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Universal solutions in Geographic Information Systems and Mapping

A spatial data infrastructure for Portuguese National Health Plan

GEOSAÚDE

Eduardo Coelho
eduardo.coelho@novageo.pt

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Introduction to the Project

Project Partners:

DGS desde 1899 Direção-Geral da Saúde

Directorate-General of Health - Division of Health Statistics and Monitoring:

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Introduction to the Project

Project Team:

Novageo Solutions:

- André Silva
- Paulo Neiva
- Eduardo Coelho

Directorate-General of Health - Division of Health Statistics and Monitoring:

- Paulo Nogueira
- Carla Farinha
- Luís Serra
- Maria Isabel Alves

Introduction to the Project

Project Timeline:

- Started in 2008 and was intended to monitor the National Health Plan (NHP) 2004-2010
- This NHP had a perspective of integration and development of information systems to:
  - empower the several levels of decision-making to identify potential health gains and priority interventions
  - monitor the activity and performance of the Health System

Introduction to the Project

Project Timeline:

- The Project Team focused on creating an SDI to support an interactive health mapping platform
- Designed in agreement with INSPIRE standards:
  - Metadata Standards
  - Interoperability of spatial datasets
  - Network Services

Introduction to the Project

Project Timeline:

- First known as “WebSIG – Mapas Interactivos”
- The NHP 2012-2016, brought new programs and statistical indicators, leading to the platform being developed and renamed “GEOSAÚDE”:
  - User-friendlier interface
  - More charts types available
  - More file formats to export

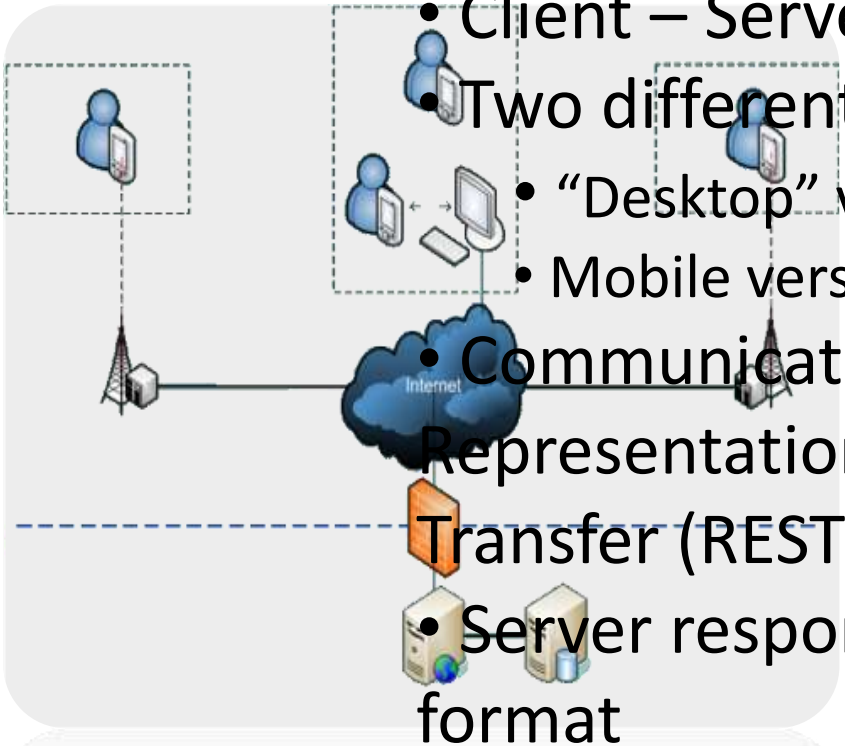
Methodology

NHP SDI uses Open GeoSpatial Consortium (OGC) Standards to achieve INSPIRE Compliance:

- INSPIRE Download Service
- INSPIRE View Service
- Interoperability

Methodology

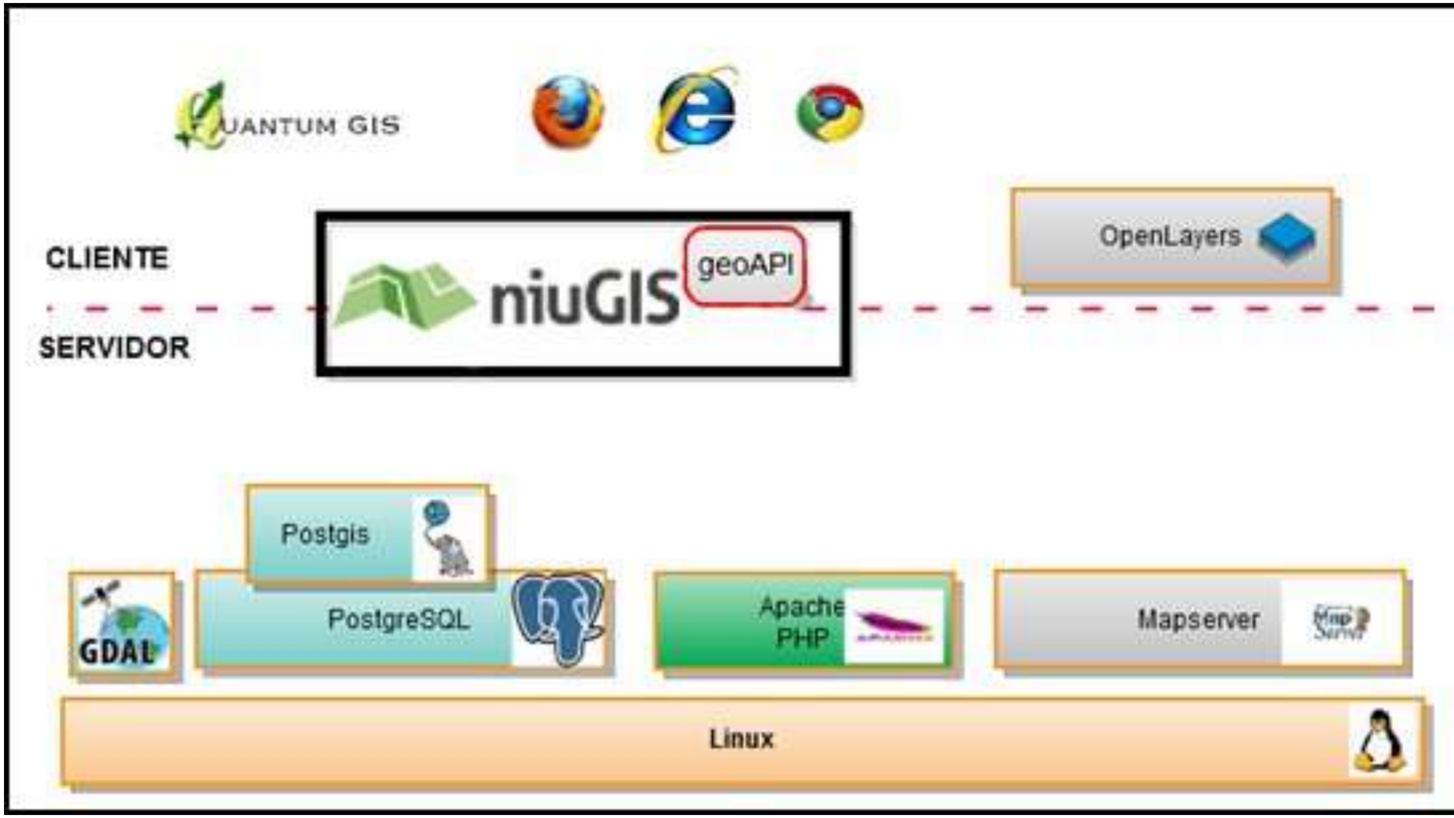
Hardware Architecture:



- Client – Server model
- Two different versions:
  - "Desktop" version
  - Mobile version
- Communication through Representational State Transfer (REST) Services
- Server response uses JSON format
- Infrastructure: Amazon Elastic Computing Cloud

Methodology

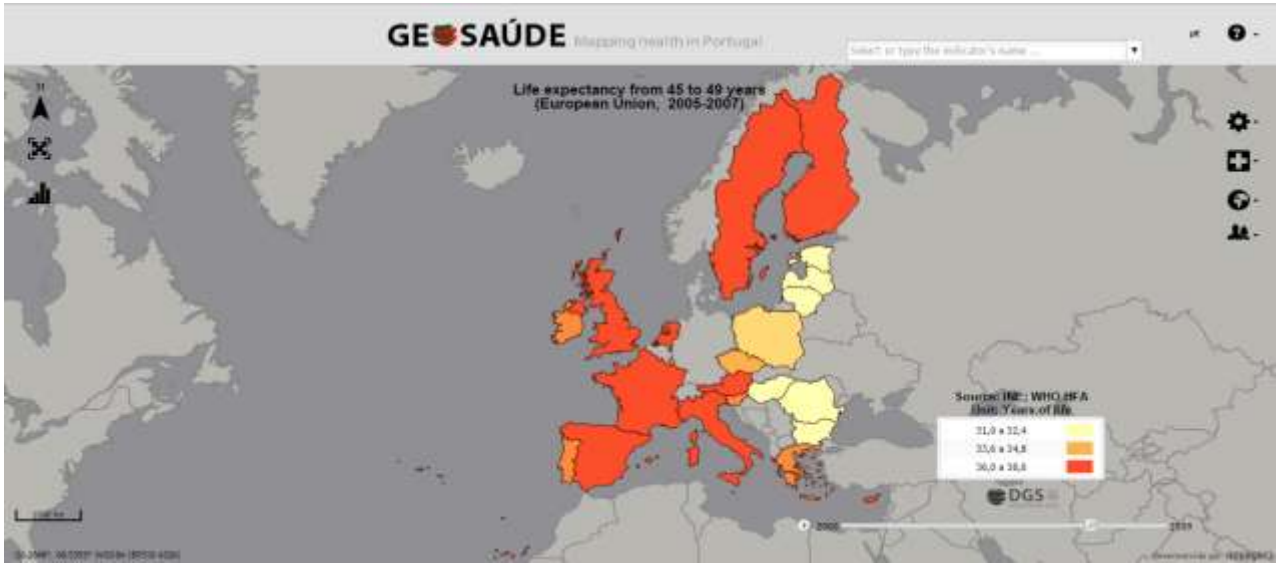
Software Architecture:



Methodology

Datasets:

- NHP datasets lie within Annex III data themes: Human Health and Safety
- Data is represented by statistical aggregation of raw measurement data reported on statistical units



Project Results

Following INSPIRE Requirements:

- Data was harmonized and standardized to create building blocks on which the software and OGC standards were applied

- Datasets had:
  - Mandatory attributes:
    - Disease measure
    - Reference period
  - Voidable attribute:
    - Gender

So far:

- Age wasn't considered an attribute but was "denormalized" as a different health indicator

Project Results

Other INSPIRE Requirements ensured:

- Health determinant statistical data were modelled as health statistical data characterized by a measurement value based on ISO/TS 19103:2005 and a statistical aggregation method

- Metadata for each health indicator is available

- Coordinate reference system: Datum European Terrestrial Reference System (ETRS 89) (WGS 84 and ETRS 89/TM06 also available for display)

- Temporal reference system

Future Developments

Improvements arising from the INSPIRE data specification Human Health and Safety:

- International Classification of Diseases code list should be used to identify the disease name

- Age range should be used as voidable attribute.

Conclusions

- INSPIRE Directives concerning to full interoperability have been implemented with OGC standards
- SDI can be freely accessed by health information users
- All datasets now centralized in a single datacenter, allowing a higher level of data quality
- The adoption of OGC compliant open source software greatly helped to implement INSPIRE Directives
- INSPIRE Directives, OGC standards and open source software operating together allowed:
  - greater interoperability
  - vendor independence
  - easier maintenance

Thank You!

eduardo.coelho@novageo.pt