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Abstract ID: 8O1

SAFIR GIS: Where did lightning strike?

At the RMI of Belgium, we use the SAFIR lightning detection system. The current configuration needed a dedicated phone line for every client who wishes to see the data. This was off course not longer maintainable due to the fact that the number of clients grew.

In cooperation with an external firm, we developed a GIS to represent lightning detection data from our SAFIR-system in a geographical way. By using a simple web browser, the client can look at real-time lightning data or look up historical data (ex. for insurance purposes).

By using geographical standards like Web Map Services and Web Feature Services we can easily add our own maps or data to the system. We can incorporate web based services like Google Maps as long as they use the standards as well.

SAFIR GIS: Where did lightning strike?

Hans Van Hauteghem

Royal Meteorological Institute of Belgium

Overview

- **Introduction**
- Application
- Demo

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Introduction

What is SAFIR?

"Surveillance et Alerte Foudre par Interférometrie Radioélectrique"

Lightning detection by using radio electrical interferometry

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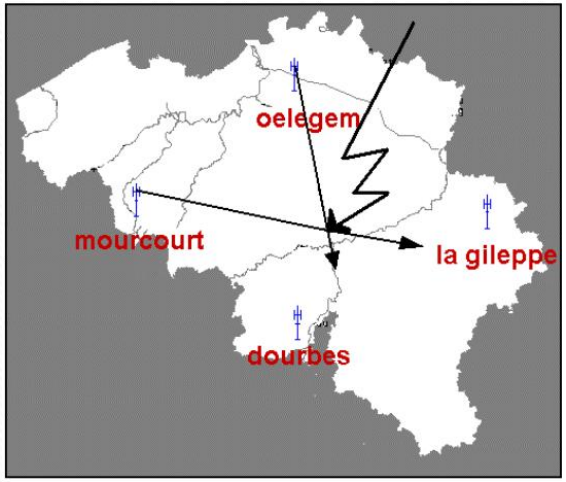
SAFIR

- Developed by Dimensions, France (=> Viasala ‘00)
- Network of 8 stations, distributed over Belgium (4(+1)) and the Netherlands (4)
- Each station contains 3 types of sensors:
  - 5 dipole antennas to determine the angle
  - Discrimination antenna to determine the type (ground or cloud-cloud)
  - GPS antenna for accurate time measurements



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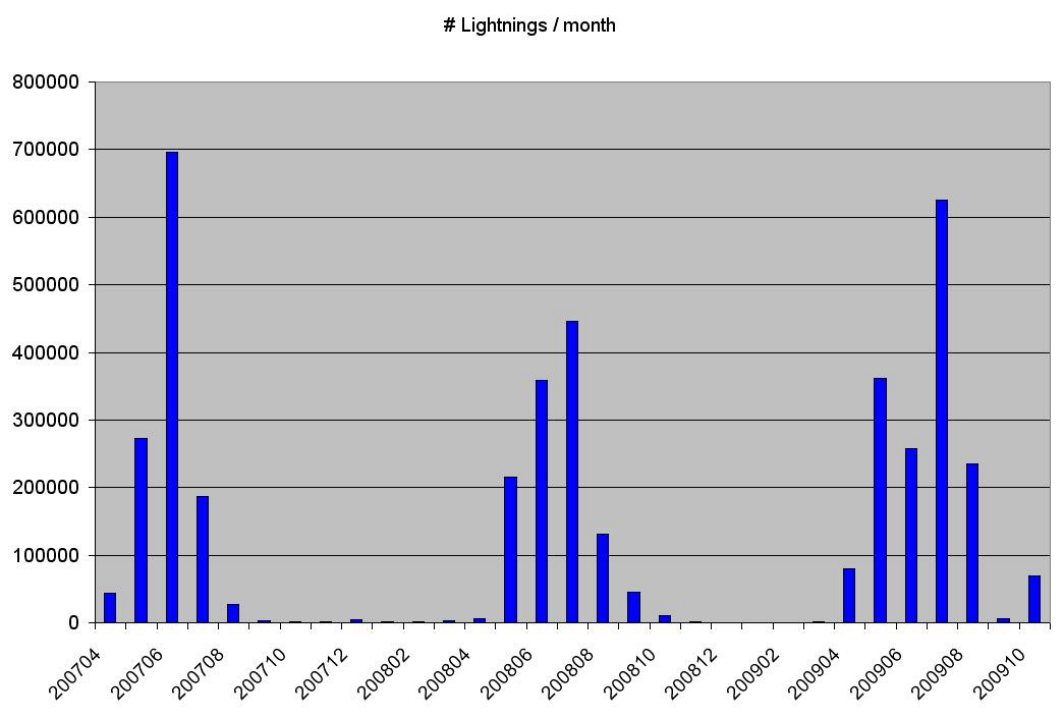
Safir data

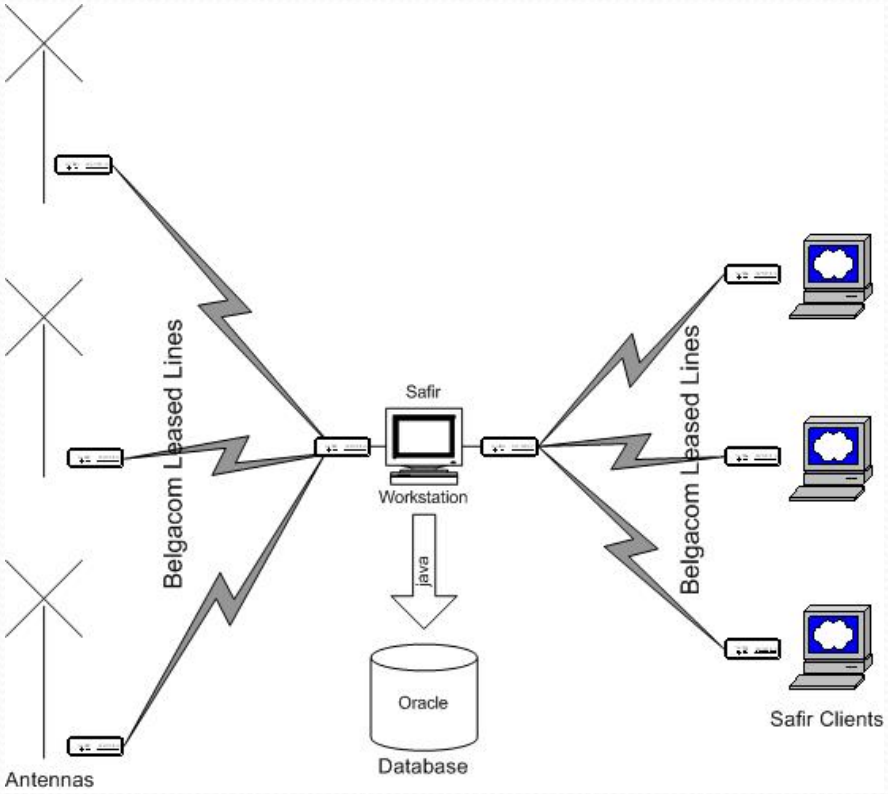
- 2007 – 2009: 4M detections
- Peaks of 300k/day



SAFIR Clients

- Energy companies (high voltage power lines)
- Aviation Control (airport safety)
- Insurance companies (dead live stock, damage claims, ...)
- General public: ‘Safir SMS’-product: the client receives an SMS when a thunderstorm approaches his location
- Climatology Department (# days with thunderstorms)

Old SAFIR Architecture



Disadvantage:

For each client:

- 1 expensive leased line
- 1 Safir licensed viewer

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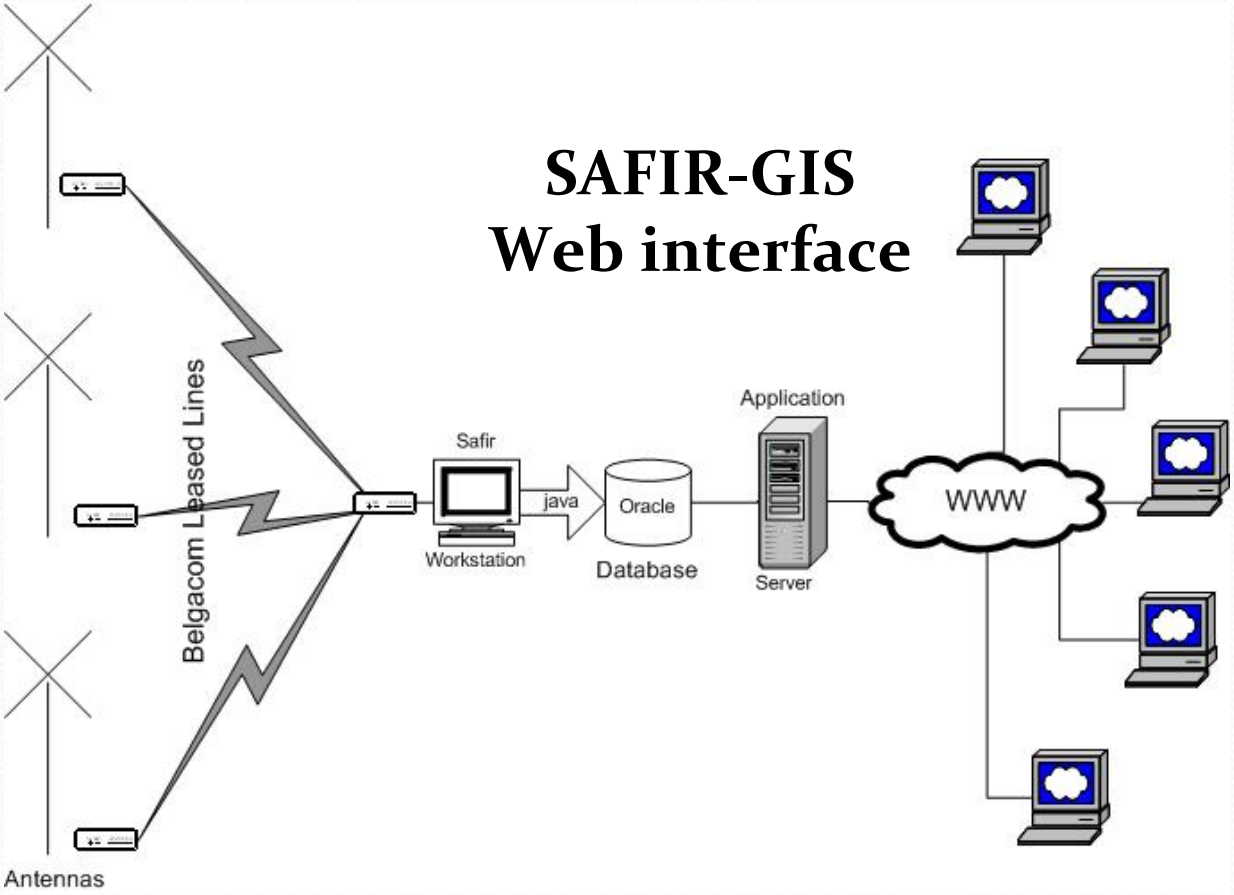
New SAFIR Architecture



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SAFIR-GIS

- Developed by GeoSolutions 

- Display lightning data on a map via a web browser:
  - Real-time data (last N minutes)
  - Historical data (since 2007)

- 2 different maps:
  - Localisation data: the actual impacts
  - Density data: the number of lightnings per square

- Animations of both

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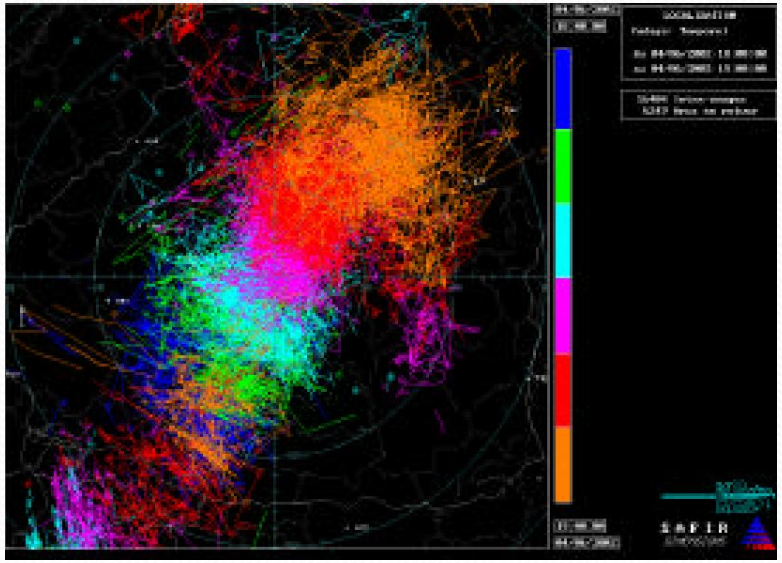
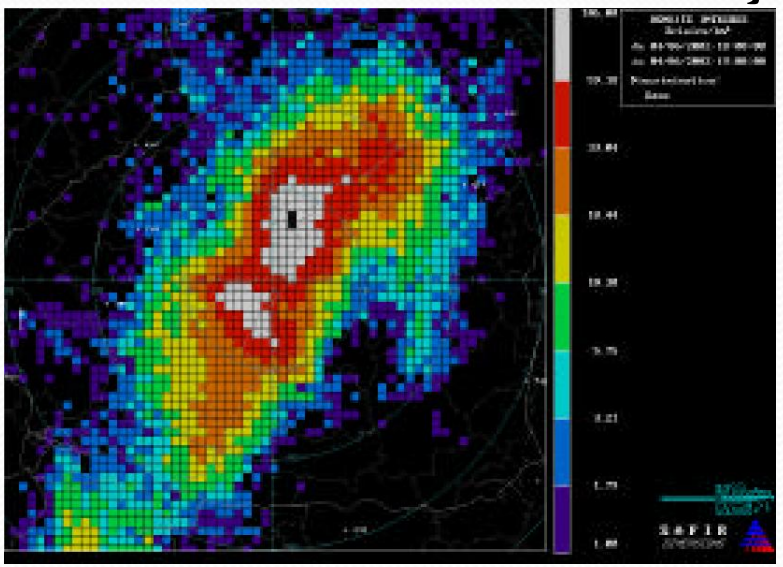
Examples LD - DD



LD: colors represent the time intervals

DD: colors represent the density



Software requirements

- Open Standards (WMS, WFS)
- Open Source
- User friendly

OGC Standards

- WMS: Web Map Service:
  - Provides map images
- WFS: Web Feature Service
  - For retrieving info on 1 specific lightning

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Web Map Service

- Requests
  - GetCapabilities: returns xml-file with available information
  - GetMap: returns the map in the format specified
- Example URL:
  http://www.mapservice.be/maps/mnr/bel/demo/map?SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&FORMAT=image%2Fjpeg&LAYERS=MNR_BEL_DEMO&WIDTH=500&HEIGHT=500&SRS=EPSG:31300&BBOX=149000,164000,151000,166000&

Web Feature Service

- Features: points, polygons, shapes
- Returns the information of a specific feature
- Can alter existing features (Transactional WFS)

Open Source Software

- Server-side:
  - PostgreSQL – PostGIS (spatial database) synchronised with our Oracle central DB
  - GeoTools (WMS/WFS-server): Open Source Java GIS Toolkit
- Client-side:
  - OpenLayers (Dynamic maps for web pages)
  - Jquery (Javascript library)

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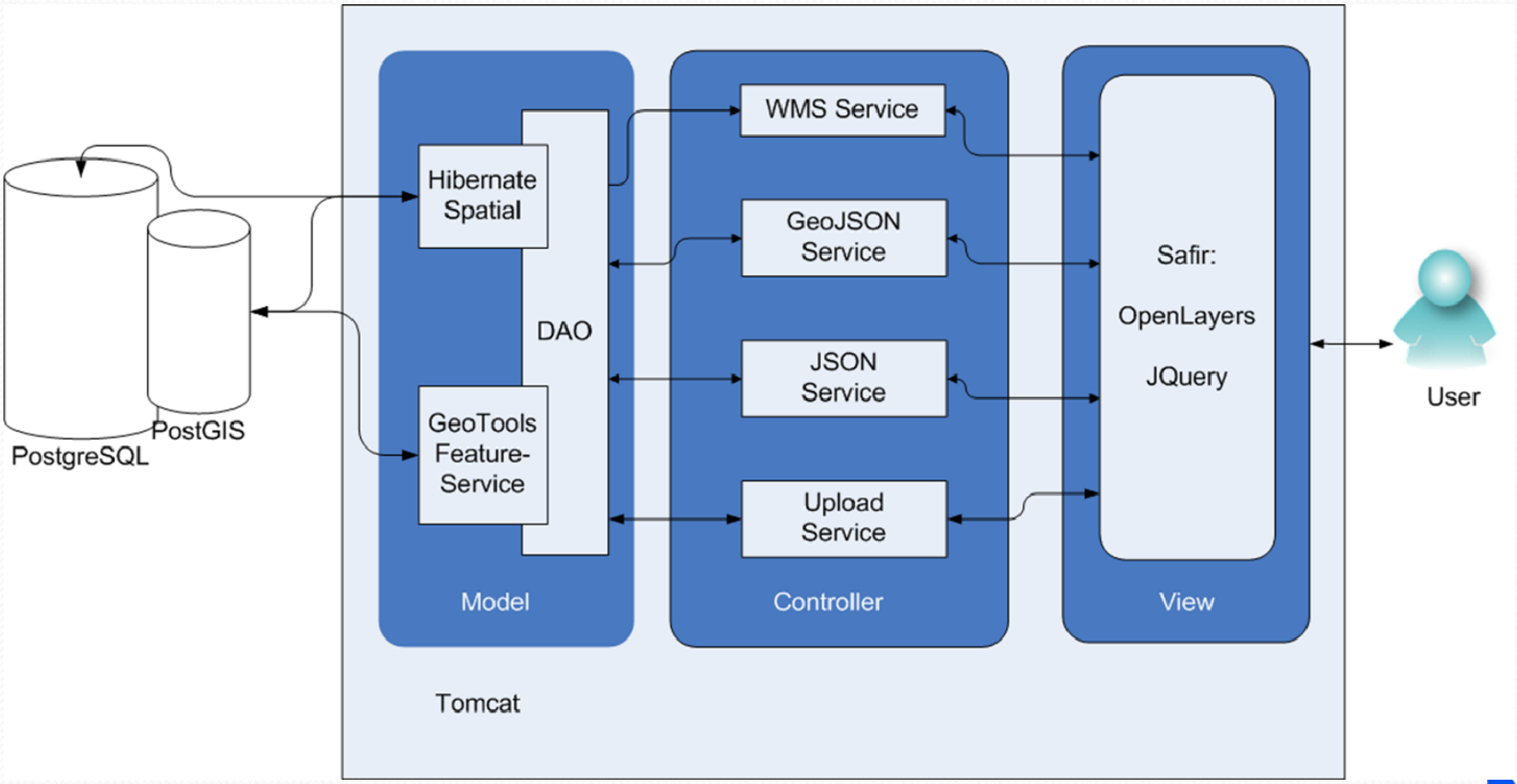
Architecture



User friendly

- Upload own layers (other than the lightnings) ex.: powerlines of the energy companies
- High Performance visualisation of all the lightnings in a period of time for fast response times
- Configuration: easy to change background layers, colors, timesteps, language, …
- Tools: measure distances, jump to specific address or region

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Thank you !

Questions?