

“Visualize, eXplore, know”

Istat, Rome
26th April 2010

***Data visualization for integration:
first experiences with eXplorer at Istat***

***Antonio Pitrone, Michele Ferrara,
Stefania Bergamasco, Luigi De Iaco***

Division of Users' Needs, Integration and Territory

What we were looking for?

Our aim was to find an easy way to use

Geovisual analytics application

(or *GAV = GeoAnalytics Visualization*)

Something enabling researchers, policy makers, citizens at large

- To investigate socio-economic information in a spatio-temporal and multivariate context;
- To share their own analysis
- To make available data_on the Web

Open eXplorer: What is it?

Open eXplorer ⁽¹⁾ is a web compliant application which enables users:

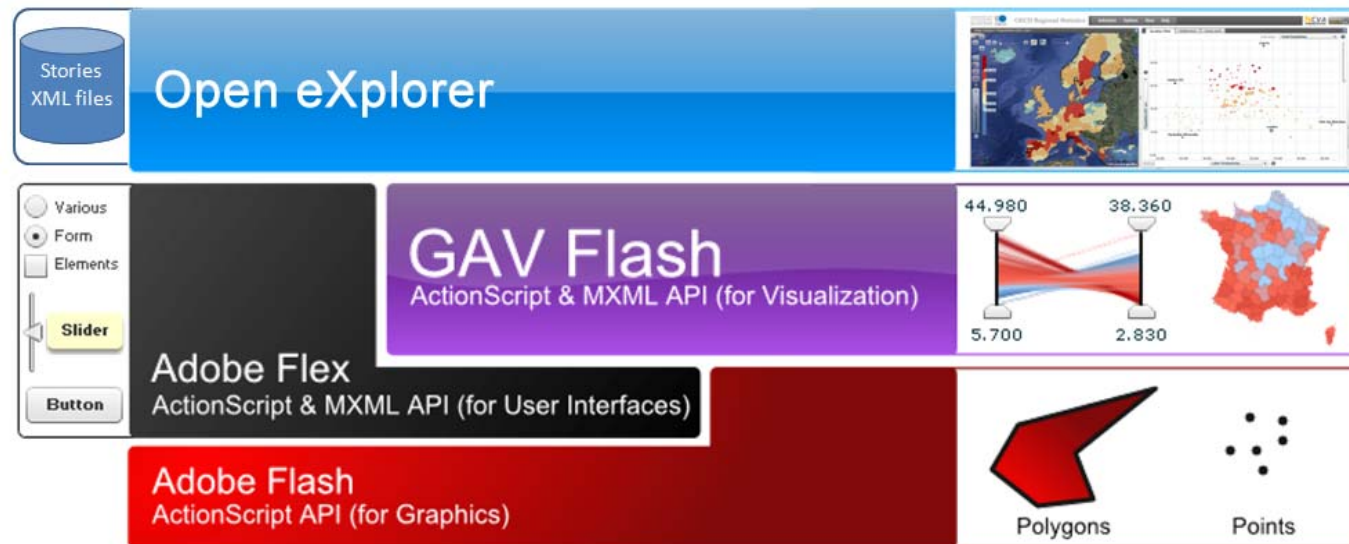
- To explore simultaneously spatial, temporal and multivariate data
- To discover interesting relationships
- To share their incremental discoveries with other people

And finally ...

To turn information into meaningful knowledge on the Web.

(1) developed by National Center for Visual Analytics - Linköping University

Open eXplorer: How is it built up?



Open eXplorer uses Adobe’s Flash basic graphics and Flex. In details, it uses NCVA⁽¹⁾’s own GAV Flash framework programmed in Adobe’s object-oriented (OO) language (ActionScript), and it uses Adobe Flash API for graphics, integrated with the Adobe Flex Framework for the user interfaces.

(1) National Center for Visual Analytics - Linköping University

Open eXplorer: The viewpoint

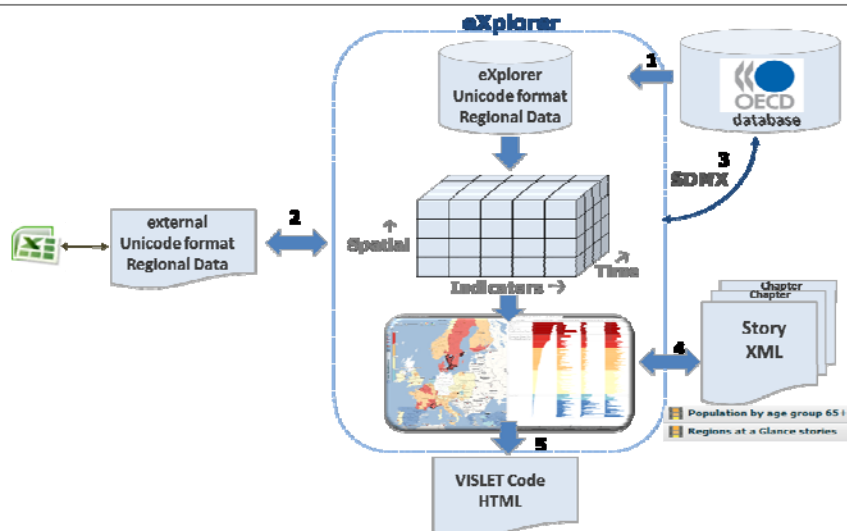
“In order to detect complex patterns it is convenient to view data through a number of different visual representations simultaneously, each of which is best suited to highlight different features.”

“Spatial-temporal and multivariate statistical data are simultaneously explored through the use of dynamically linked multiple views to detect complex patterns and problems”

“Analysts and citizens want to create content and express themselves through “user-created knowledge” and a more pro-active, collaborative role in content creation, distribution and shared use.”

OECD eXplorer: Making regional statistics come alive
through a geovisual analytics web tool -
Mikael Jern, Monica Brezzi

Open eXplorer: Loading data



The data can be:

- loaded using a Unicode text file format (UNICODE), generated via Excel.
- imported by the user from a client local data file using an Excel-like format “Unicode” (arrow 2).
- included in story xml (arrow 4).

NCVA is also developing a SDMX interface in collaboration with OECD.Stat database (arrow 3) providing a direct feed of data to eXplorer data cube.

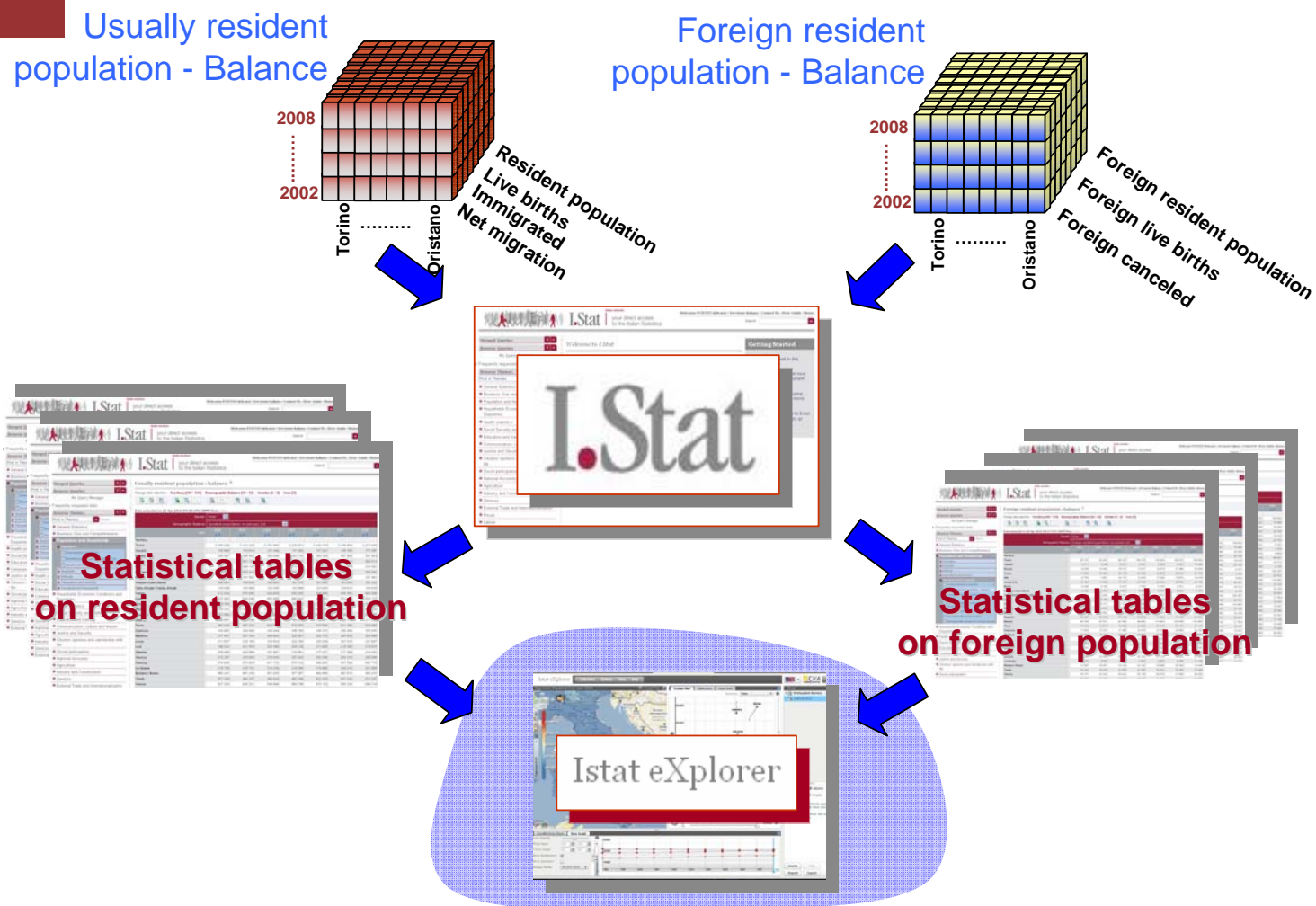
Vislets (eXplorer Publisher) include data and HTML code for publishing stories in blogs and wikis

- 1) Integration scenario for data visualization**
- 2) Istat Corporate Data Warehouse (I.Stat) and eXplorer**
- 3) Istat.eXplorer: first results**

Hypercube

DW

Olap function
Data visualization and extraction



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The reference scenario: Integration with other sources

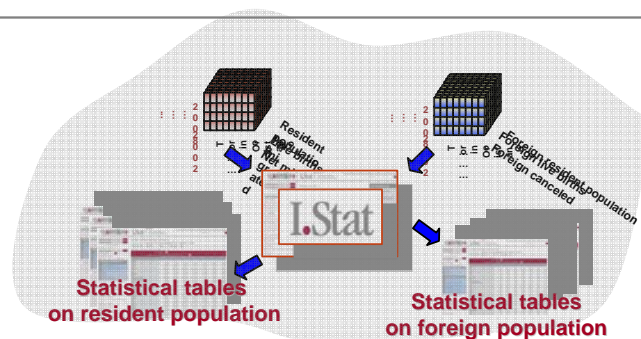
Indicatori regionali per tema
(aggiornamento di marzo 2010)

Nota esplicativa degli indicatori aggiornati a marzo 2010	
Acqua	Aria
Rifiuti	Ambiente, altro
Energia	Beni culturali
Lavoro	Istruzione e formazione
Competitività	Dinamiche settoriali
Demografia d'impresa	Internazionalizzazione
Mercato dei capitali e finanza d'impresa	Ricerca e innovazione
Società dell'informazione	Esclusione sociale
Legalità e sicurezza	Capitale sociale
Servizi di cura	Città
Trasporti e mobilità	Turismo

“Banca dati regionale di indicatori per la valutazione delle politiche di sviluppo”



“Atlante Statistico dei Comuni”



**Shape files
Administrative
boundaries**



Noitalia

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From OECD.Stat to I.Stat

OECD.Stat Extracts
Complete databases available via SourceOECD, OECD's iLibrary.

Search: []

ODA by Donor

Change data selection: Donor [35 / 36] Amount type [2 / 2] Aid type [64 / 64] Flow type [1 / 1] Year [8]

Data extracted on 18 Feb 2010 06:52 UTC (GMT) from OECD.Stat

Donor	Amount type	Flow type	Year	2002	2003	2004	2005	2006	2007	2008
I. ODA	Current Prices (S. millions)	Net disbursements		52 422.58	58 296.68	69 064.86	78 431.51	107 077.81	104 387.89	121 483.22
I.A. Bilateral ODA				35 110.85	40 756.79	49 735.29	54 304.13	82 424.43	78 901.12	98 454.53
I.A.1. Grants				33 509.29	39 618.05	50 887.58	57 245.88	83 432.1	79 432.41	87 838.52
I.A.1.1. Capital Project Aid				7 789.24	8 071	9 990.01	14 428	18 596	17 812.99	27 428.79
I.A.1.1.b. Programme Aid				4 070.81	4 803.88	5 700.85	9 33			
I.A.1.1.b. —of which: Sector Programme Aid				968.15	1 171.43	1 991.56				
I.A.1.2. Technical Co-operation				13 601.8	15 451.88	18 352.39				
I.A.1.2. —of which: Imputed student costs				424.94	478.59	1 016.01				
I.A.1.3. ODA Grants in A.F. Packages				225.23	147.43	179.50				

How we have managed the customization

1) Technological issues

2) Organization by themes

3) Statistical contents

I.Stat | your direct access to the Italian Statistics

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Search: []

Four ways to access the data

I.Stat includes data and metadata from Istat.

Easy access:

- By keyword using "search"
- By theme in the left-hand menu
- By accessing your saved queries under "My Query Manager"
- By region via the selection of key indicators

SELECT a dataset in the left-hand menu.

CREATE and customize your table by clicking on "current data selection".

RESHAPE your table using "pivot dimensions" to move rows and columns.

TAKE AWAY the data to Excel or CSV, print your query or save it for later use.

more help

I.Stat: How we managed the customization

Technological issues

- Layout customization
- Interface translation from French to Italian
- Setting software according to the owned hardware
- Reusing software already available in the institute: glossary, search engine, graphics processing software
- Evaluation of the web legislation issues (accessibility)
- Drawing up a protocol cooperation with OECD

Organization for themes

Identification of themes and subthemes, according to our aim: implementing a multi-source container organized for themes.

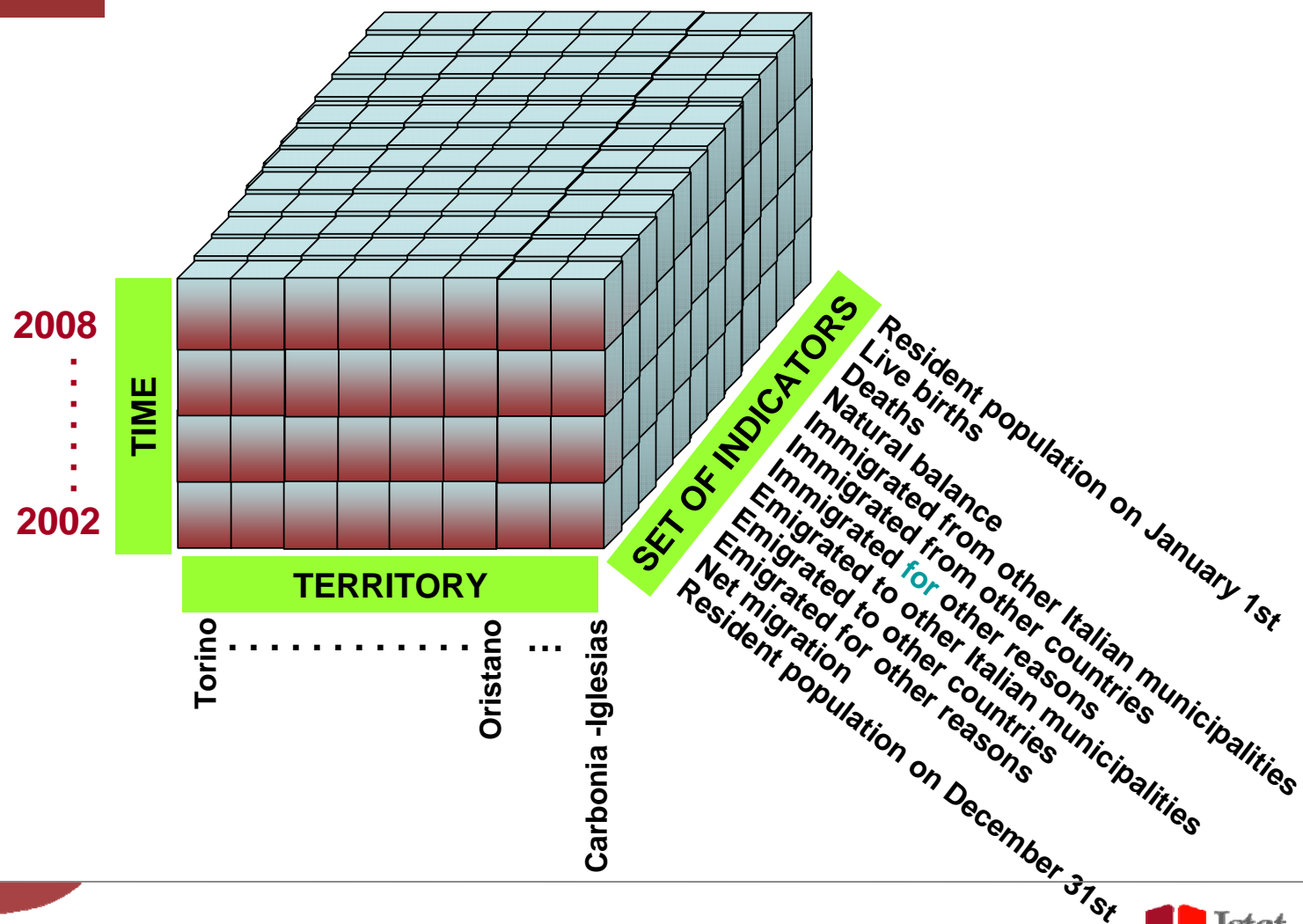
We shifted from a source-driven policy, adopted in the past, to a new theme-driven policy.

Statistical contents

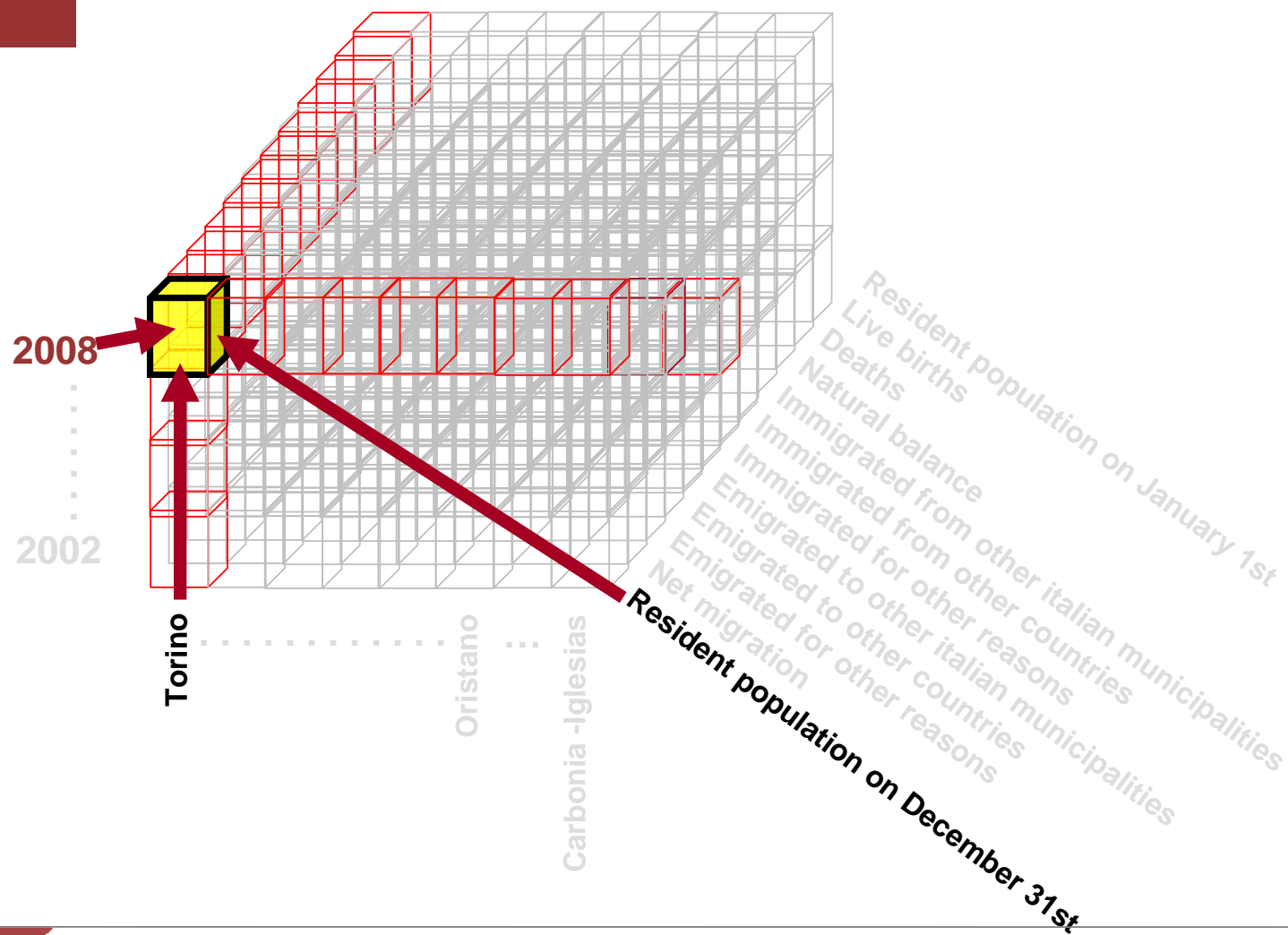
We aimed at creating an environment with data:

- Integrable
- Standardized
- Based on the concept of data cubes
- Defined by just one process within the institution

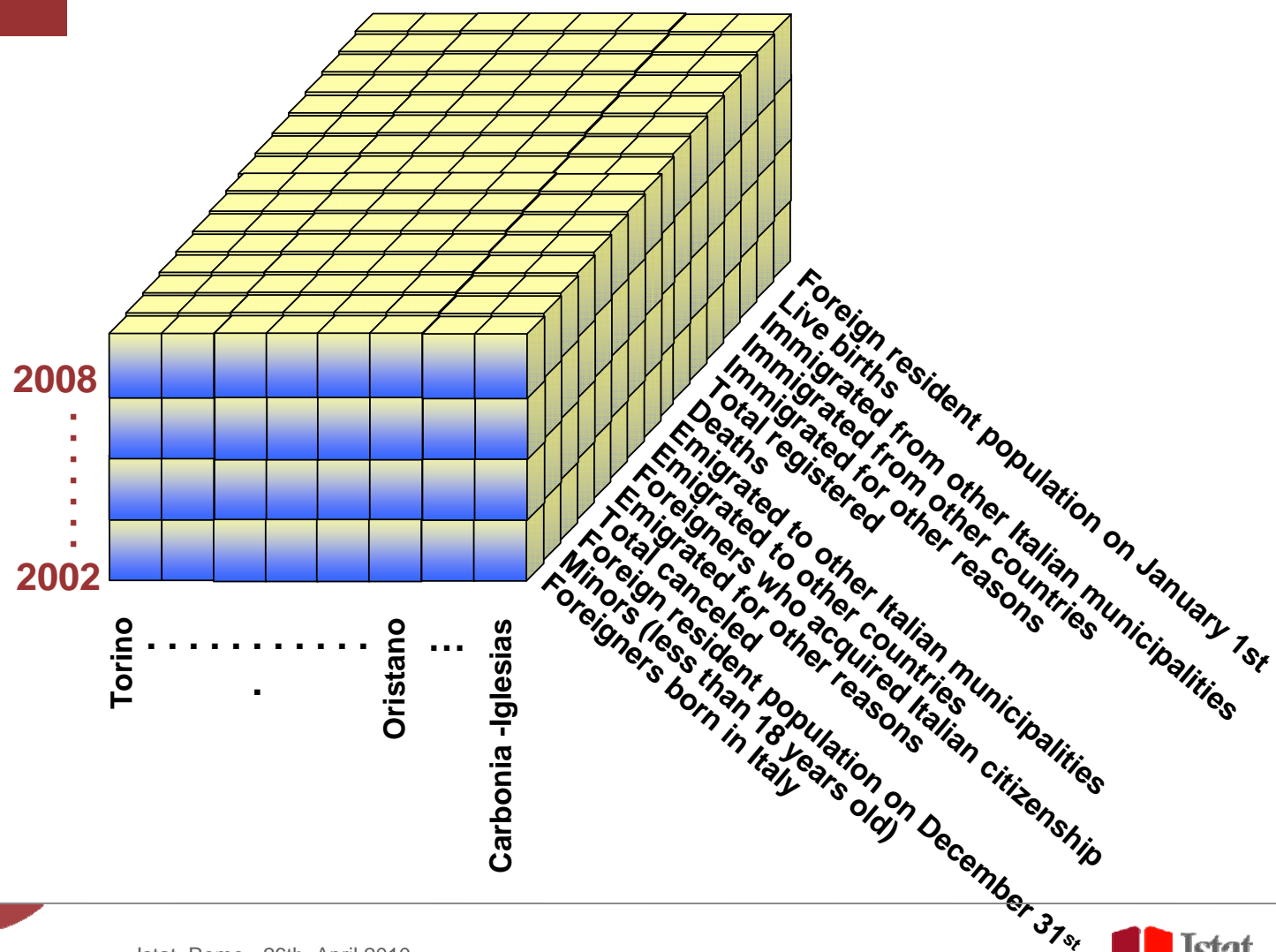
Hypercube on resident population balance

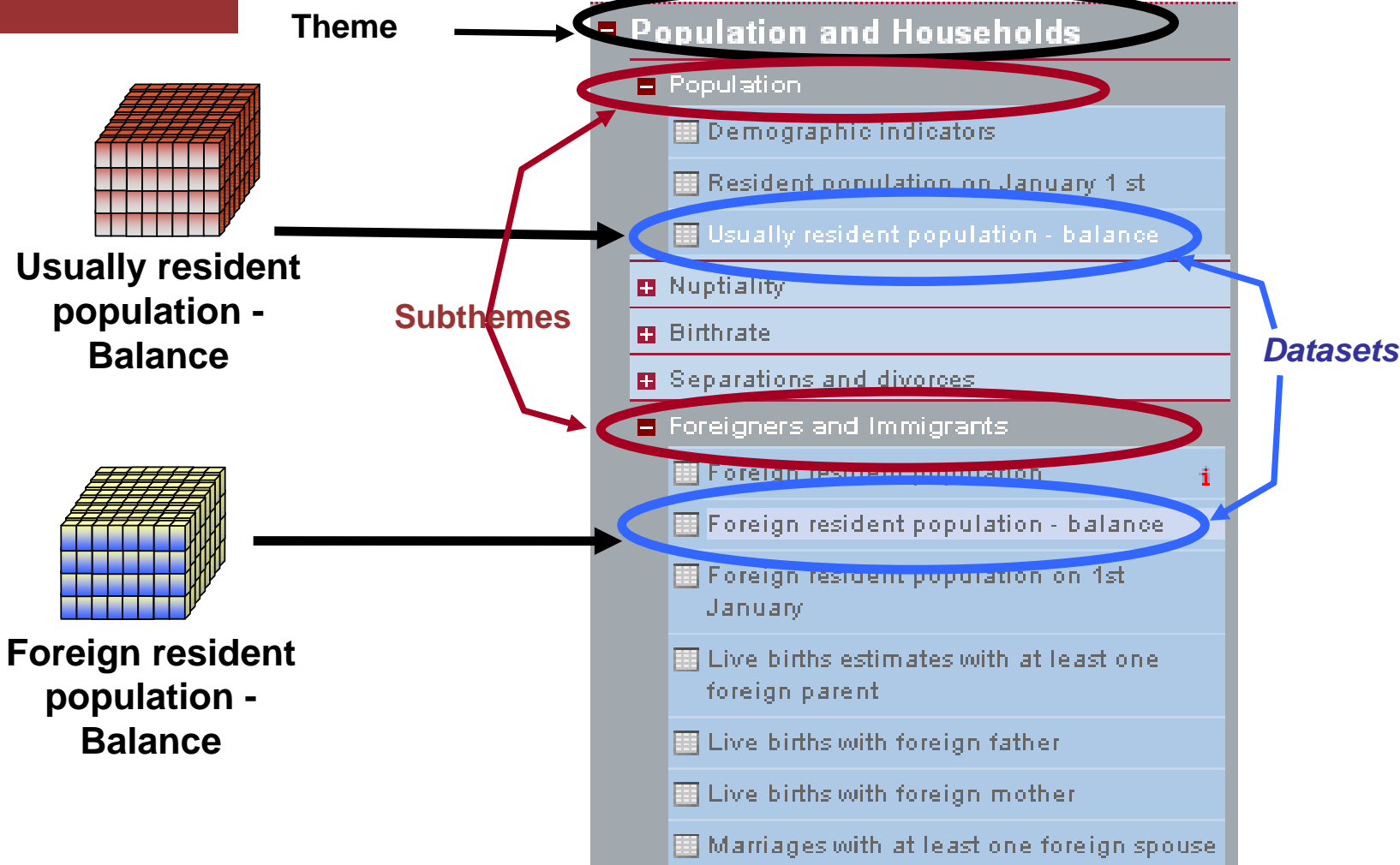


Hypercube on resident population balance



Hypercube on foreign resident population balance





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beta version

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TERRITORY

Usually resident population - balance

Change data selection: Territory [135 / 135] Demographic Balance [12 / 12] Gender [3 / 3] Year [7]

Data extracted on 20 Apr 2010 07:36 UTC (GMT) from I.Stat

INDICATORS

YEARS

	2002	2003	2004	2005	2006	2007	2008
Demographic Balance							
resident population on January 1st	56 993 742	57 321 070	57 888 245	58 462 375	58 751 711	59 131 287	59 619 290
live births	538 198	544 063	550 509	554 022	560 046	563 933	576 659
deaths	557 393	586 488	546 658	560 304	557 892	570 801	585 126
natural balance	-19 195	-42 405	15 941	-13 279	2 118	-6 868	-8 467
immigrated from other Italian municipalities	1 275 339	1 301 837				934	1 465 640
immigrated from other countries	222 801	470 491				019	534 712
immigrated for other reasons	152 821	285 642				857	46 366
emigrated to other Italian municipalities	1 210 752	1 269 159				693	1 450 352
emigrated to other countries	49 383	62 970	64 849	65 029	75 230	65 196	80 947
emigrated for other reasons	44 303	116 261	73 871	73 807	156 468	66 460	81 174
net migration	346 523	609 580	558 189	302 618	377 458	494 871	434 245
resident population on December 31st	57 321 070	57 888 245	58 462 375	58 751 711	59 131 287	59 619 290	60 045 068

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Pivot Dimensions

Please move the dimensions to the location of the data.

Filter dimension(s):

- Gender
- Demographic Balance

Horizontal dimension(s):

- Year

Vertical dimension(s):

- Territory

Data

Swap between territory and indicators

Left Panel (Navigation):

- Merged Queries
- Browse Queries
- My Query Manager
- Frequently requested data:
- Browse Themes
- Find in Themes
- Reset
- General Statistics
- Business Size and Competitiveness
- Population and Households
 - Population
 - Demographic indicators
 - Resident population on January 1 st
 - Usually resident population - balance
 - Nuptiality
 - Birthrate
 - Separations and divorces
 - Foreigners and immigrants
 - Households Economic Conditions and Disparities
 - Health statistics
 - Social Security and Welfare
 - Education and training
 - Communication, culture and leisure
 - Justice and Security
 - Citizens' opinions and satisfaction with life
 - Social participation
 - National Accounts
 - Agriculture
 - Industry and Construction
 - Services
 - External Trade and Internationalisation
 - Prices

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I.Stat: Data visualization

I.Stat beta version your data to the I

INDICATORS

PROVINCES

YEARS

Usually resident population - balance

Change data selection: **Territory [107 / 135]** **Demographic Balance [12 / 12]** **Gender [3 / 3]** **Year [7]**

Data extracted on 20 Apr 2010 07:39 UTC (GMT) from I.Stat

Territory	Demographic Balance						
	2002	2003	2004	2005	2006	2007	2008
Torino	2 165 299	2 172 226	2 191 800	2 236 941	2 242 735	2 248 955	2 277 688
Varelli	176 686	176 510	177 049	177 280	177 027	176 705	177 367
Novara	343 097	345 952	345 689	353 743	355 374	357 688	361 904
Cuneo	556 359	561 729	566 062	566 987	561 827	573 613	580 513
Asti	208 221	209 116	212 219	213 300	214 205	215 074	218 081
Alessandria	417 751	418 203	420 000	422 000	422 150	422 150	435 891
Biella	186 980	187 962	187 962	187 962	187 962	187 962	187 962
Verbania-Cusio-Ossola	158 941	159 636	160 000	160 000	160 000	160 000	162 333
Vallée d'Aoste / Vallée d'Aoste	119 546	120 909	120 909	120 909	120 909	120 909	125 979
Varese	812 934	818 940	820 000	820 000	820 000	820 000	863 099
Como	537 853	543 546	551 655	560 941	566 853	572 441	578 175
Sondrio	176 769	177 568	178 393	179 089	179 767	180 429	181 338
Milano	3 705 323	3 721 428	3 775 765	3 839 216	3 869 037	3 884 481	3 906 726
Bergamo	973 559	986 924	1 003 808	1 022 428	1 033 848	1 044 820	1 059 593
Brescia	1 109 841	1 126 249	1 149 768	1 169 259	1 182 337	1 195 777	1 211 617
Pavia	493 829	497 233	504 761	510 505	515 638	521 296	530 969
Cremona	335 950	338 690	342 844	346 168	348 370	350 368	355 947
Mantova	377 887	381 330	385 900	390 957	393 723	397 533	403 665
Lecco	311 637	315 183	318 824	322 150	325 039	327 510	331 607
Lodi	198 020	201 554	205 449	209 129	211 986	215 386	219 670
Imperia	205 095	205 998	207 997	215 591	217 037	217 354	219 383
La Spezia	272 367	276 888	279 535	281 620	282 548	283 218	285 066
Genova	876 806	873 604	871 733	875 732	890 863	887 094	883 778
Belluno / Bozen	215 736	215 707	218 209	219 366	219 686	220 212	221 595
Trento	463 207	467 338	471 635	477 067	482 650	487 673	493 910
Verona	477 359	483 157	490 829	497 546	502 478	507 030	513 357
Verona	827 328	838 221	849 999	860 796	870 122	880 230	896 316

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Search

Usually resident population - balance

Change data selection: **Territory [107 / 135]** **Demographic Balance [12 / 12]** **Gender [3 / 3]** **Year [7]**

Data extracted on 20 Apr 2010 07:46 UTC (GMT) from I.Stat

live births

resident population on january 1st

live births

deaths

natural balance

immigrated from other italian municipalities

immigrated from other countries

immigrated for other reasons

emigrated to other italian municipalities

emigrated to other countries

emigrated for other reasons

net migration

resident population on december 31st

Slice on indicators

Territory	live births	resident population on january 1st	live births	deaths	natural balance	immigrated from other italian municipalities	immigrated from other countries	immigrated for other reasons	emigrated to other italian municipalities	emigrated to other countries	emigrated for other reasons	net migration	resident population on december 31st
Torino	9 942	20 051	20 513	21 163									
Vercelli	1 360	1 372	1 469	1 373									
Novara	3 162	3 306	3 373	3 381									
Cuneo	5 163	5 231	5 372	5 654									
Asti	1 826	1 838	1 871	1 914									
Alessandria	2 954	2 956	3 161	3 107	3 262								
Biella	1 440	1 494	1 406	1 466									
Verbania	1 215	1 327	1 338	1 245									
Verbania	1 107	1 151	1 177										
Verbania	7 423	7 547	7 581										
Verbania	5 010	5 208											
Verbania	1 868												
Verbania	35 765												
Verbania	10 426												
Verbania	11 697												
Verbania	3 838												
Verbania	2 819												
Verbania	3 267												
Verbania	2 944												
Verbania	1 178												
Verbania	1 532												
Verbania	2 047												
Verbania	6 381												
Verbania	1 632												
Verbania	5 208												
Verbania	5 067												
Verbania	8 239												

Data extraction from I.Stat

I.Stat Statistics

Exports

This feature generates a Microsoft Excel file. The layout is preserved but if you want to export the data related to a specific query, you can: - drag-and-drop the corresponding query in the list - export the data in a text format

☐ Include extra columns for the selected query

Export

If you have an Excel version: - Download and install OpenOffice - Do not open your extracted file - Use OpenOffice "Calc" to open the file - Save the file to a new file with a different name to be compatible with your own

Microsoft Excel - 6e4f1fb9-88ce-478b-b54a-6ee5733bab7a [Sola lettura]

File Modifica Visualizza Inserisci Formato Strumenti Dati Finestra ?

Digitare una domanda.

A1 =DotStatQuery(B1)

Dataset: Usually resident population - balance		Gender total						
Demographic Balance		resident population on January 1st						
Year	2002	2003	2004	2005	2006	2007	2008	
Territory								
7 Torino	2165299	2172226	2191960	2236941	2242775	2248955	2277686	
8 Vercelli	176666	176510	177049	177280	177027	176705	177367	
9 Novara	343097	345952	350689	353743	355354	357688	361904	
10 Cuneo	556359	561729	568062	569987	571827	573613	580513	
11 Asti	208221	209116	212219	213369	214205	215074	218081	
12 Alessandria	417751	418203	423118	429080	431346	432215	435891	
13 Biella	186960	187962	188421	188197	187619	186938	187491	
14 Verbano-Cusio-Ossola	158941	159636	160697	161575	161580	161640	162333	
15 Valle d'Aosta / Vallée d'Aoste	119546	120909	122040	122868	123978	124812	125979	
16 Varese	812934	818940	829629	843250	848606	855400	863099	
17 Como	537853	543546	551655	560941	566853	572441	578175	
18 Sondrio	176769	177568	178393	179089	179767	180429	181338	
19 Milano	3705323	3721428	3775765	3839216	3869037	3884481	3906726	
20 Bergamo	973559	986924	1003808	1022428	1033848	1044820	1059593	
21 Brescia	1109841	1126249	1149768	1169259	1182337	1195777	1211617	
22 Pavia	493829	497233	504761	510505	515636	521296	530969	
23 Cremona	335950	338690	342844	346168	348370	350368	355947	
24 Mantova	377887	381330	385900	390957	393723	397533	403665	
25 Lecco	311637	315183	318824	322150	325039	327510	331607	
26 Lodi	198020	201554	205449	209129	211986	215386	219670	
27 Imperia	205095	205998	207997	215591	217037	217354	219383	
28 Savona	272367	276888	279535	281620	282548	283218	285066	
29 Genova	876806	873604	871733	875732	890863	887094	883778	
30 La Spezia	215736	215707	218209	219366	219686	220212	221595	
31 Bolzano / Bozen	463207	467338	471635	477067	482650	487673	493910	
32 Trento	477359	483157	490829	497546	502478	507030	513357	
33 Verona	827328	838221	849999	860796	870122	880230	896316	

I.Stat export /

Disegno Eforme

Pronto

NUM

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Population and Households
Population
Nuptiality
Birthrate
Separations and divorces
Foreigners and immigrants
Foreign resident population - balance
Foreign resident population on 1st
Live births estimates with at least one foreign parent
Live births with foreign father
Live births with foreign mother

Foreign resident population - balance

Change data selection: Territory [107 / 135] Demographic Balance [15 / 15] Gender [3 / 3] Year [7]

Data extracted on 20 Apr 2010 09:27 UTC (GMT) from I.Stat

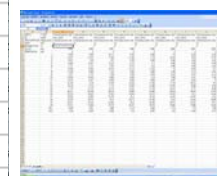
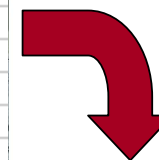
Territory	Year	foreign resident population on january 1st	live births	immigrated from other italian municipalities	immigrated from other countries	immigrated for other reasons	total registered	deaths	emigrated to other italian municipalities	emigrated to other countries	foreigners who acquired italian citizenship	emigrated for other reasons	total canceled	foreign resident population on december 31st	minors (less than 18 years old)	foreigners born in Italy
Torino	2009	105 276	116 284	129 533												
Vercelli	2009	8 051	8 845	9 431												
Novara	2009	17 621	10 574	21 485												
Novara	2009	30 355	32 930	35 547												
Asti	2009	12 004	13 529	14 872												
Alessandria	2009	20 849	24 302	26 593												
Biella	2009	7 760	8 100	8 321												
Verbania-Cusio-Ossola	2009	5 652	6 047	6 420												
Valle d'Aosta / Valles d'Aoste	2009	4 258	4 976	5 534												
Varese	2009	23 719	25 455	34 141												
Como	2009	14 491	16 573	21 733												
Sondrio	2009	2 495	2 724	3 485												
Milano	2009	180 827	195 362	201 159												
Repubblica	2009	32 287	35 229	50 799												
	2009	2 821	3 231	3 323												
	2009	3 023	3 763	3 931												
	2009	4 888	5 765	6 083												
	2009	1 585	1 601	1 703												
	2009	5 119	5 462	5 653												
	2009	3 722	4 035	4 258												

foreign resident population on january 1st
foreign resident population on january 1st
live births
immigrated from other italian municipalities
immigrated from other countries
immigrated for other reasons
total registered
deaths
emigrated to other italian municipalities
emigrated to other countries
foreigners who acquired italian citizenship
emigrated for other reasons
total canceled
foreign resident population on december 31st
minors (less than 18 years old)
foreigners born in Italy

Selection of statistical tables on foreigners



	A	B	C	D	E	F	G	H
1	META	CODE	Unemployment rate	Unemployment rate	Unemployment rate	Unemployment rate	Unemployment rate	Unemployment rate
2	ID	regID	tass_disoc	tass_disoc	tass_disoc	tass_disoc	tass_disoc	tass_disoc
3	DESCRIPTION	Regional ID	Unemployment rate	Unemployment rate	Unemployment rate	Unemployment rate	Unemployment rate	Unemployment rate
4	UNIT	NA	%	%	%	%	%	%
5	PARSETYPE	S	F	F	F	F	F	F
6	SLICE	NA	1995	1996	1997	1998	1999	
7	PRECISION	NA	2	2	2	2	2	
8		1	9,88	9,86	10,12	9,92	8,86	
9		2	12,37	11,37	11,04	11,26	11,5	
10		3	6,01	5,9	5,6	5,34	4,59	
11		5	6,66	6,57	6,33	6,13	5,7	
12		6	7,77	7,11	7,05	6,14	6,2	
13		7	12,88	12,85	12,16	12,13	11,62	
14		8	5,39	4,86	5,3	4,92	3,88	
15		9	7,57	7,22	7,28	7,05	6,54	
16		10	10,09	10,43	9,08	9,09	8,3	
17		11	6,72	6,07	6,99	6,05	5,98	
18		12	12,34	12,4	12,04	12,02	11,85	
19		13	12,24	11,72	11,9	12,02	12,86	
20		14	11,9	11,75	12,19	12,92	12,18	
21		15	20,21	20,28	20,74	19,98	19,98	
22		16	15,75	16,42	17,92	19,54	18,13	
23		17	15,96	15,85	16,76	16,2	15,32	
24		18	14,73	16,73	15,7	19,13	21,28	
25		19	22,67	23,16	23,48	24,2	24,46	



“Visualize, eXplore, know”

Getting the shape file

Istat.it

giovedì 22 aprile 2010, ore 14:59

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cerca

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in english

Cartografia: confini amministrativi e dei sistemi locali del lavoro

Censimento 2001, 31 dicembre 2008 e 1 gennaio 2010

argomenti

Censimenti

14° Censimento della popolazione e delle abitazioni (2001)

Ambiente e territorio

descrizione dati

Struttura dei dati

confini amministrativi

Censimento 2001

- Regioni
- Province
- Comuni

31 dicembre 2008

- Regioni
- Province
- Comuni

1 gennaio 2010

- Regioni
- Province
- Comuni

altra cartografia

- Sistemi locali del lavoro
- Censimento 2001
- NUTS2 2008

All data used are referred to the Nuts2 and Nuts3 area.

We avoided using municipalities data, not to overload the eXplorer system

So ...

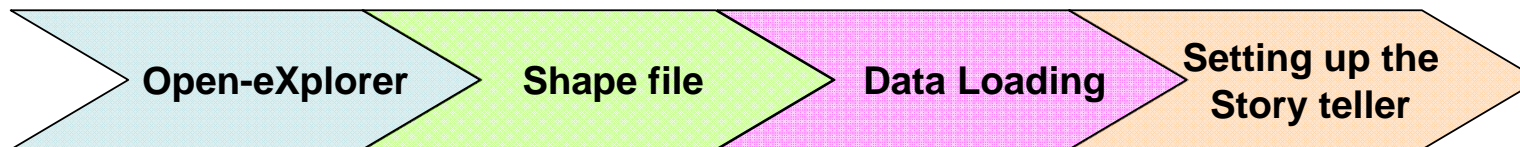
We used the administrative boundaries shape files, available and downloadable in the Istat web site

www.istat.it/ambiente/cartografia/



“Visualize, eXplorer, know”

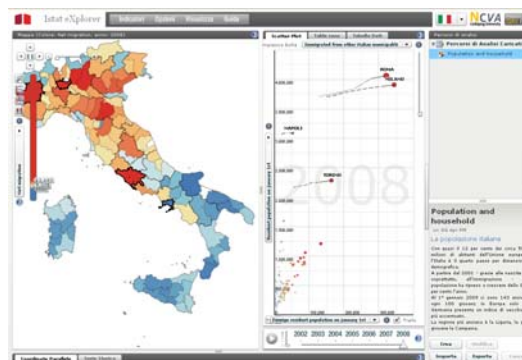
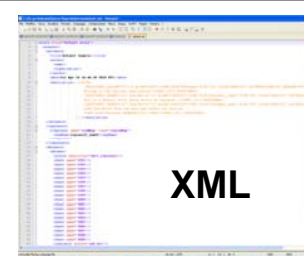
The four steps to the first Istat eXplorer prototype



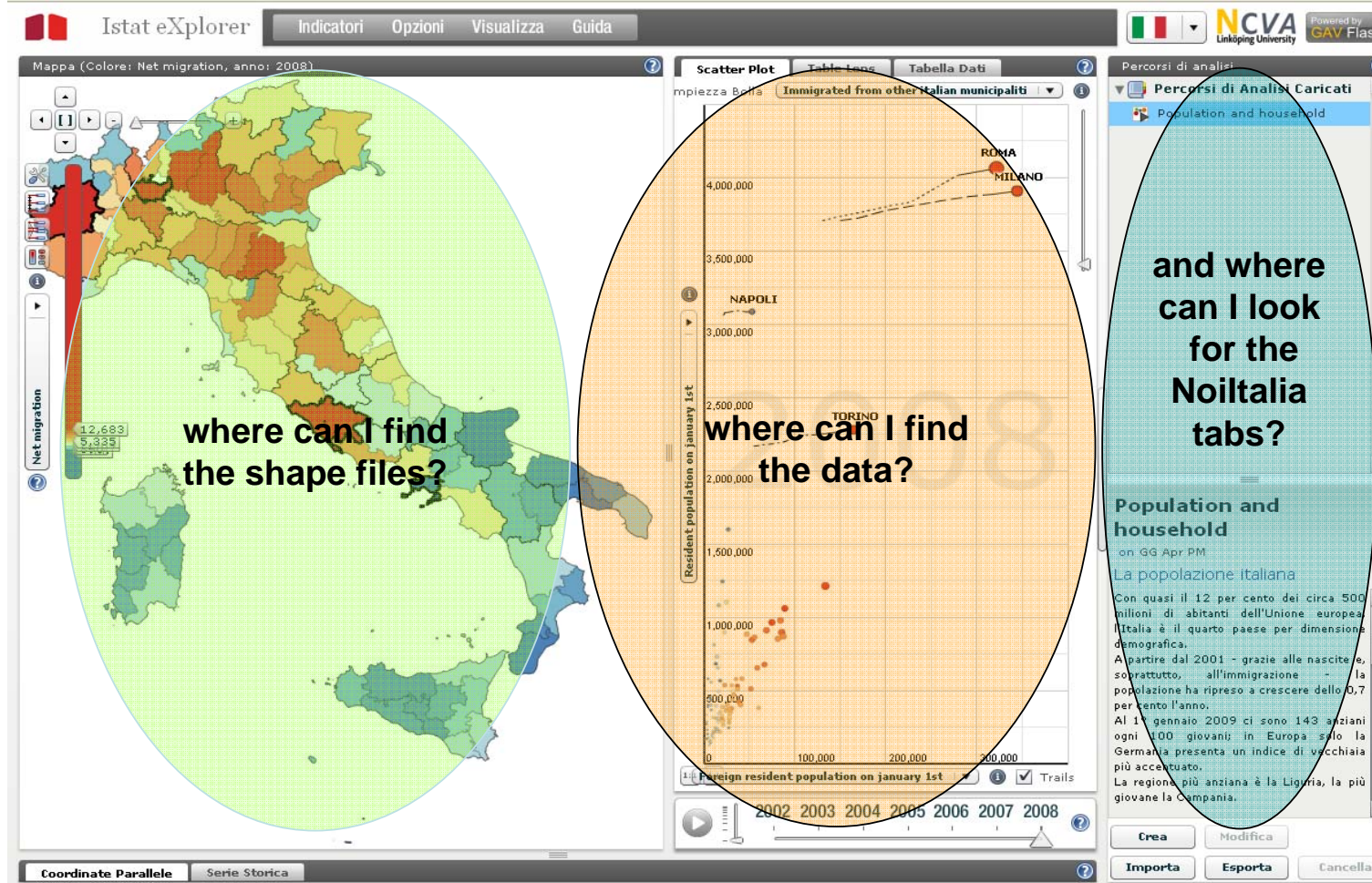
ncva.itn.liu.se/explorer/openexp?!=en

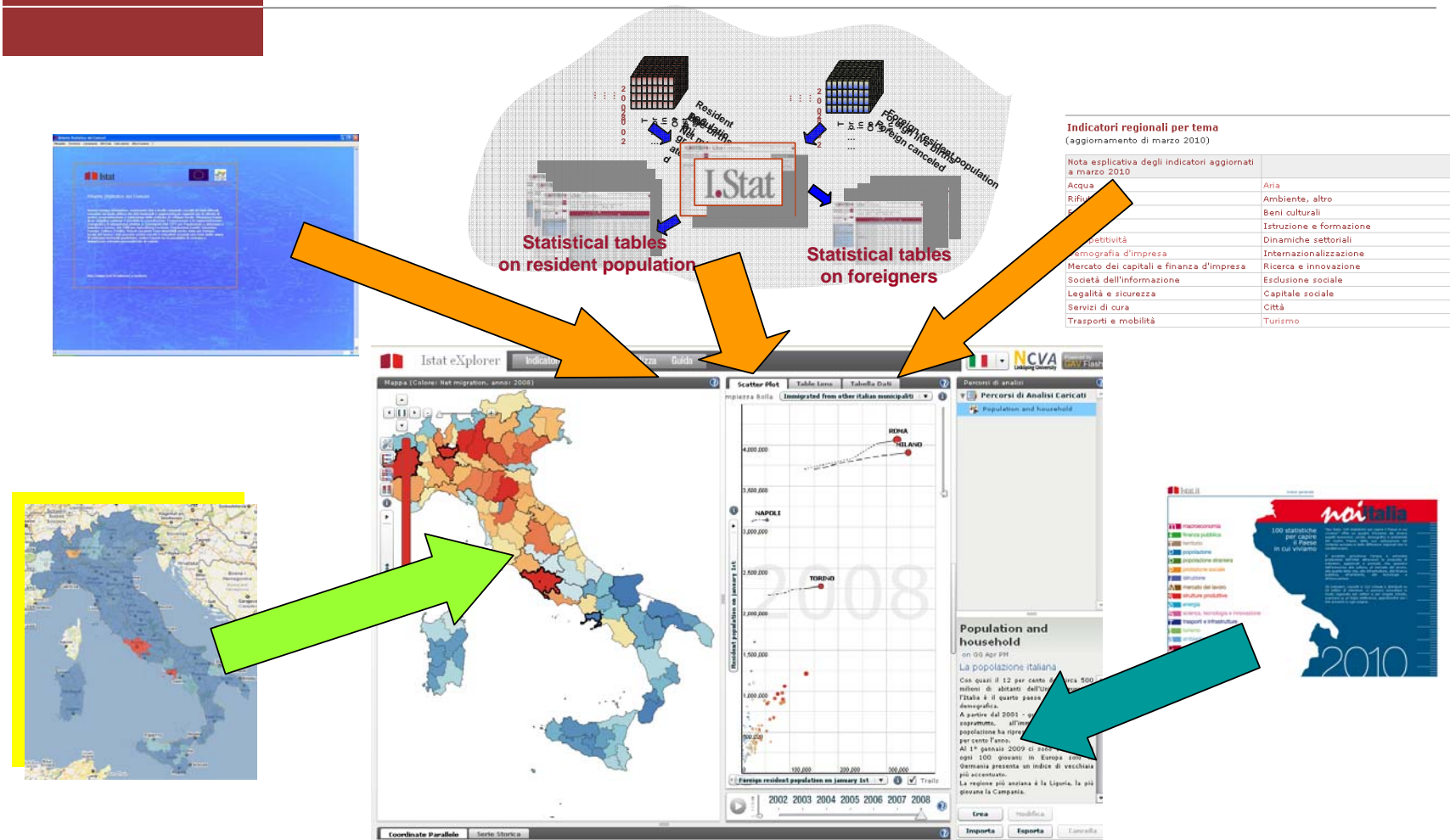


vitagate.itn.liu.se/GAV/eXplorer/wizard/



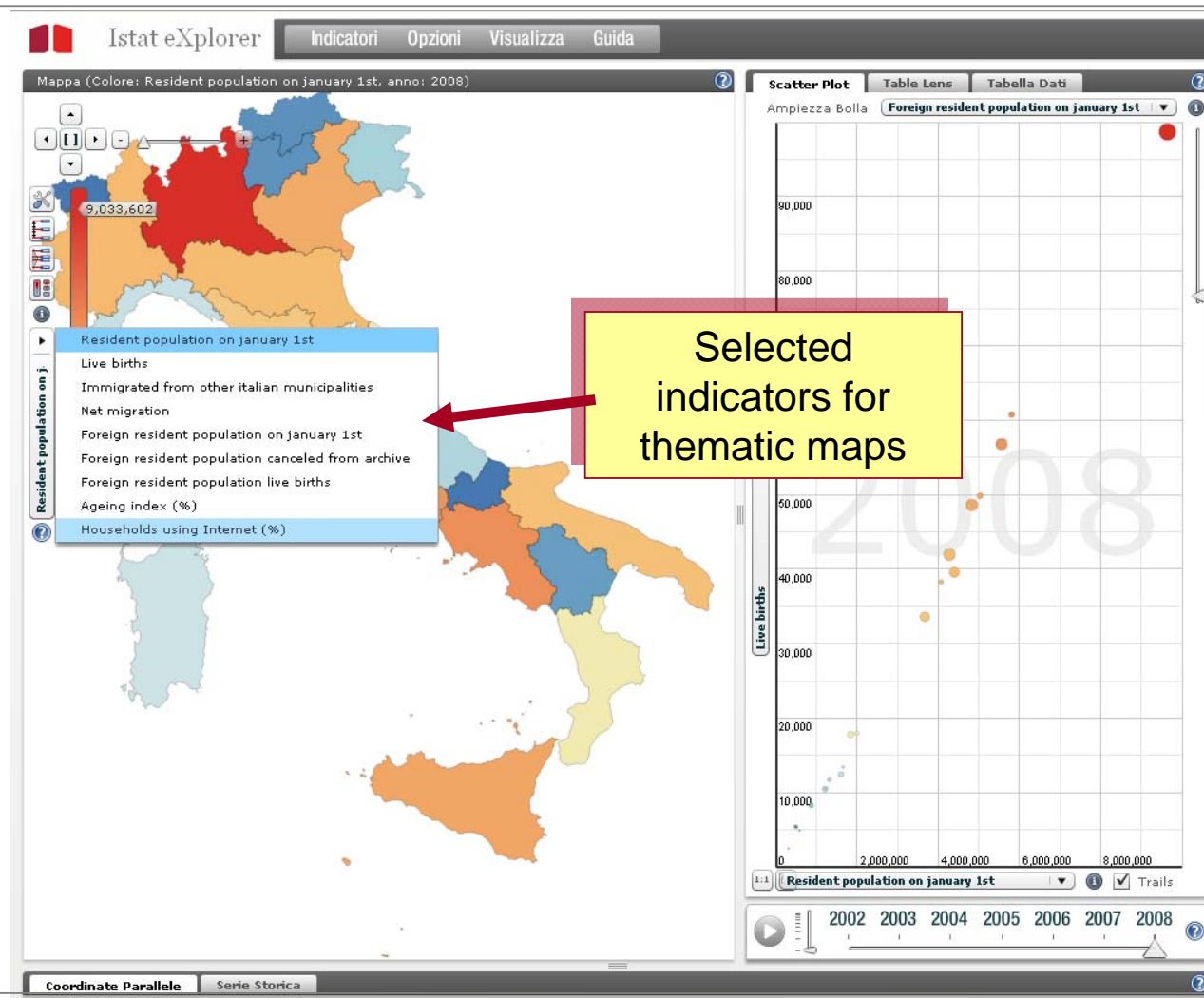
Istat.eXplorer
(...the idea...)





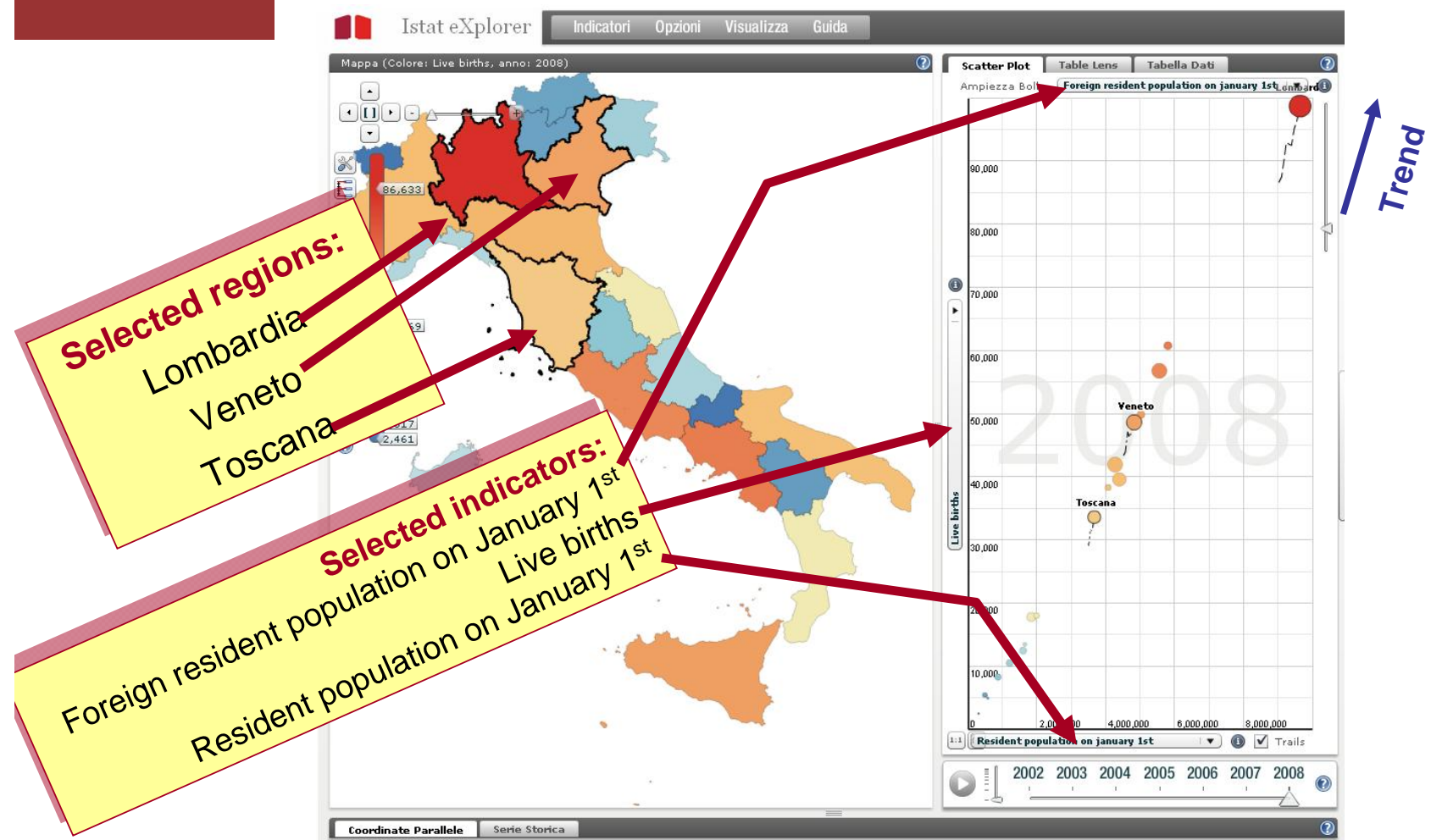
“Visualize, eXplore, know”

Let's navigate: Thematic maps



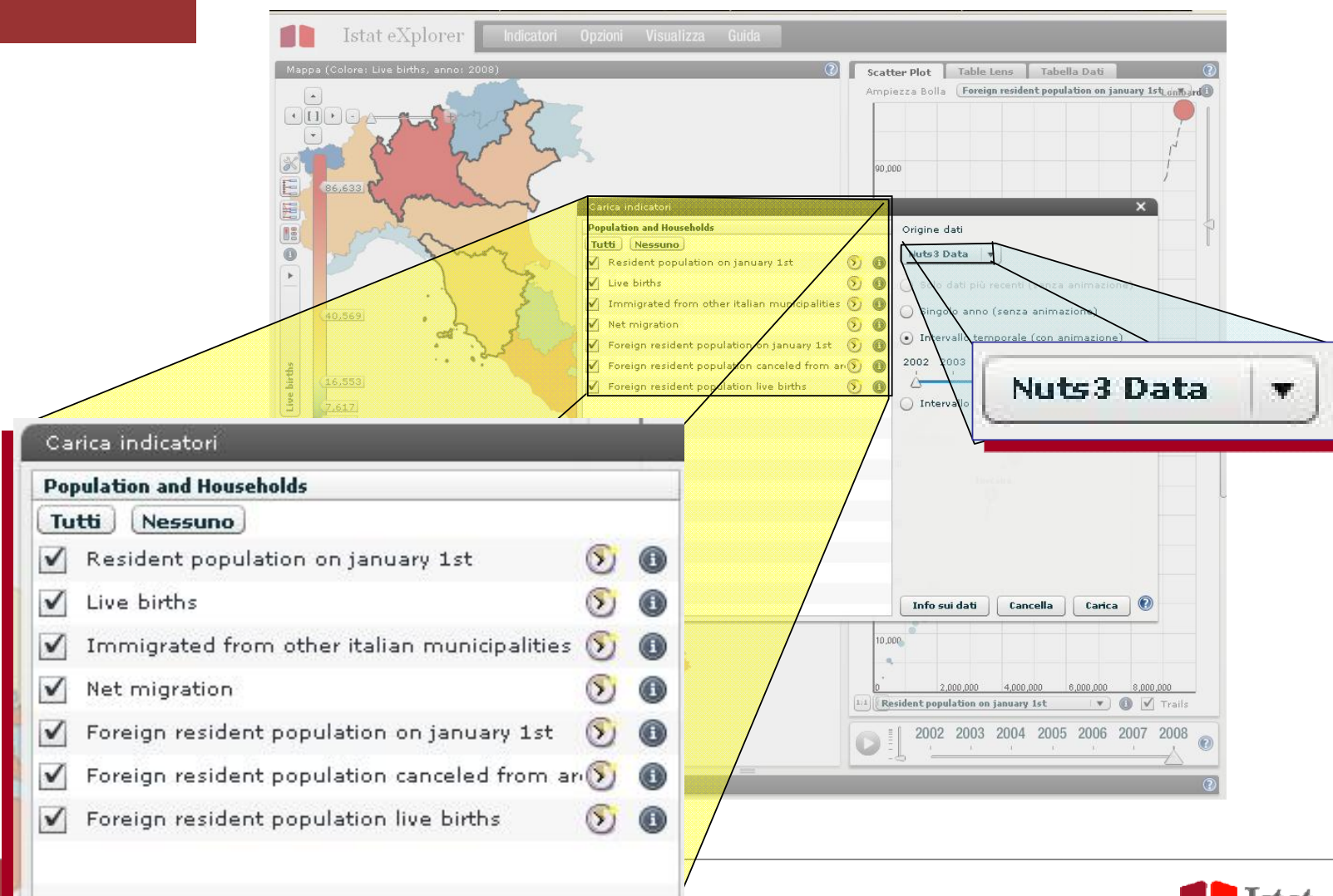
“Visualize, eXplore, know”

Let's navigate: Dynamic data analysis



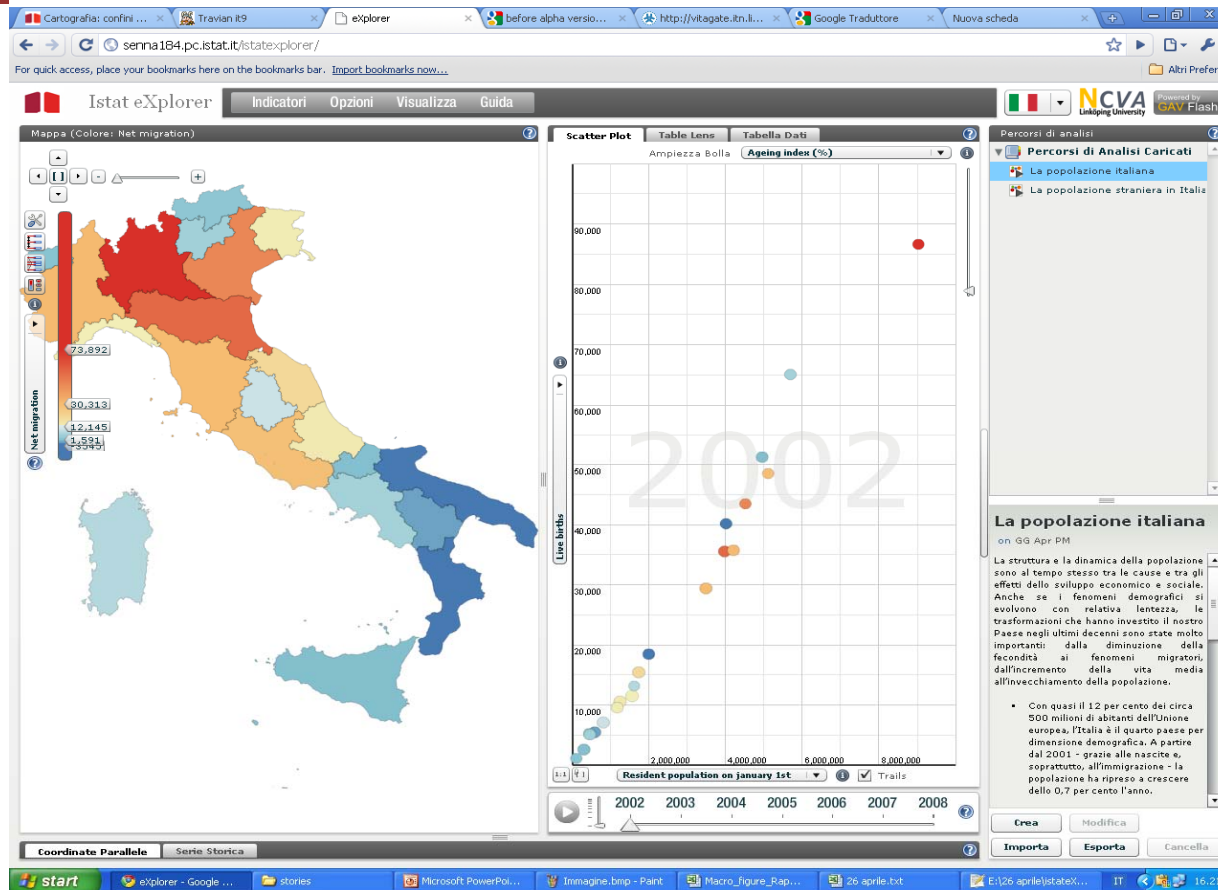
“Visualize, eXplore, know”

Let's navigate: Choosing other areas and indicators



“Visualize, eXplore, know”

Let's navigate



<http://senna184.pc.istat.it/istatexplorer>

- To enable users to focus data in a spatial, temporal and multivariate environment
- To increase the quality of knowledge on the local factors among specialists as well as non-specialized users
- To share *knowledge* (e.g. text and dynamic representation of data) with other analysts
- To publish stories about statistical data, embedded with interactive visualization and integrated into a HTML document structure

Flex technology is a semi-thick client based technology (like the traditional Java applets or ActiveX controls). So the weaknesses of Open eXplorer are mainly the weaknesses of those technology.

- It is not compliant with the accessibility guidelines for Web applications.
- It needs the right version of Flash Virtual Machine.
- It could be subjected to performance problems: Overloading data can freeze the machine.