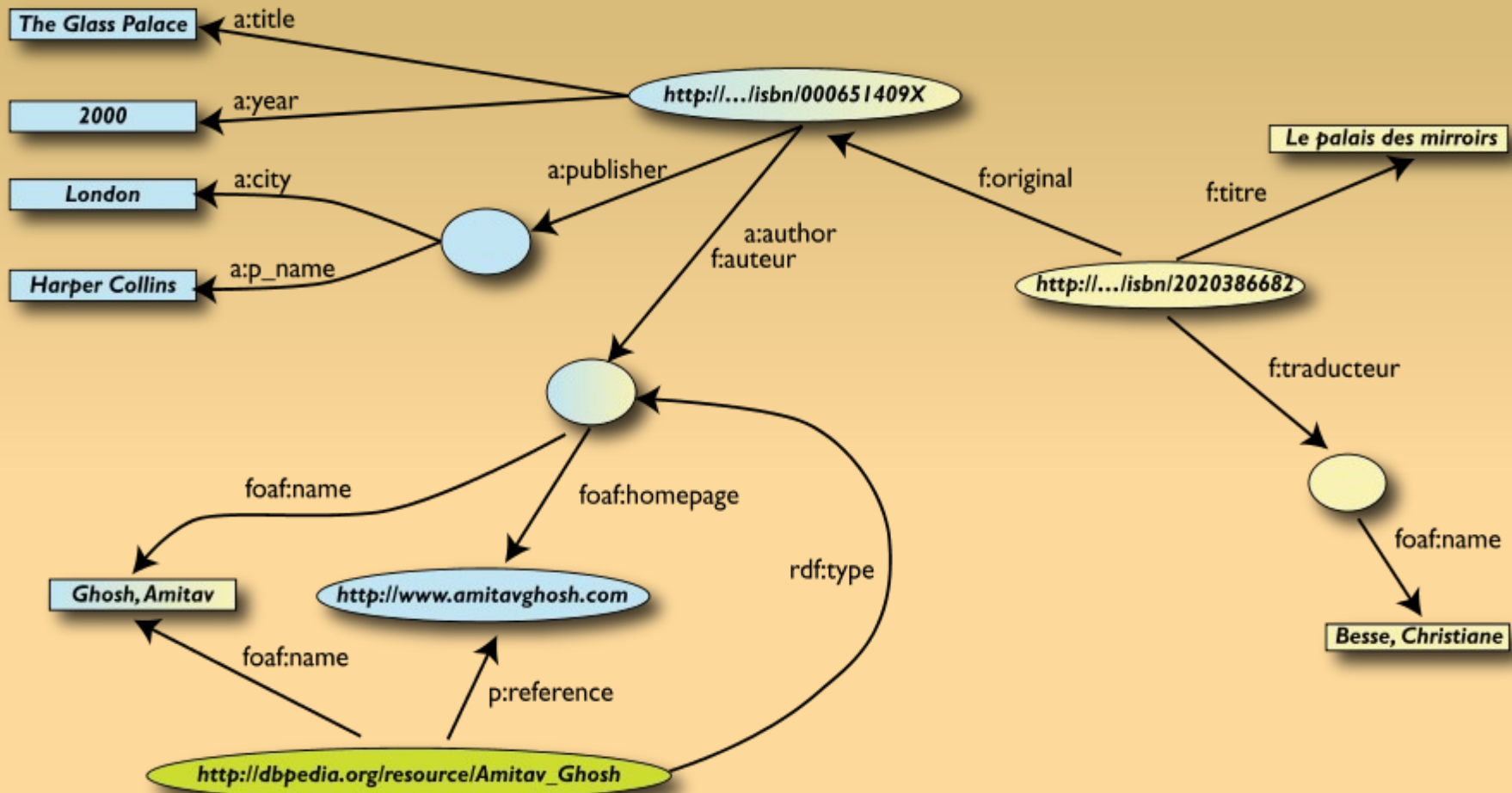
- User of dataset “F” can now query:
  - “donnes-moi la page d’accueil de l’auteur de l’originale”
    - well... “give me the home page of the original’s ‘auteur’”
- The information is not in datasets “F” or “A”...
- ...but was made available by:
  - merging datasets “A” and datasets “F”
  - adding three simple extra statements as an extra “glue”



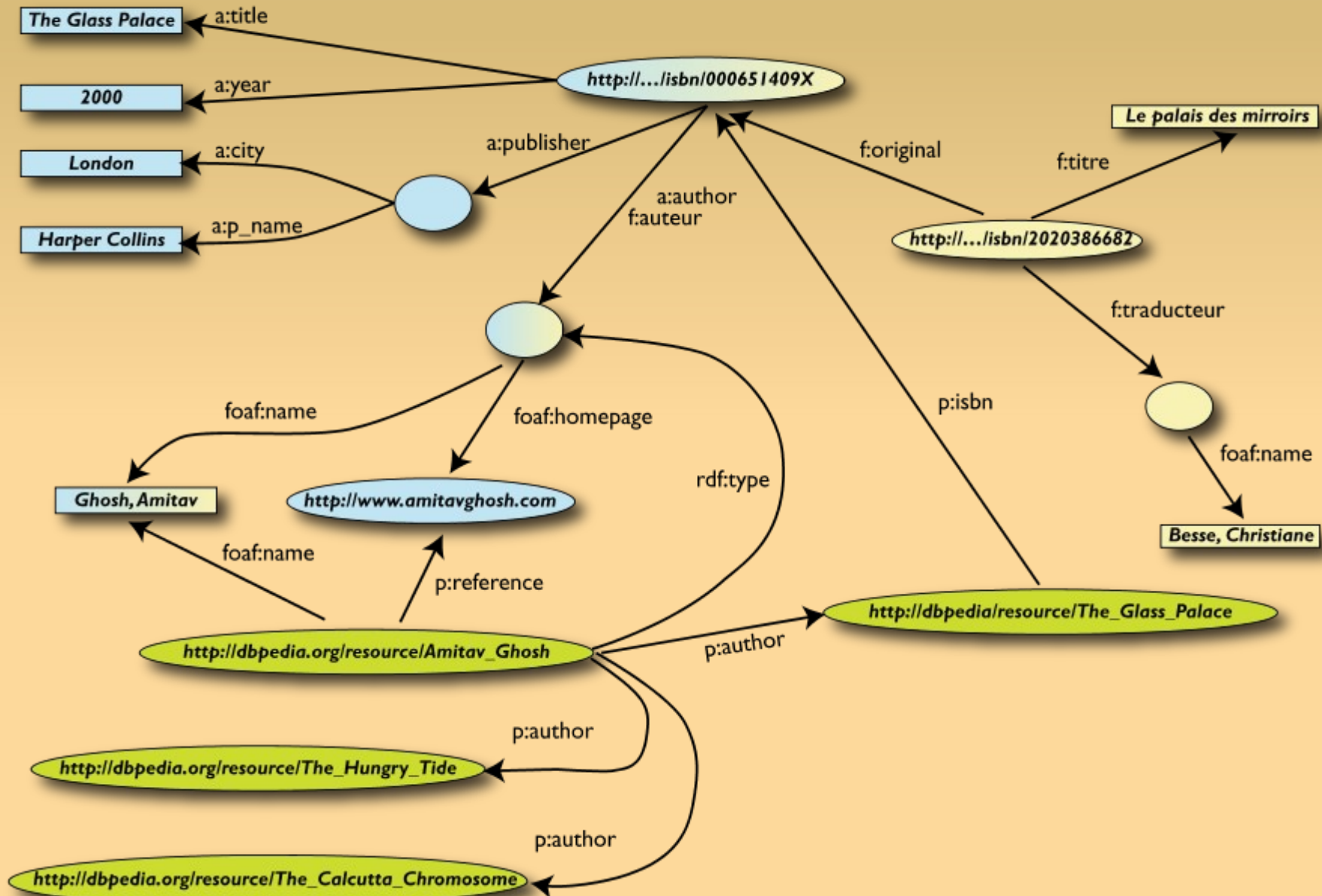
# Combine with different datasets

- 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...

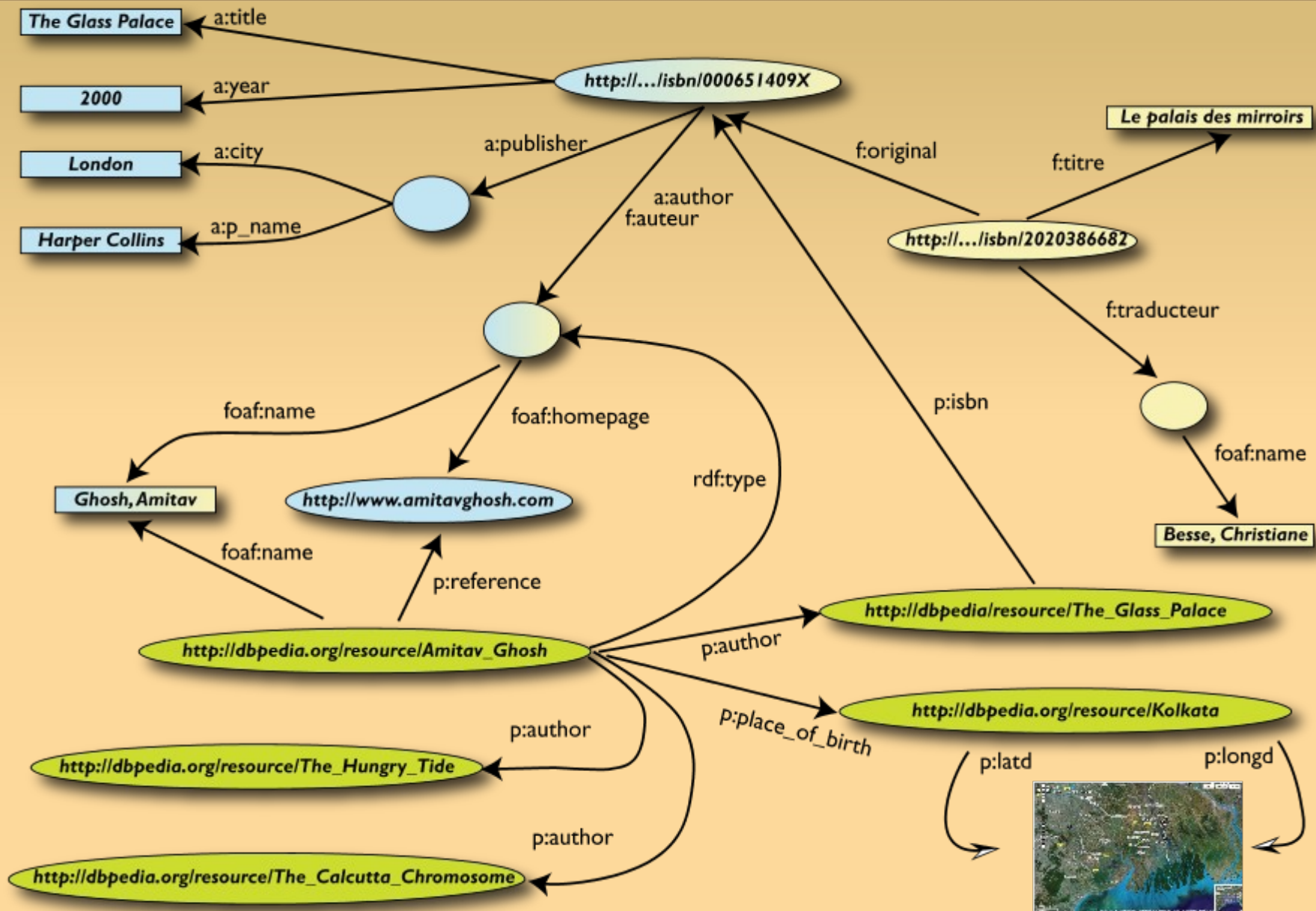
# Merge with Wikipedia data



# Merge with Wikipedia data



# Merge with Wikipedia data



# Is that surprising?

- Maybe but, in fact, no...
- What happened via automatic means is done all the time, every day by the users of the Web!
- The difference: a bit of extra rigour (e.g., naming the relationships) is necessary so that machines could do this, too

# What did we do?

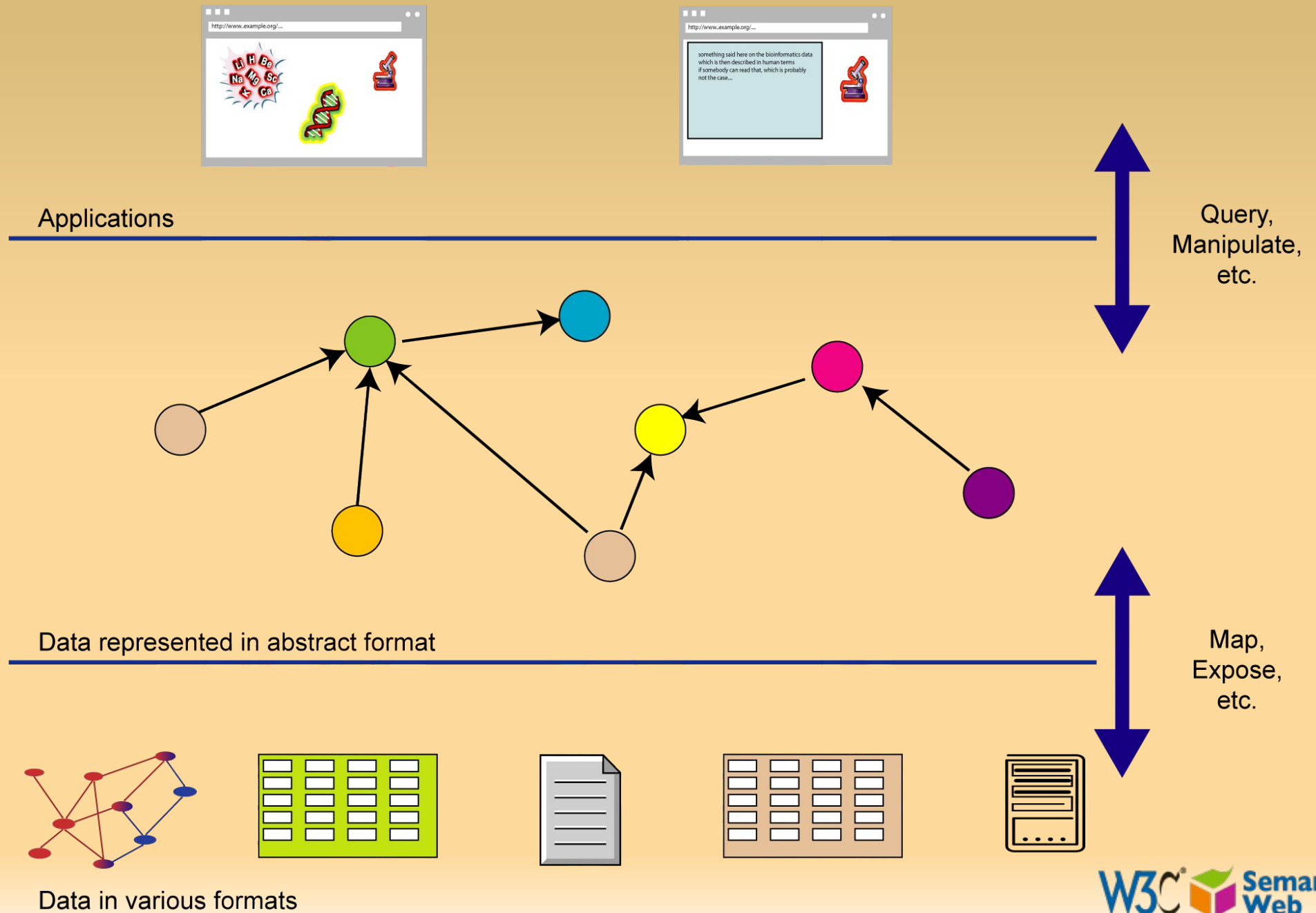
- We combined different datasets that
  - are somewhere on the web
  - are of different formats (mysql, excel sheet, XHTML, etc)
  - have different names for relations
- We could combine the data because some URI-s were identical (the ISBN-s in this case)
- We could add some simple additional information, using common terminologies that a community has produced
- As a result, new relations could be found and retrieved

# It could become even more powerful

- We could 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, extra 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



# What did we do? (cont)



# The technical building blocks...

- An abstract model for the relational graphs: **RDF**
- Convert/assign RDF graphs to existing data: **GRDDL, RDFa, POWDER, R2RML**
- A query language adapted for the relational graphs: **SPARQL**

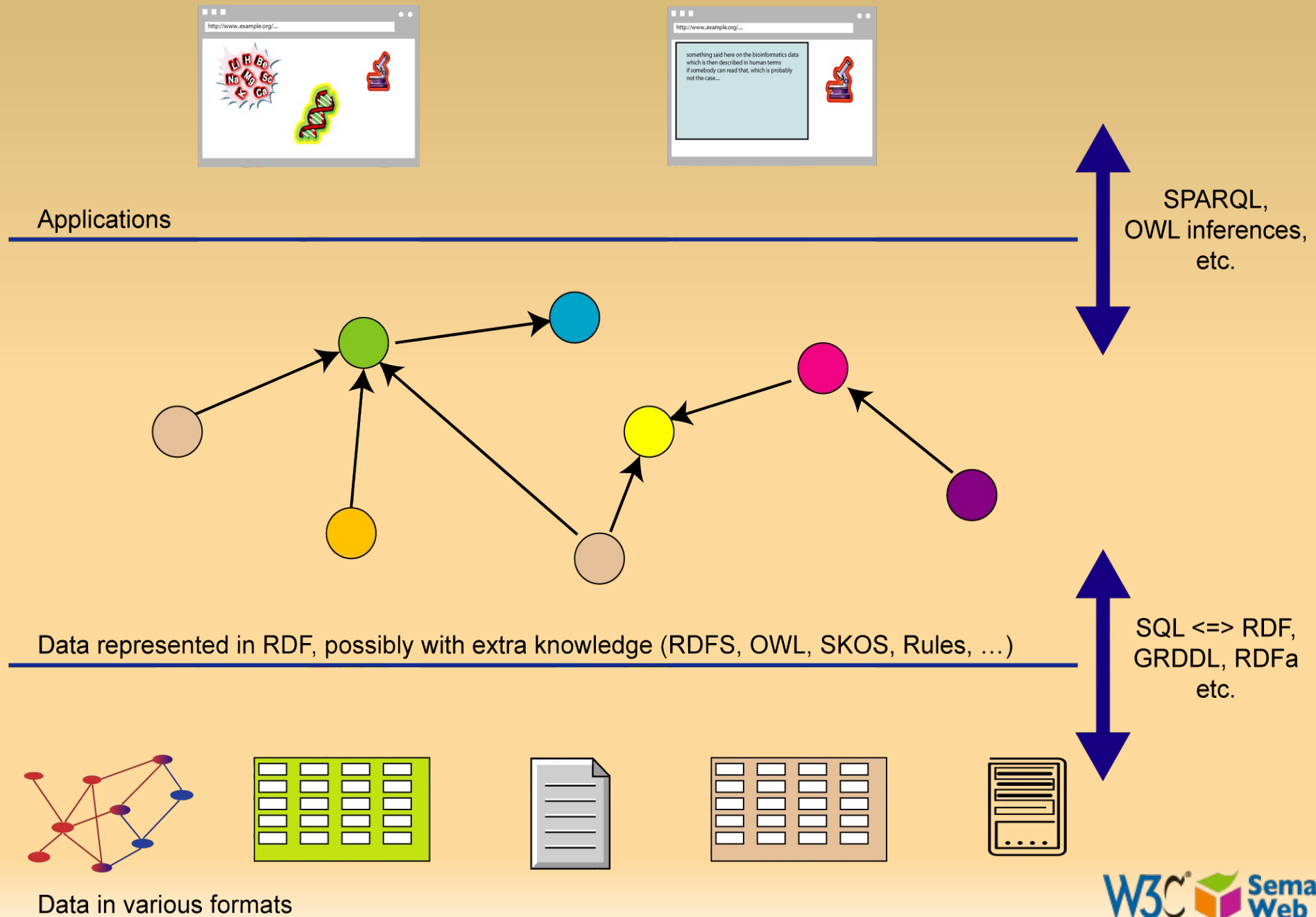


# The technical building blocks...

- Characterize the relationships, categorize resources: **RDFS**, **OWL**, **SKOS**, **Rules**
  - applications may choose among the different technologies
- Reuse of existing “ontologies” that others have produced (**FOAF** in our case)



# So where is the Semantic Web? (cont)



# Public datasets are accumulating

- **IgentaConnect** bibliographic metadata storage: over 200 million triplets
- **RDFS/OWL Representation of WordNet**: also downloadable as 150MB of RDF/XML
- **“Département/canton/commune”** structure of France published by the French Statistical Institute
- **Geonames Ontology and Data**: 6 million geographical features
- **“dbpedia”**: infobox data of Wikipedia into RDF
- Note the **“Billion Triple Challenge 2009”**!

# The network effect

- The usage of URI-s mean that we can link any data to any data on the Web
- The “network effect” is extended to the data on the Web
- “Mashup on steroids” become possible

# Practical applications

- Comes later today...

# In the end...

- More and more data should be “published” on the Web
  - this can lead to the “network effect” on data
- New breeds of applications come to the fore
  - “mashups on steroids”
  - better representation and usage of community knowledge
  - new customization possibilities
  - ...

