PREDICT

***P**revent and **R**espond to **E**pidemics*
*and **D**emonstrate **I**nformation and **C**ommunication **T**echnologies*

ARTES Applications Workshop

April 19th 2012

esa

DSV

MEDES

AviaGIS

Context

- 75 % new diseases affecting humans over last decade are zoonoses
- Animal diseases have huge economic impact in developing world
- Early warning reduces the risk of outbreaks
- International bodies promote the use of early warning systems
  - ➔ GLEWS « GLobal Early Warning System » for major animal diseases, including zoonoses », a common initiative of WHO, FAO, OIE

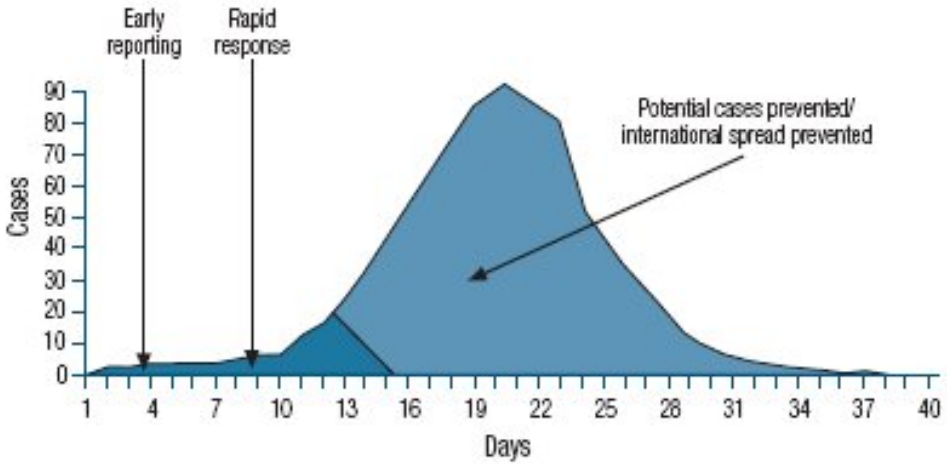


Figure 1: Global outbreaks, the challenge: late reporting (WHO World Health Report 2007)

Feasibility study

- **First objective of the feasibility study**
  - ➔ **Define the feasibility both technically and economically in Senegal for animal health**

- **Second objective**
  - ➔ **Promote a generic solution for Health Early Warning in animal health**

Overall Presentation of DSV

- **DSV "Direction des Services vétérinaires" is responsible for animal health protection through the implementation of the National System of Epidemiological Surveillance (SNSE), and for medical and health prophylaxis against animal diseases**
- **Organisation and stakeholders**
  - ➔ 14 regions, each region divided in 45 counties.
  - ➔ 150 veterinary posts are located very close to livestock farmers
  - ➔ The veterinary posts managers report outbreaks to SDEL County Stock Farming Services)..., which in turn are accountable to SREL (Regional Stock Farming Services).
  - ➔ The central level is in Dakar
  - ➔ 255 private veterinarians, 50 with a special accreditation for vaccination and insemination
  - ➔ Laboratories (2 main Senegalese Institute of Agricultural Research (ISRA) and the Pasteur Institute of Dakar (IPD)); five regional
  - ➔ Samples are accompanied by an Outbreak Notification Form and a Memo giving information

DSV Use Case

- **Actual paper transmission slow and not effective**
- **Move to digital exchanges for collection and reporting**
  - **DSV is implementing the SIGEL "Système de Gestion de l'Elevage"**
- **PREDICT will complement the SIGEL**
  - **Improve quality of information and treatment efficiency**

    ➔ geo-referencing of outbreaks and localisation of herds
    ➔ validation and monitoring of data
    ➔ follow up of user activity

  - **Automated report production especially with configurable queries**
  - **Implement Performance Indicators**

DSV User Needs

	Need	Priority	System(s) that will fulfil the need
1	Data collection	5	SIGEL
2	Data entry verification	3	SIGEL
3	Search for aberrations	3	SIGEL
4	Manual validation of data	3	SIGEL
5	Follow up of user activity	4	PREDICT data exploitation module
6	Parameterisable queries	4	PREDICT data exploitation module
7	Help to query definition	3	PREDICT data exploitation module
8	Data base and space time analysis	5	PREDICT GIS module
9	Delimitation of burnt areas	3	PREDICT GIS module
10	Localisation of herds	4	PREDICT GIS module
11	Field enquiries	3	PREDICT crisis team terminal and data exploitation module
12	Follow up of suspected outbreaks	4	SIGEL
13	Report production	3	PREDICT data exploitation module
14	Performance indicators	5	PREDICT data exploitation module
15	Interface with SIGEL	5	PREDICT data exploitation module

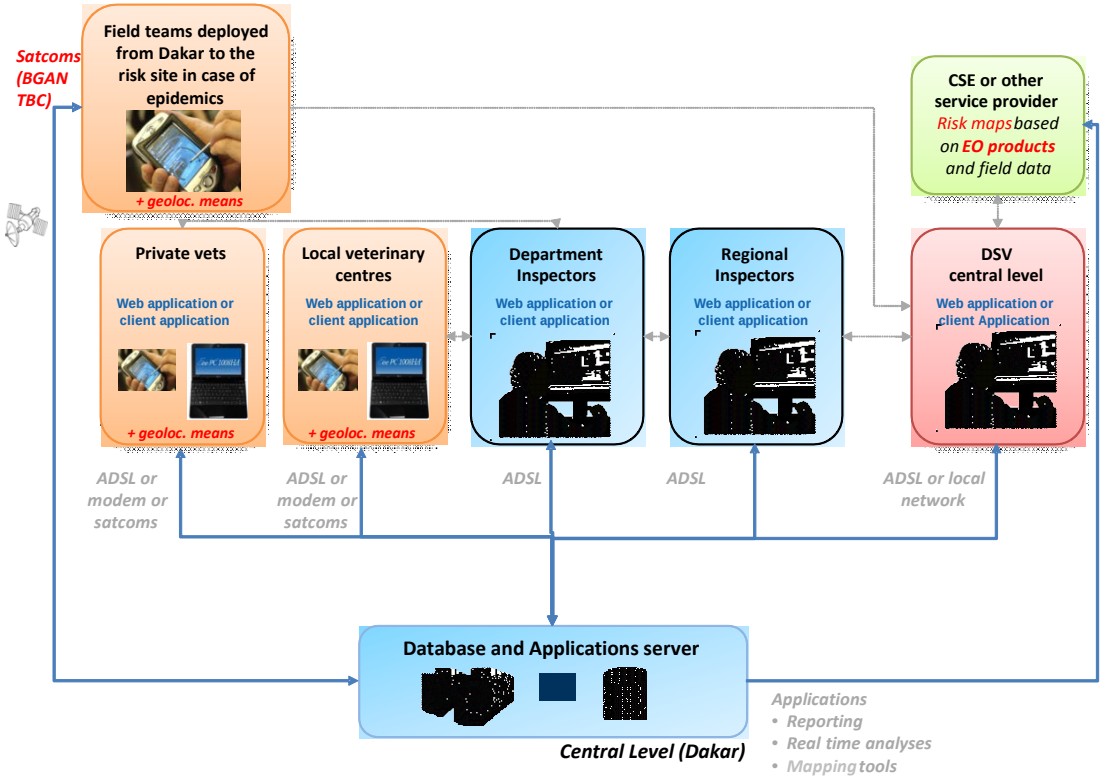
Scale of priority from 1 to 5: 1 = low, 3 = average, 5 = the highest

Proposed Solution

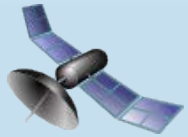
- **Scope and objectives**
  - ➔ Electronic surveillance including field agents
  - ➔ Resource management and risk mapping
  - ➔ Reporting (to international bodies)

- **End user**
  - ➔ DSV

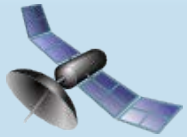
DSV – Overview of the architecture of the envisaged system (to be studied during the feasibility phase)



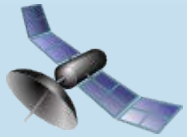
System architecture



Positionning



Communication



Imagery

Access to internet

Field enquiries

Crisis team

Geo-referencing

Data collection

Local Vets

Data viewing

Data quality assurance
Data mining
Data reporting
Performance indicators

Data input for thematic maps

Thematic maps

Central users

Data collection module

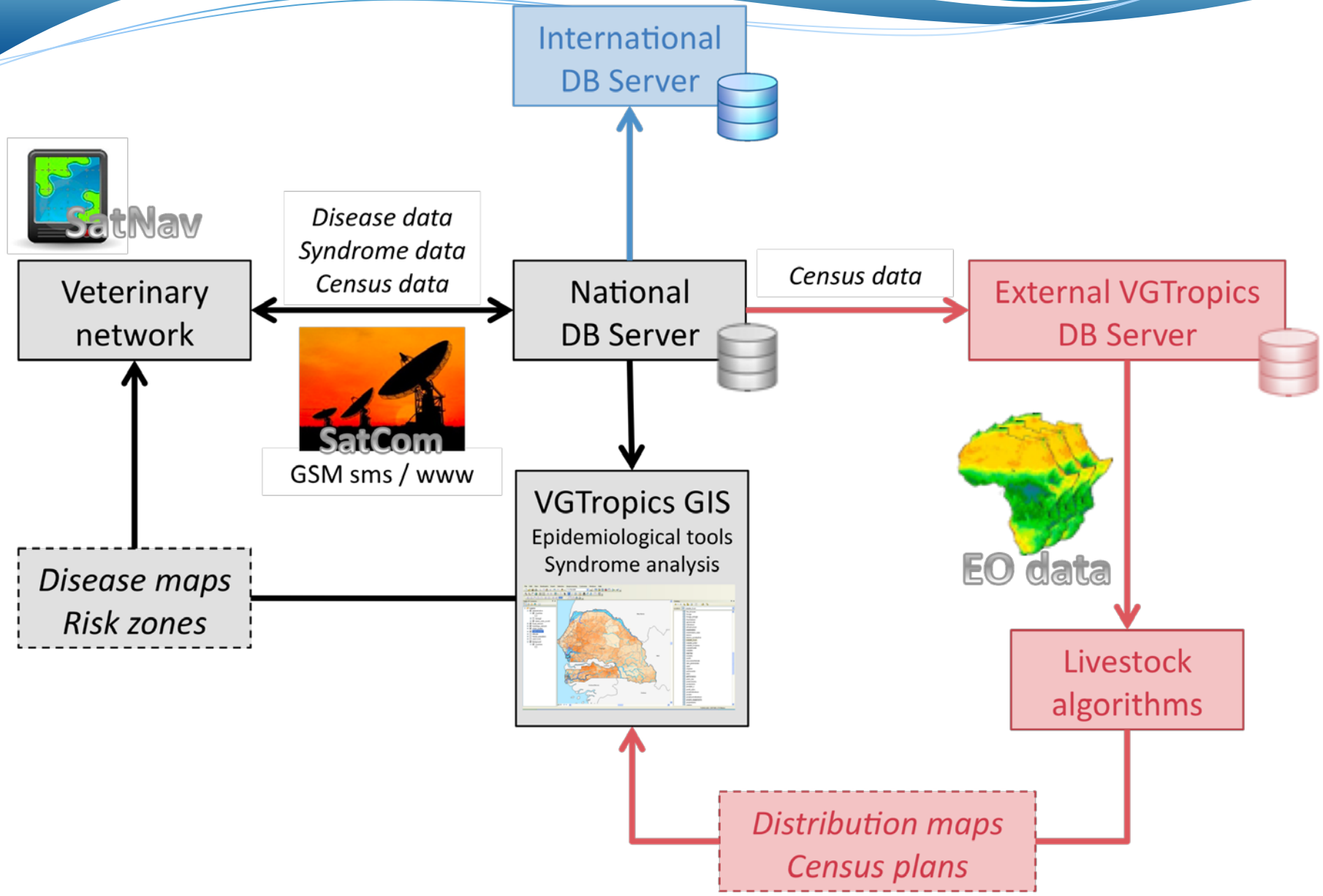
SIGEL IS

Data exploitation module

GIS module

PREDICT IS

System architecture



System functionalities

FRONT OFFICE

Data collection

- Security
- Privileges
- Geo-referencing
- Dictionaries
- Mobile terminal

Data quality assurance

- Entry verification
- Aberration detection
- Validation
- Biological confirmation
- User activity follow up

Interfaces

- SIGEL database

BACK OFFICE

Data mining

- Queries
- Reports
- Data export

Performance indicators

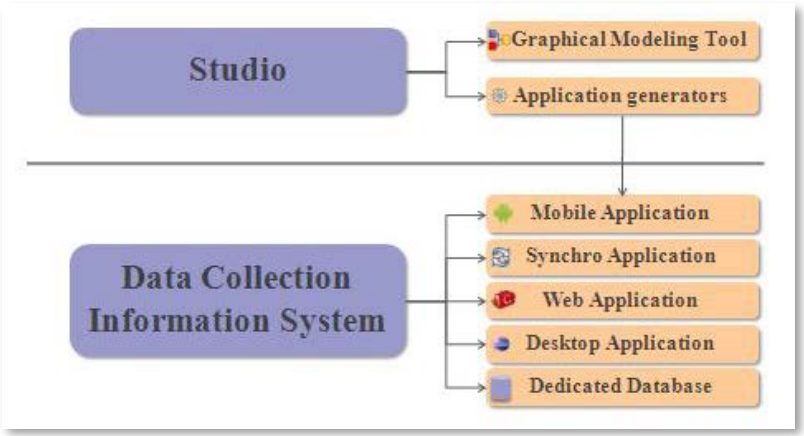
- Definition
- Dashboard

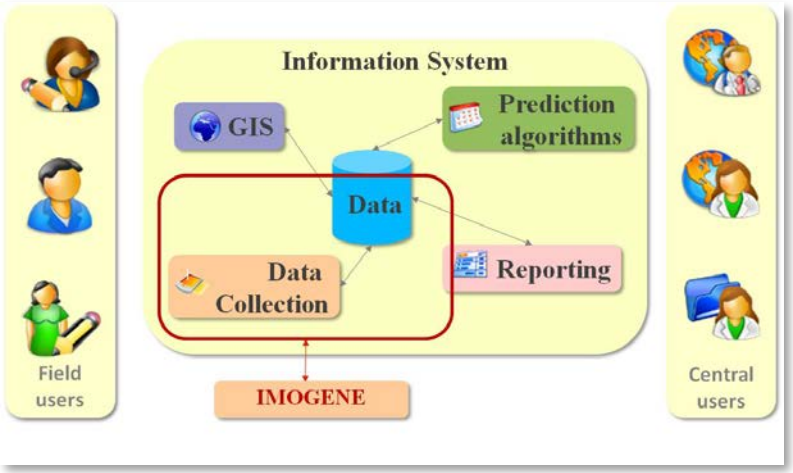
Mapping tools

- Delimitation of burnt area
- Localisation of herds
- Livestock distribution mapping

Technology used

- **Imogene: a development studio to generate and easily deploy integrated Data Collection Information Systems**
  - ➔ Generation of an independent and dedicated IS
  - ➔ Multi-platform
  - ➔ Generated applications: Desktop, web & Android



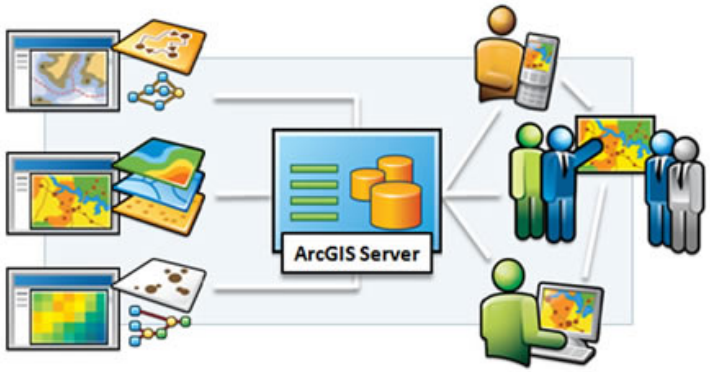


Analysis and Reporting tools will be added to IMOGENE

Technology used

- **Preferred approach: Use of ArcGIS + SatScan**
  - ➔ **Available at client side (version 9.1)**
  - ➔ **Transfer of EO data and spatial data from CSE to server**
  - ➔ **Data storage in a shared archive**
  - ➔ **Web Feature Server with offline calculation on GIS server**
  - ➔ **Development of specific client tool boxes**

- **Standardised formats:**
  - ➔ **GeoTiff for raster exchange**
  - ➔ **Shapefile for vector exchange**



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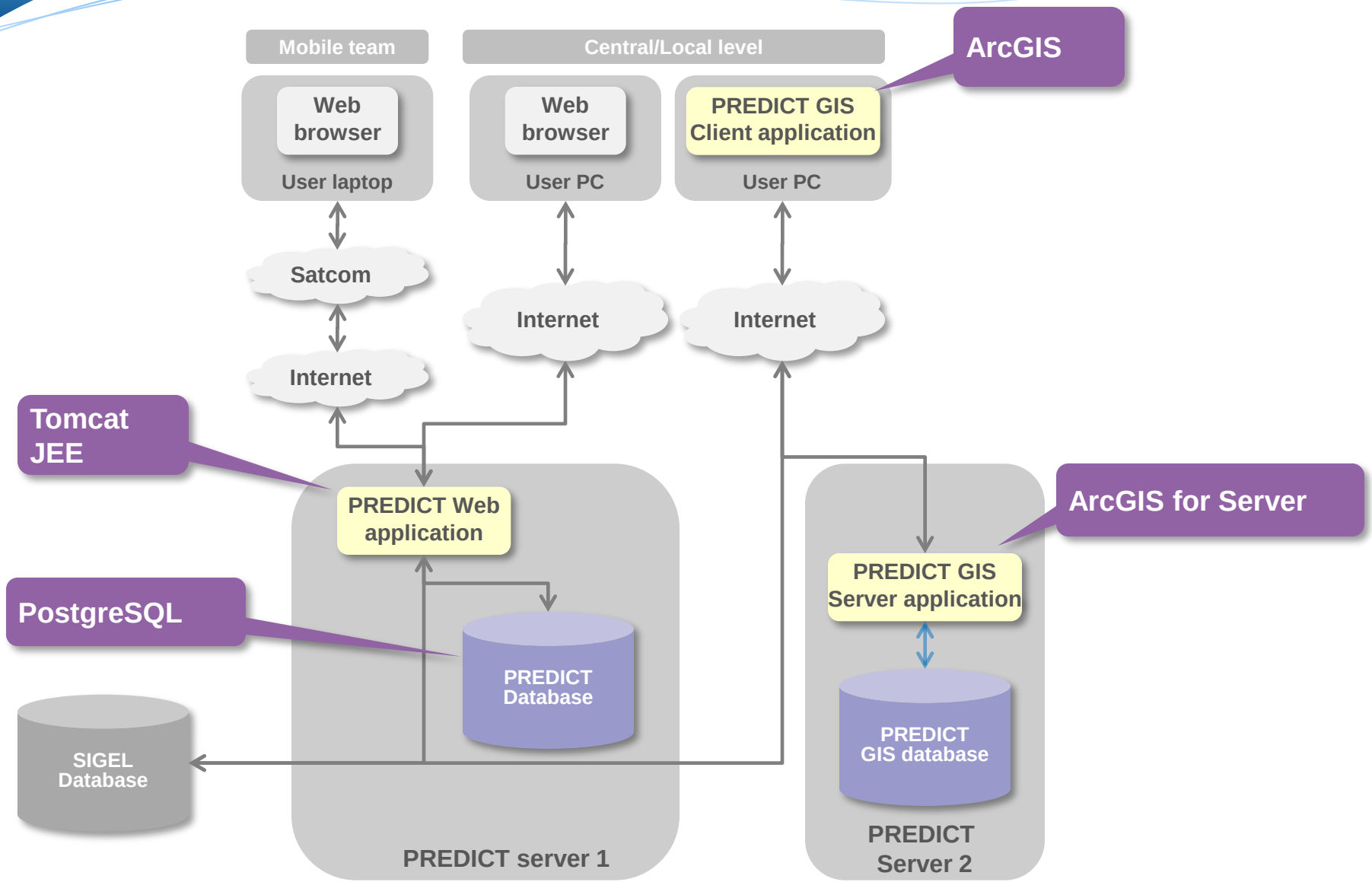
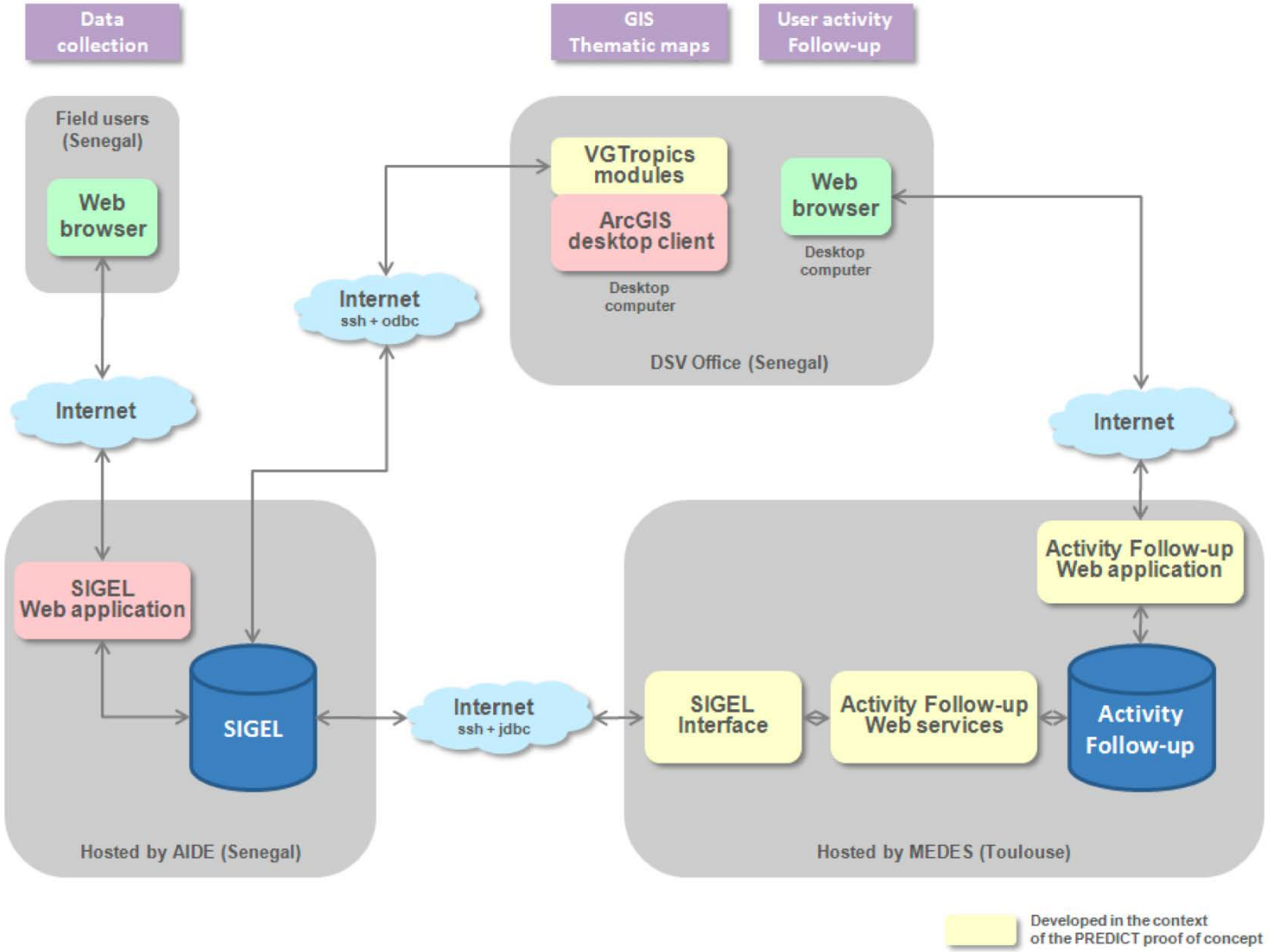


Components developped during PoC



Sustainability

- Real needs expressed by DSV
- PREDICT complements the ongoing SIGEL initiative of DSV
- Strong partnership between DSV, CSE and ADIE
  - ➔ Free-of-charge services or preferential rates
- Low running costs expected for PREDICT, to be evaluated during the viability analysis
- Experience of DSV on Information systems from previous projects

The Demonstration Phase: VGTropics

- Senegal showcase to other countries
  - ➔ Definition of a “generic PREDICT “ solution
  - ➔ Project-based exploitation
- Other user groups included in the demo-phase:
  - ➔ Veterinary Departments of 52 African countries (national or state level)
  - ➔ Development aid agencies and NGOs
  - ➔ International agencies
  - ➔ Pharmaceutical and veterinary pest control industry
- Submission of outline proposal JCB May
- Focus on
  - ➔ Development of all components and integration
  - ➔ Testing
  - ➔ Validation in pre-operational scenarios
- Full proposal submission in September