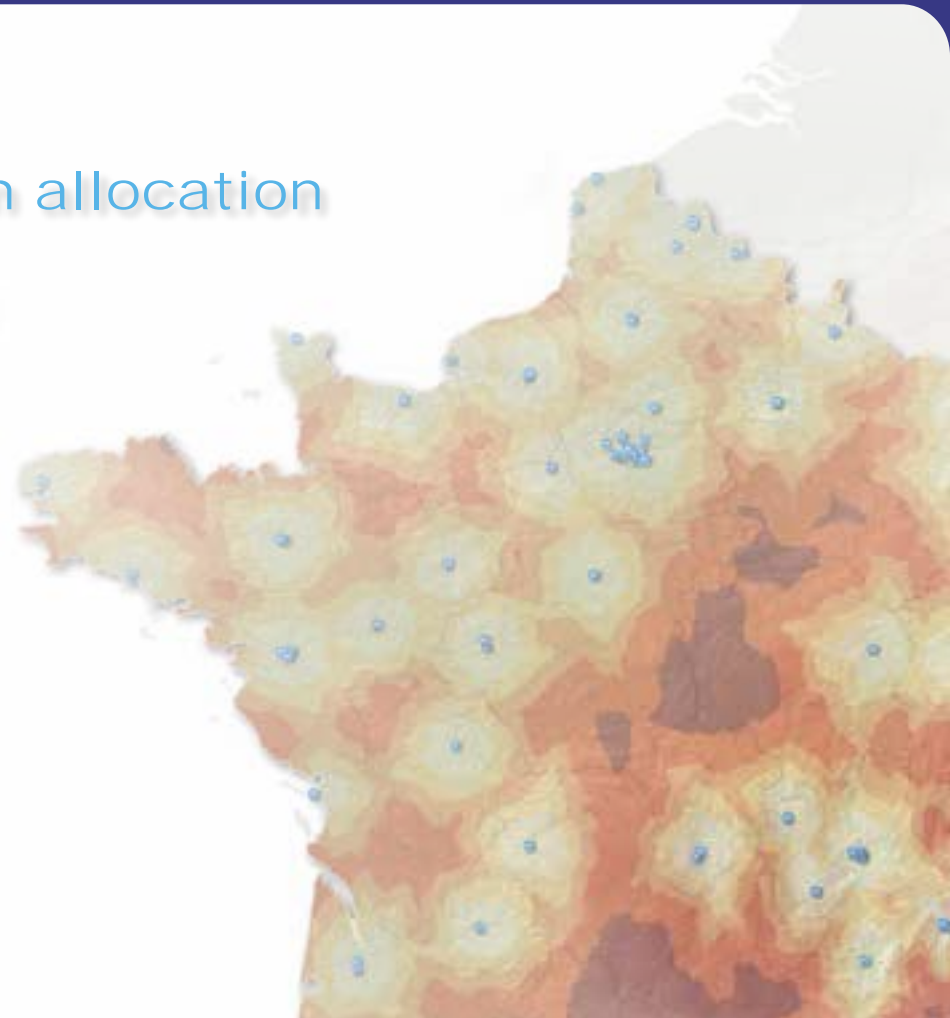


Using Arcgis for Server for organ allocation optimization in France

Esri UC 2014



a - Introduction

Contents

1. Context
2. Methodology
3. Results
4. Conclusion and future work

1 - Context



1 - Context

L'Agence de la biomédecine

- n Created by the bioethics law of August 6, 2004 from the Etablissement Français des Greffes created in 1994
- n French public body
- n Responsible for:
 - § Operational coordination and administration of organ transplantation and tissue harvesting
 - § Coordination and administration of hematopoietic stem cell grafting
 - § Administration of assisted reproductive technology, human embryology and human genetics

1 - Context

L'Agence de la biomédecine

It is responsible for Organ allocation rules and the national waiting list

- n **To ensure the impartial distribution of organs to the most appropriate recipient**
- n **To make an optimal compromise between efficacy, equity and feasibility**

Some allocation rules are related to a score, with a distance interaction :

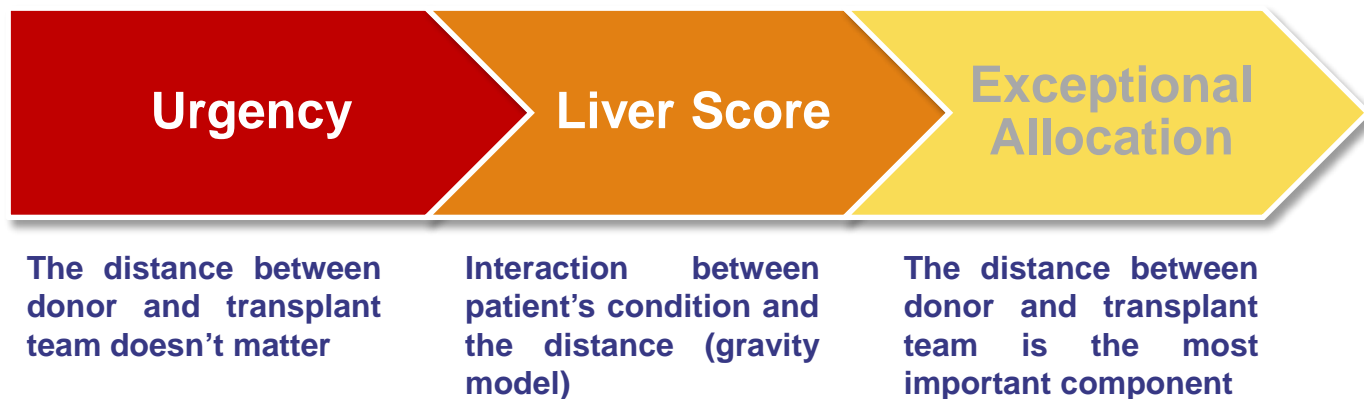
- n **Liver Score**
- n **Kidney Score**

1 - Context

Example : the Liver Score

In liver transplant, the compromise between efficacy, equity and feasibility must take into account :

- n Specific recipient condition (i.e. emergency life threatening conditions)
- n The quality/safety of the transplant and organ
- n The distance between donor and transplant centres (cold ischemia time, transplantation team's security)



1 - Context

The distance in allocation rules

Need to calculate the distance between transplant team and donor location for :

- **Liver's exceptional allocations**
- **Pediatric patients**
- **Deceased donors after cardiac death**
- **HBC and HCV donors**

Problem : no specific tools to do it

- **manual search on internet**
- **Difficulty to have an overview of all patients locations**
- **Difficulty to have an overview of all available transport modalities**
- è **Time wasting**

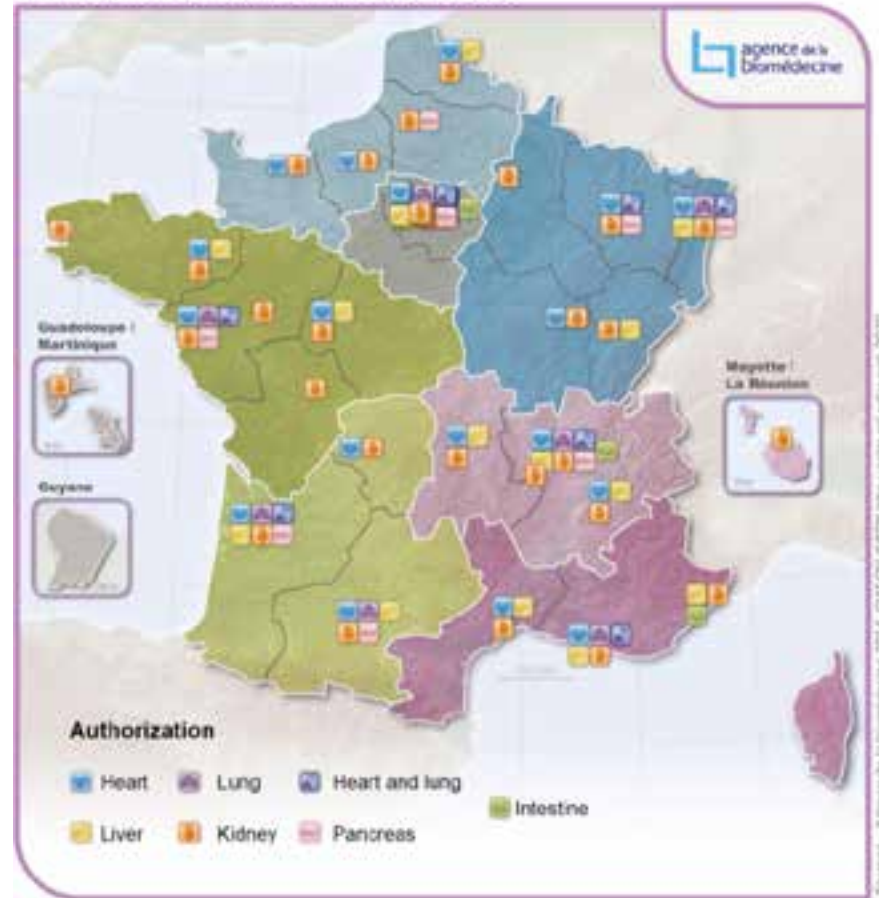
1 - Context

Health care supply

Organ procurement hospitals in France in 2013



Transplantation teams in France in 2013



1 - Context

Objectives

- 1/ Offer a geographical decision making tool for organ allocation
 - n **access to geocoded data (patients, hospitals) updated regularly.**
 - n **Euclidian and drive time distance calculating.**
 - n **Semantic request on data.**
- 2/ Provide an access to geographical information for our partners
 - n **Dynamic thematic maps (organ donation rate by year)**
 - n **Location maps (hospitals, dialysis centers, patients)**

Constraints

- 1/ Web application
- 2/ Secure access by the Agence security portal
- 3/ Filtering view depending of user's right

2 - Methodology



2 - Methodology

Existing tools

Webmapping : BO-Webigéo-ArcIMS (since 2007)

- n **Only for geographical data information access.**
- n **Users : only internal agents.**

Maps production : Arcmap

- n **Geographical database (40 base maps, 30 000 health structures regularly geocoded at the address, 1 DEM, roads network)**
- n **Maps production » 250/year (half by the biostatisticians)**

è Use of outcomes, functional and data specifications

2 - Methodology

Project schedule



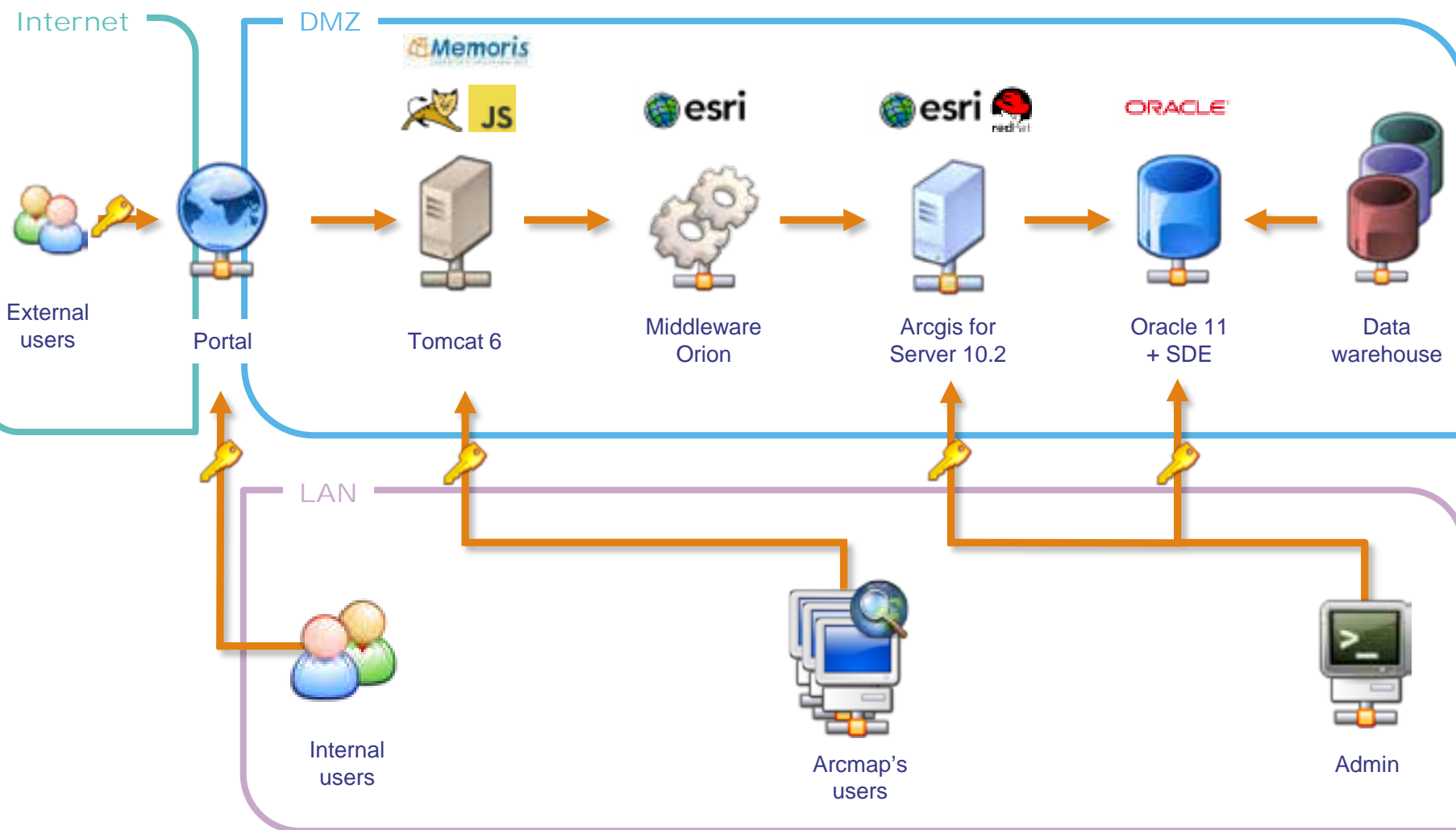
Ressources : **Geomatic project manager, decision support department, public market department, IT department, ESRI, Memoris**

Arcgis for server integration and installation

- n **A middleware for the security access has been developed by ESRI France**
- n **A web application based on ESRI's Javascript API has been developed with Memoris**
- n **The flex application was created with the flex builder and is still used by the regulation until the Javascript application is ready.**

2 - Methodology

Network architecture



2 - Methodology

Middleware

Objectives : filter the access to mapservices or to the mapservice content (whereclause) depending of the user's profile. These profiles already exist for our Business Objects application

A/ Users see everything on the mapservice

- § Mapservice : retrieval teams & DEM
- § Layers : all
- § Fields = team's name only



B/ Users see one region on the mapservice

- § Mapservice : retrieval teams & DEM
- § Layers : Region = 'north'
- § Fields = all



C/ Users can't see the retrieval teams mapservice

- § Mapservice : DEM only



2 - Methodology

Web application

Must

- n **Use Javascript**
- n **Be simple as possible for users**
- n **Be configurable**

A template and a specifications document have been written

A Javascript webapp using ESRI's API has been developed by Memoris

2 - Methodology

Web application

The screenshot displays a web application interface for organ donation management. The top navigation bar includes the logo of the 'Agence de la biomédecine' and several functional icons: 'Couches de données', 'Fonds de carte', 'Recherche rapide', 'Outils', a download icon, a printer icon, and a help icon. Below this, a secondary menu highlights 'Prélèvement & greffe' among other categories like PEGH, CSH, PNRG, REIN, and Autre. The main content area is split into a left sidebar and a right map. The sidebar contains a 'Liste des couches disponibles' section with checkboxes for 'DDAC (couche)', 'HBC', 'HCV', and 'Pédiatrie'. It also lists 'Sites autorisé au prélèvement' (D'organes et de tissus, De tissus seuls) and 'Equipe de greffe d'organes' (Equipe). A 'Filtre sur la couche : DDAC' section includes a search field, and dropdown menus for 'Equipe de greffe', 'Organe attendu', and 'Groupe sanguin'. The right side shows a map of France with various regions highlighted in different colors.

3 - Results



3 - Results

Demo

Since januar 2014

n Allocation platform uses a flex application

<https://www.sipg.sante.fr/>

4 - Conclusion



4 - Conclusion

Advantages

- n Time saving for the organ platform
- n Time saving for maps production
- n Easy access to the data
- n Homogeneous data for all Agence's decision support system

Limits

- n No backup
 - è An order form can be sent to Memoris to investigate the problem
- n On-call duty ?

4 - Conclusion

Futur works

Testing the javascript application

Final quarter 2014

- **Lauching the javascript application for internal users**

2015 : opening to external users ?

New thematics to add :

- **dialysis**
- **procreation and genetics**
- **hematopoietic stem cell**



Thank you for your attention