Cour des comptes
Chambres régionales
& territoriales des comptes

THE PRACTICAL IMPLEMENTATION OF *INFORMATION TECHNOLOGY IN REGIONAL AUDIT INSTITUTIONS*

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0.1 – Information technologies change the way French financial jurisdictions (the French Court of Audit and the regional audit chambers) work

▪ Information technologies profoundly change in different ways the way French financial jurisdictions work. The digital switchover of regional audit chambers allows two different uses:

▪ Support in the programming of audits, corresponding to the use of the system by the presidency and the supervision of the audit chambers

▪ Support to audit, corresponding to the use for the carrying out of instructions led by audit teams in audit chambers

▪ It also allows a different communication approach once reports are released.

0.2 – The emergence of a common strategy based on data analysis

- A practice which is based on several former tools (2007-2012) for follow-up on activity

- A **recent strategy** (2012-2014) with various challenges:

- Collecting data which do not belong to financial jurisdictions

- Data extraction and transformation

- Handling of data and their analysis

- Data visualization

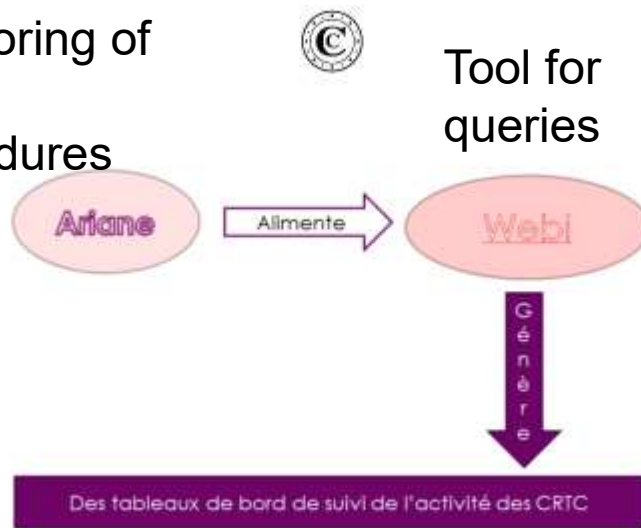- The conversion of analysed data into publishable « story »

Objectives :

- Support to traditional tasks

- Identifying financial, legal and even criminal risks

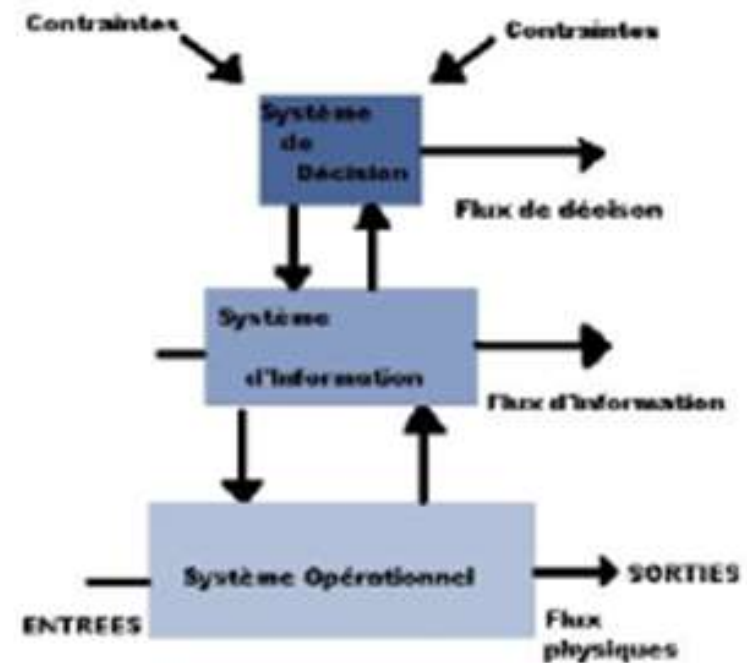- Quantitative assessment of public policies

Monitoring of audit procedures

Tool for queries

Alimente

Ariane

Webi

Génère

Des tableaux de bord de suivi de l'activité des CRTC

Scoreboards for monitoring of activity

Contraintes — Contraintes

Système de Décision

Flux de décision

Système d'Information

Flux d'Information

Système Opérationnel — SORTIES

ENTREES — Flux physiques

## 0.4 – WHY ARE WE INTERESTED IN THESE COMPUTER DATA?

- Quicker, even immediate availability of data: hence fewer delays in publishing reports (nowcasting)

- Information at a finer scale: information systems enable to produce situated and exact analyses

- Objective and strong measures, with regard to the contradictory procedure which allows the audited body a right of reply

- Productivity gains: a reduction of the burden of inquiries

0.5 – TOWARDS A DECISION SUPPORT AND GEOGRAPHIC INFORMATION SYSTEM?

Without further IT development, on the basis of these old tools for monitoring activity, it should be emphasized that the analysis of the territory coverage can be usefully supported by cartographic tools

Identification in Occitania of treasuries for which no single body has been submitted to audit in the period 2006- 2016
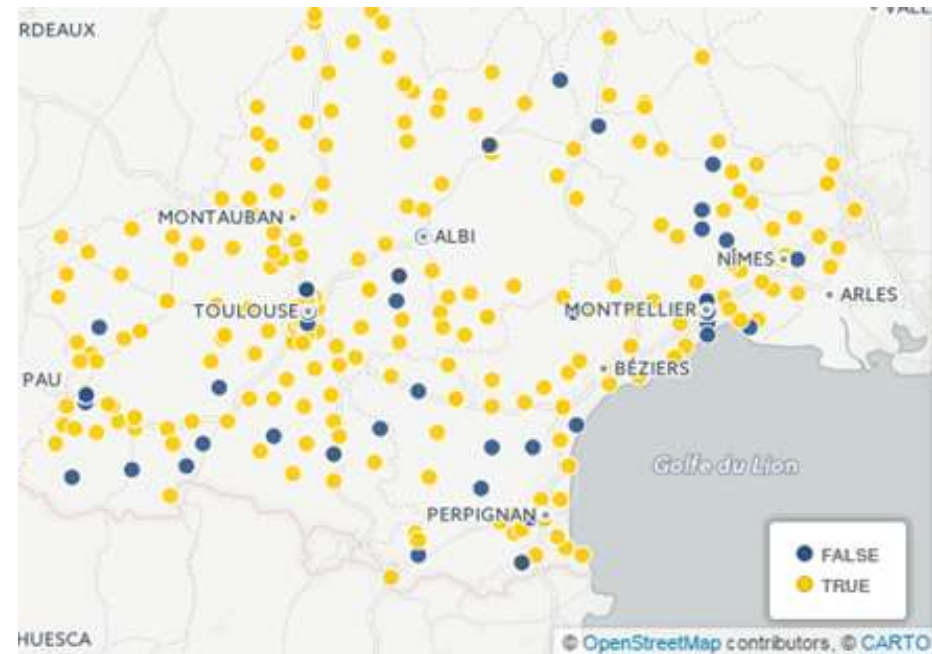
FIRST PART

TOOL FOR FINANCIAL ANALYSIS (ANAFI)

1.1 – Data collection and analysis of data flows in public accounts

▪ The project started at the end of 2012 as an alternative to a pre-existing tool which had been entrusted to an external provider and had become largely unsuitable.

▪ This new project, internally developed, is used to support audit teams since January 2014. It offers in just a few clicks and within a few seconds access to the accounting data (2009 and later years) of local public services as well as an **automated** retrospective financial analysis of local authorities.

▪ The tool should provide evidence to answer two key questions regarding the retrospective financial analysis, namely:

• 1/ Has the local authority carried out its investment programme without damaging its financial situation?

• 2/ Does the local authority assume its entire obligations or does it carry forward expenses (maintenance or fixed assets renewals) or risks (loans) to the future?

1.2 – Objective and types

▪ Through its pedagogic development and the indicators selected, this analysis suggests an **audit methodology**, without aiming at setting a binding standard:

- Present a comprehensive approach in order to promptly ensure the overall financial balance,
- Design an homogeneous analysis for all local authorities,
- Ensure consistency with the aggregates used in other tools of the ministry of finance.

▪ The data flow provided by the ministry of finance since 2012 gives access to **170 000 accounting balances** of local authorities, under 18 different classifications, corresponding to each different type of local authority and public service.

▪ The automated financial analysis is made possible through the elaboration of grids adapted to each budgetary and accounting classification.

▪ To go into more detail, the analysis is divided into two grids: annual financial performances; the assets position or balance sheet situation.

1.3 – Limits and recent developments

- **Limits :**

  - The tool does not perform an analysis of what has still to be realized,
  - Nor does the tool perform qualitative debt analysis (identification of bad loans),
  - The tool is not intended for verifying the reliability of the accounts, even if some automatic verifications are carried out.

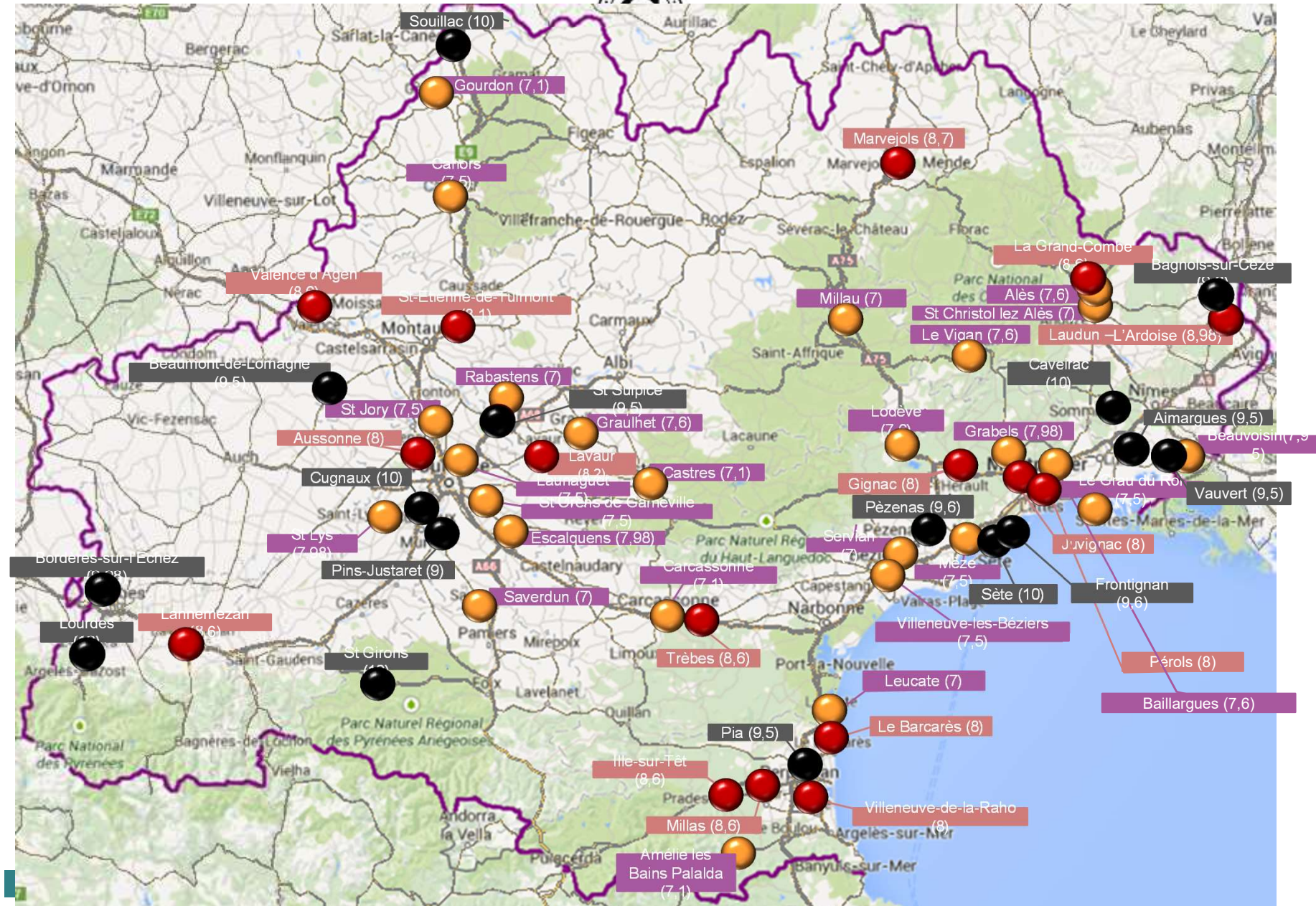- Since the project is being implemented it has benefited **many new modules:**

  - of prospective financial analysis,
  - of public services of an industrial or commercial nature,
  - of public health centres,
  - of cities etc…

- The tool introduces a system of **financial rating of its own:**

  - This renews the **risk programming** by a systematized processing of management accounts: homogeneous evaluation of the level of financial risk for municipalities;
  - It also allows to create a configurable warning system
  - However, this tool still has a limited used (a few audits per year in some audit chambers).

Scoring of financial risk

ANAFI software : municipalities in Occitannia with more than 3 500 inhabitants with a score greater than or equal to 7

Souillac (10)
Gourdon (7,1)
Cahors (7,5)
Marvejols (8,7)
La Grand-Combe (8,6)
Bagnols-sur-Ceze
Valence d'Agen (8,6)
St-Étienne-de-Tulmont (8,1)
Alès (7,6)
St Christol lez Alès (7)
Millau (7)
Le Vigan (7,6)
Laudun –L'Ardoise (8,98)
Beaumont-de-Lomagne (9,5)
Cavelrac (10)
Rabastens (7)
St Sulpice (9,5)
St Jory (7,5)
Graulhet (7,6)
Lodève (7,9)
Grabels (7,98)
Aimargues (9,5)
Aussonne (8)
Lavaur (8,2)
Beauvoisin (7,9 5)
Cugnaux (10)
Laumaguet
Castres (7,1)
Gignac (8)
Le Grau du Roi (7,5)
St Orens de Gameville (7,5)
Pèzenas (9,6)
Vauvert (9,5)
Escalquens (7,98)
Servian (7)
Juvignac (8)
St Lys (7,98)
Mèze (7,5)
Bordères-sur-l'Echez (9,98)
Pins-Justaret (9)
Carcassonne (7,1)
Sète (10)
Frontignan (9,6)
Saverdun (7)
Villeneuve-les-Béziers (7,5)
Lourdes
Lannemezan (8,6)
Trèbes (8,6)
Pérols (8)
St Girons (10)
Leucate (7)
Baillargues (7,6)
Pia (9,5)
Le Barcarès (8)
Ille-sur-Têt (8,6)
Villeneuve-de-la-Raho (8)
Millas (8,6)
Amélie les Bains Palalda (7,1)

Légende :   ● = score de]7 à 8]   ● = score de [8 à 9[● = score de [9 à 10]

SECOND PART

SEARCH AND CONSULT FILE-BASED DOCUMENTS (ORC PROJECT)

2.1 – Support for the investigation. Cross-section potentials

▪ A project also launched at the end of 2012, placed within the context of **digitisation** of the accounting information system and an affirmation of the principle of documents being supplied without being requested;

- → It is not the responsibility of financial jurisdictions to go and seek the documents but the accountant's responsibility to furnish them in advance.
- → a shared electronic filing system: a common data warehouse which keeps the documentary evidence in support of the management accounts (State and local authorities) ;

▪ The tool has become operational since March 2017: including data for 2013, 2014 and 2015. With time the tool will store 10 accounting years.

▪ A deployment campaign with training courses for reference officers followed by cascade training of all personnel + the granting of access permission.

2.2 – THE SETTING UP OF ELECTRONIC FILES

- One of the classical professional practises of financial jurisdictions was the search through bundles of papers: audit teams used to plunge into thousands of pages in order to obtain the specific information they were searching for.

The new tool allows to search for information directly in electronic format and the assembling of a file, the "liasse", set up on an ad hoc basis, also in electronic format, and afterwards download it.
Example: research on public contracts of a local authority, subsidies, payroll elements.

2.2 – TRANSVERSAL RESEARCH

- Principle: Accounting records allow to know, for instance, third party networks (suppliers, grant holders, ...) of all local authorities within the sphere of responsibility of an audit chamber and the related amounts.

- Technical limitation: a ceiling of 1,000 results per survey.

- Challenge: have a better understanding of local "ecosystems"

- Premises.

- To better target audit programming.

Example: associations which receive the most operating grants in 2015 in Occitania

Relational map

Étiquettes de lignes	Somme de Mt TTC ligne
TAM HORODATEURS	47 163 380
TCN	36 081 032
CFTPM CORPOR FRANCAISE TRANSPORT	22 400 191
TAM	21 422 476
KEOLIS SA	16 221 622
SUD DE FRANCE DEVELOPPEMENT	13 829 783
OPERA ET ORCHESTRE NATIONAL MPT	13 000 000
SAS TRANSDEV URBAINT BMT	10 320 082
CMTE REG TOURISME MP	10 139 150
HERAULT SPORT	7 601 505
BTP CFA LR	7 568 593
TPMR TOULOUSE	6 036 627
TAM TRANSPORT AGGLOM MONTPELLIER	5 861 553
SEM TM SOCIETE D ECONOMIE	5 346 470
CROIX ROUGE FRANCAISE	5 059 034
CFTPM CORPOR.FRANCAISE.TRANSPORT	4 854 159
COSAT COMITE OEUVRE SOCIALE AG	4 124 832
HÃ©RAULT TOURISME	4 124 741
OPERA ET ORCHESTRE NATIONAL DE M	4 000 000
MADEELI AGENCE REG DEVPT EXPORT	3 385 787
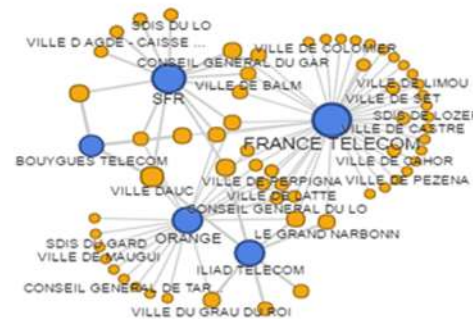
THIRD PART

AUTOMATISATION OF DATA MINING IN MASSIVE DATABASES ON PAYROLL RECORDS (ALTAIR PROJECT)

3.1 – EVALUATION OF PAYROLL RECORDS

- Pay slips of local government employees were transmitted in CD-Rom electronic format to financial jurisdictions at the time of the forwarding of the management accounts of local government public accountants.

- These documents were, however, barely used: the budget ministry had developed a data mining software, but the tool was difficult to use and time-consuming.

- An internal IT development, on the basis of « R » computer language, of statistical analysis, was carried out in order to automatically compile payroll records. It was thus possible to automatically search data from local authorities and hospital centres, in order to audit them.

  - Objectives :
    - Data extraction and the audit of their reliability
    - To perform automated tests relating to compliance with applicable regulations
    - To provide potential statistical analyses.

3.2 – A cross-cutting test

- The tool is designed to help audit teams with a specific audit.

- However, a cross-cutting use in the overall key accounts of a financial jurisdiction can be devised.

- In April 2017, a test was undertaken on the **128 key accounts** of Occitania:

  - In order to verify the quality and completeness of the deposited data.

  - To have an overview of all potential irregularities.

- This represents **921,000** pay slips audited.

FOURTH PART

DIFFICULT ACCESS TO NON-FINANCIAL DATA

4.1 – Access to intangible assets of the State

- **<u>Challenge</u>** : to cross-check financial and non-financial data bases

- **« Data are like oil, but with a plus»** : it is a reusable raw material. In order to discover the new raw material, data bases cross-checks operate as a mechanism whose pieces, the cogwheels, are going to interlock and can move.

- In order to develop a new database which is still non-existent: for example, a database on tourism, swimming-pools.

- To highlight average differences at regional level.

- To explore the distribution of a value at regional level.

- To confirm or disprove intuitions, to document and quantify them.

- To raise new elements of analysis, diagrams or networks.

- → **THE IMPORTANCE of relations with ministerial statistical services** to**:**

  - Identify the databases derived from the applications and surveys of the government services, and avoid fragmented compartmentalization of information.

  - Exchange ideas on statistical confidentiality.

  - Mobilize, if necessary, the Chief Data Officer ("Administrateur Général des Données") of the French Administration.

4.2 – Examples: investigations being finalised and prospects

- Reports on tourism in Occitania:
    - Distribution of tourist tax revenues (stay)
    - Chart of delays in tourism governance
    - Recruitment projects per employment area
    - Web analytics on tourism promotional websites

- Exploitation of data on public contracts (TED)
- Exploitation of employment data in local public service

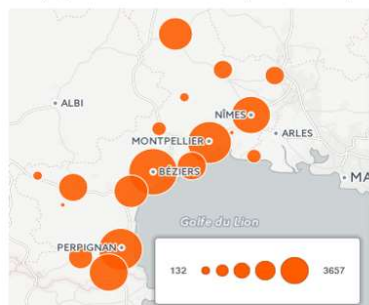carte 1 : répartition du produit de la taxe d'habitation liée aux résidences secondaires
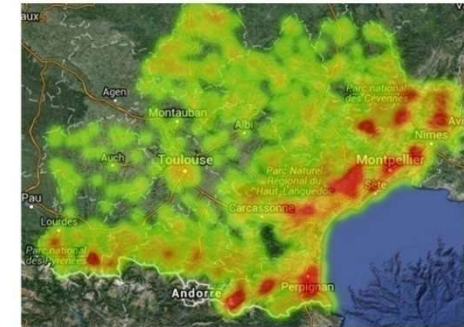
Source : données DGIFP – mise en carte avec Google Fusion Tables

carte 2 : la carte de l'intercommunalité touristique d'après la taxe de séjour en 2014

Source : CRC – anafi, d'après les comptes de gestion - mise en carte avec CartoDB

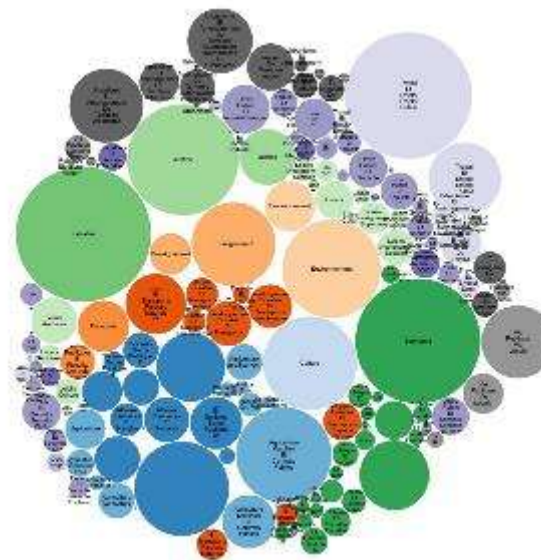Carte 4 : les projets de recrutements en 2016 par bassin d'emploi en Languedoc-Roussillon

Source : enquête BMO 2016 – Pôle Emploi - mise en carte avec CartoDB
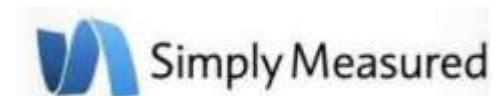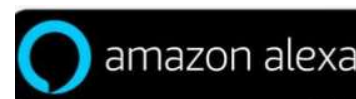
4.3 The #Datasession - June 2017: public data access

- To learn techniques used by data scientists (data integration and preparation), rapid prototyping of interactive map, rapid prototyping of official papers.

- To verify agility and brainstorming tools on a specific issue annoying for citizens.

- To identify internal, local and national actors that will help us to subsequently improve.

4.4 – Limits: advantages and disadvantages of centralised resources

- Advantages of centralisation: The National Court of Audit has recruited **data scientists** in a national data network (a significant internal expert resource)

- → but severe risk of **congestion**: all requests converge towards a limited number of staff

- → importance of disseminating **data literacy** in all audit teams.

- → to develop training which goes beyond expertise in introduction/expertise in Excel.

- To exploit developments of open data: Data.gouv.fr / Insee.fr/http://webstat.banque-france.fr/fr

- Example: advanced research on Google : combine search operators: site: .fr filetype : xls culture

- Example: computer programming, web scraping → in the future magistrates/auditors will be encoders?

```python
import pandas as pd
import os
from selenium import webdriver
from selenium.webdriver.firefox.firefox_binary import FirefoxBinary
from bs4 import BeautifulSoup
import re
import time


def scrap( input_path, output_path,binary_path, ind_debut , ind_fin ):
    start_time = time.time()
    old_index_start= 0
```
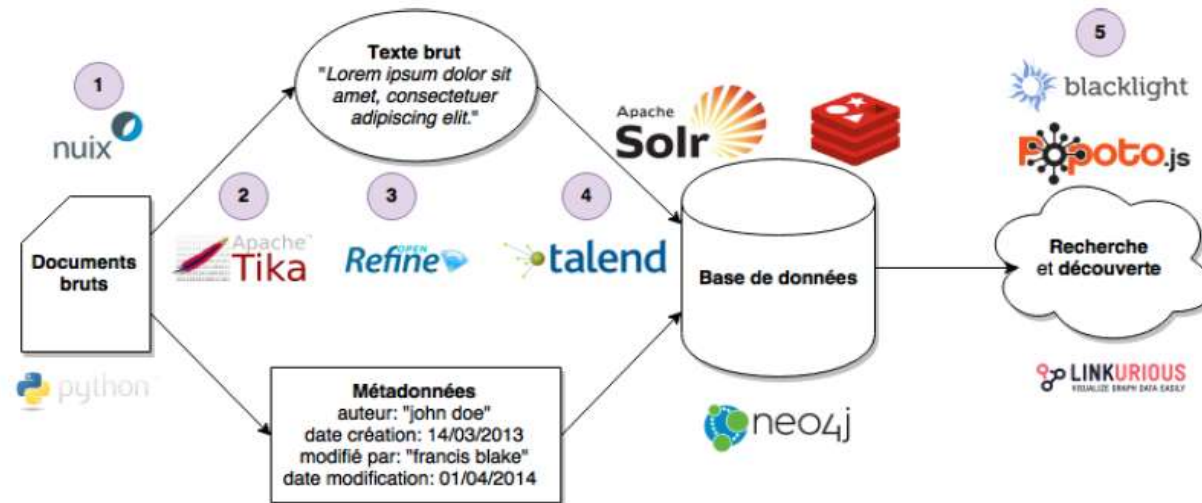
4.5 – Data feedback from journalists: the #Panama Papers

- 11.5 million documents (of which 4.8 million e-mails)
- Heterogeneous and unstructured data:
  - .doc, .pdf, .xls, .msg, images.
  - Mainly text (very few figures)

- Complementary data in Open Data :
  - Luxembourg Trade and Companies Register
  - Société.com, Verif.com

Chaîne de traitement de l'information des Panama Papers

3.3 – Imagine advanced uses: examples of probity issues

- **From third-party data bases with respect to local authorities concerned it is possible to combine data and identify probity issues (prevention of conflicts of interest).**

Example: Elected representatives (T2) of a local authority (T1) which subsidizes an association (T4) of which they are members.

→ To rely then on computerized data (deliberation) for examination.
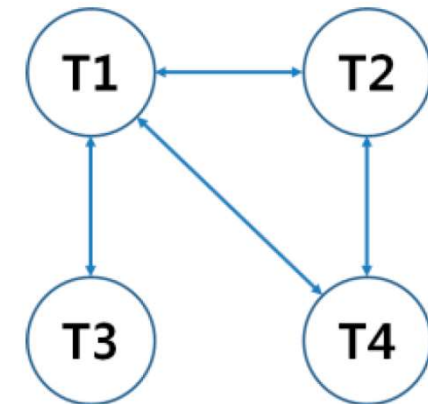
Another example: the elected representatives of a local authority which has financial relations with a supplier enterprise where they are managers/shareholders…

- Need to test on verify specific projects to evaluate the potential of these methods, sources: use of sandbox
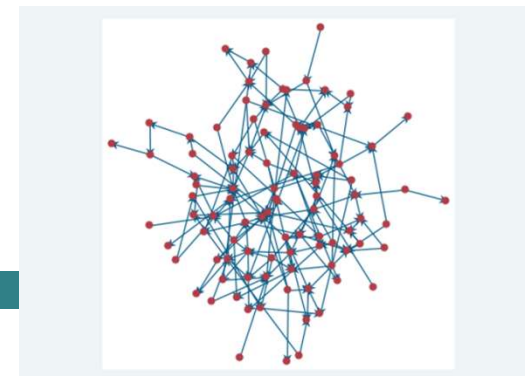
4.1 – Tell stories (the culture of the image)

- To analyse the contents (structures and trends) and improve the way they are shared

- The first principle of data visualisation: <u>keep it simple</u> to narrow the gap between figures and the reader.

4.2 – Open the data associated with the report (to participate in Open data)

- Since the 2016 data session the National Court of Audit publishes the data associated with its reports. The Audit Chamber of Occitania did it for the first time at local level in 2017.

4.3 – Assess the impact (web analytics)

- Complete the indicators of printed press coverage
- Make use of web tools and influential intermediaries?