Synopsis Project:
From Synergie to Synergie-Next

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METEO FRANCE
Toujours un temps d'avance

Overview

- From Synergie
- To Synergie-Next

Synergie : A little history

- First stages of Synergie development started in 1989
- First operational release in 1993
- More than 18 operational versions since 1993
- Several Operating System changes
- Today :
  - Linux only
  - More than 1,5 million lines of code
  - A sum of 180 man-year of development
  - A software patchwork of the best tools and libraries of Météo-France and ECMWF
  - More than 220 operational client workstations at Météo-France
  - More than 200 operational workstations in 60 other countries
- Operational version 4.6
- Version 4.7 under development

New needs of forecasters

- Zooming and panning in any area as seen in any common web tools, with GIS functionalities
- Reduce delay between end of development and availability on forecaster's desk
- New data available on forecaster's desk, in less than one month after their arrival in central data bases
- Adjust automatically GUI to data available on server and useful for a specific forecaster.
- Easier User customisation
- Open to interoperability with other meteorological layers

Synergie Technologies not fitted to take all these new requirements into account.

Towards Synergie-Next

- More than one year Pilot project :
  - OGC (Open Geospatial Consortium)
  - SOA (Service Oriented architecture)

Météo-France direction has decided to go forward in partnership with Meteo France International

- A single workstation for “advanced forecasting” OS independent (with a progressive and smooth transition from Synergie)
- A “light” workstation (Web-Based) for other needs
- Sharing the same business OGC server components …

No or slight changes for end-users

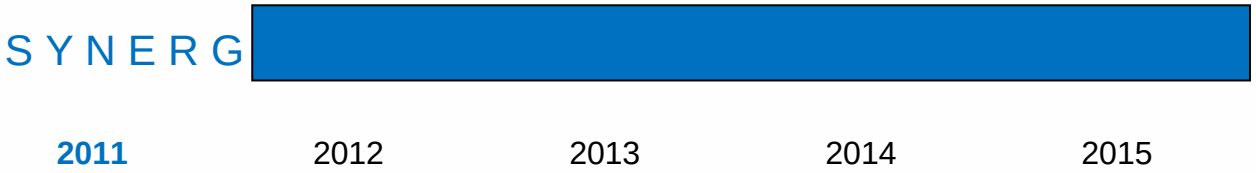
Synopsis project

Specific team in Météo-France IT and forecast divisions,
and MFI (Meteo France International)

- Review of actual specification
- At present, first operational OGC services available for:
  - lightning visualization;
  - Radar and satellite images;
  - Cartography: basemap with road and so on …. as in a GIS
- First operational GUI for specifics Météo-France forecast objects (Symposium 2)
- Start a Cooperation with FMI

Synopsis project

- In progress
  - ergonomic definition;
  - User guide and documentation methodology;
  - Development of new smart client using OGC services available.



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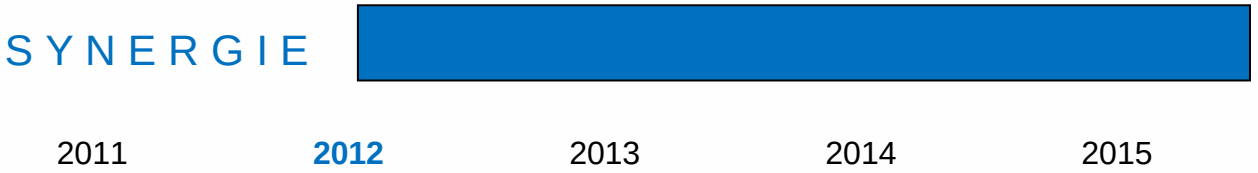

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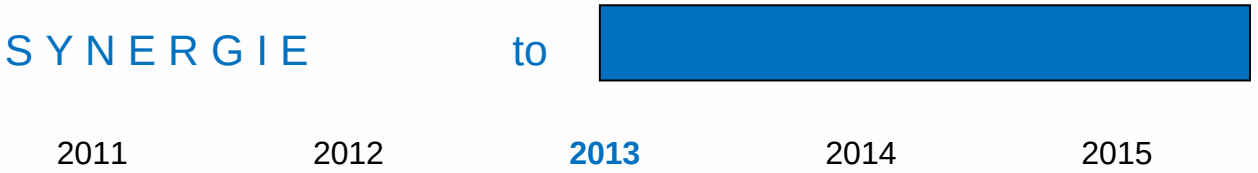

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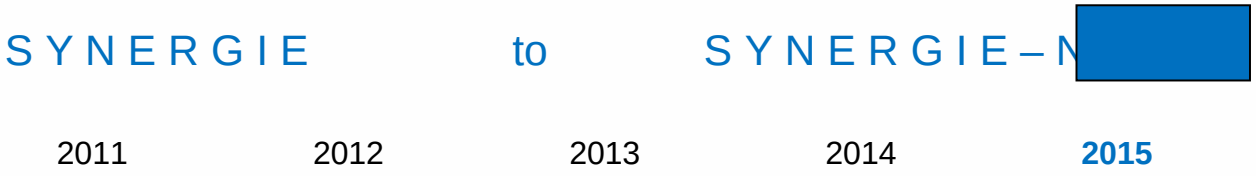
  - Mid 2015: principal production tools ready.



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  - Mid 2015: principal production tools ready.

Project closed. Business as usual

S Y N E R G I E to S Y N E R G I E – N E X T

2011 2012 2013 2014 **2015**

Technical specifications

- OGC and SOA
- Multi-platform and auto-deploying client
- Flexible architecture which must work:
  - As standalone behind a satellite receiver
  - As an high performances « cloud » service
    - » horizontal scalability
    - » no service interruption upgrades
  - As an hybrid thing with several levels of data access

New Functional specifications

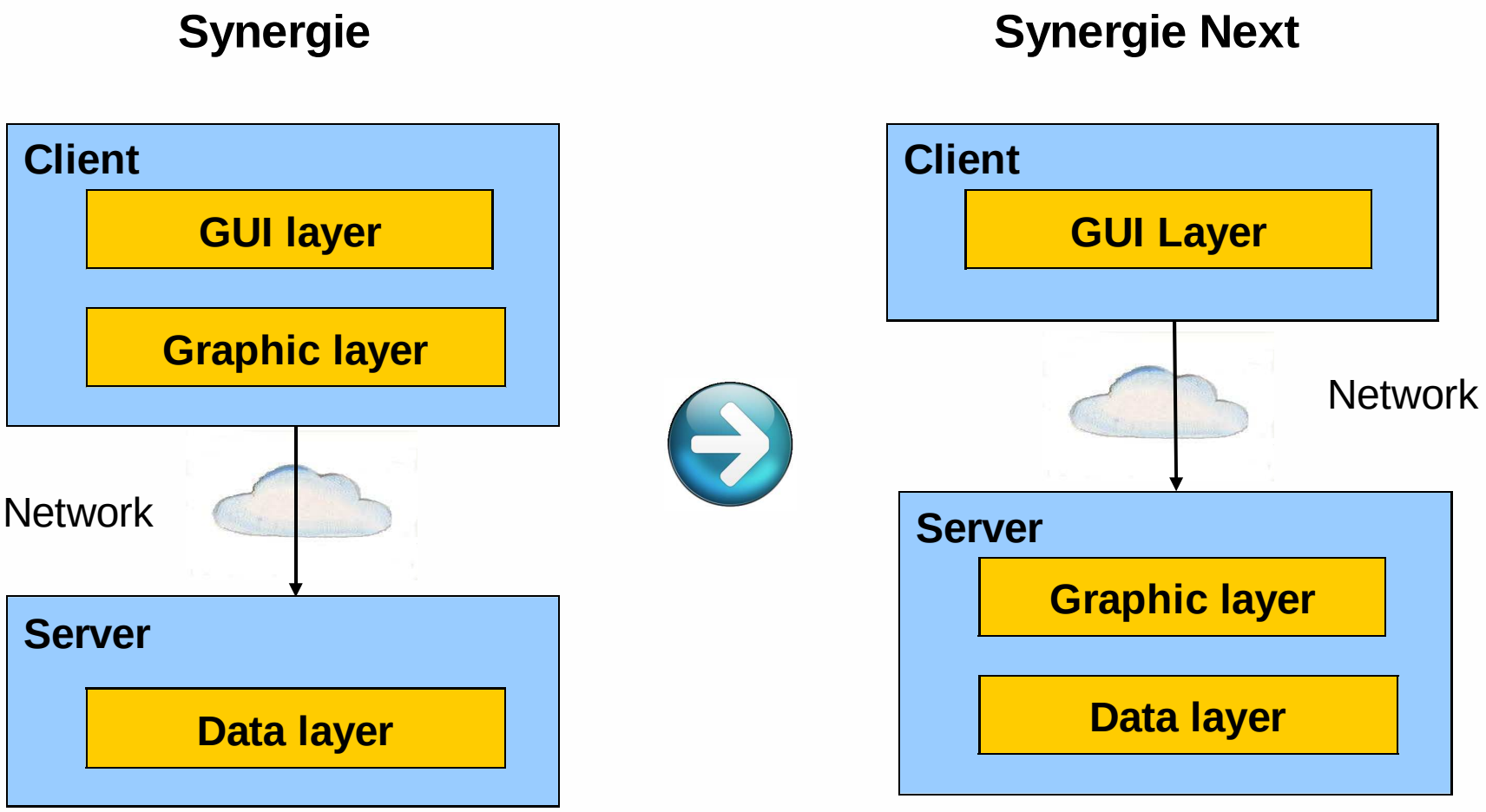
- Interoperability in both directions
- Zooming and panning without any constraints
- Adaptive GUI depending on:
  - Forecaster profile
  - Really available data on the server side for the current context
- Customizable GUI at the user level

Technical foundations

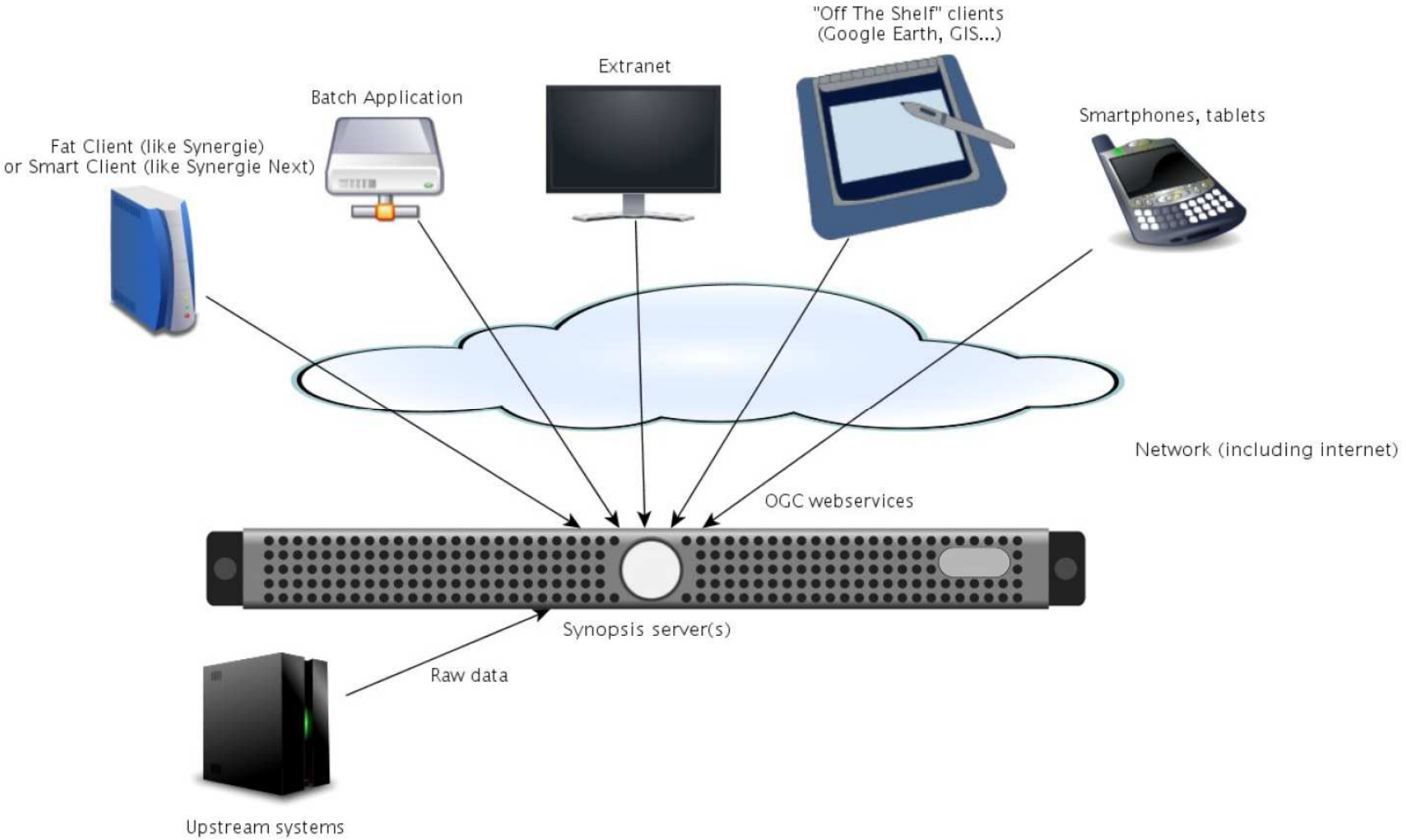
- (1) A center of gravity on the server side
- (2) « Java Web Start » thin client based on:
  - WMS layers concept
  - Netbeans Platform (RCP)
- (3) « Linux only » server architecture based on:
  - Opensource components
  - Web Oriented Architecture (WOA) : SOA reshaped and simplified by RESTful concepts

Technical foundations

- (1) A center of gravity on server side



Technical foundations



Technical foundations

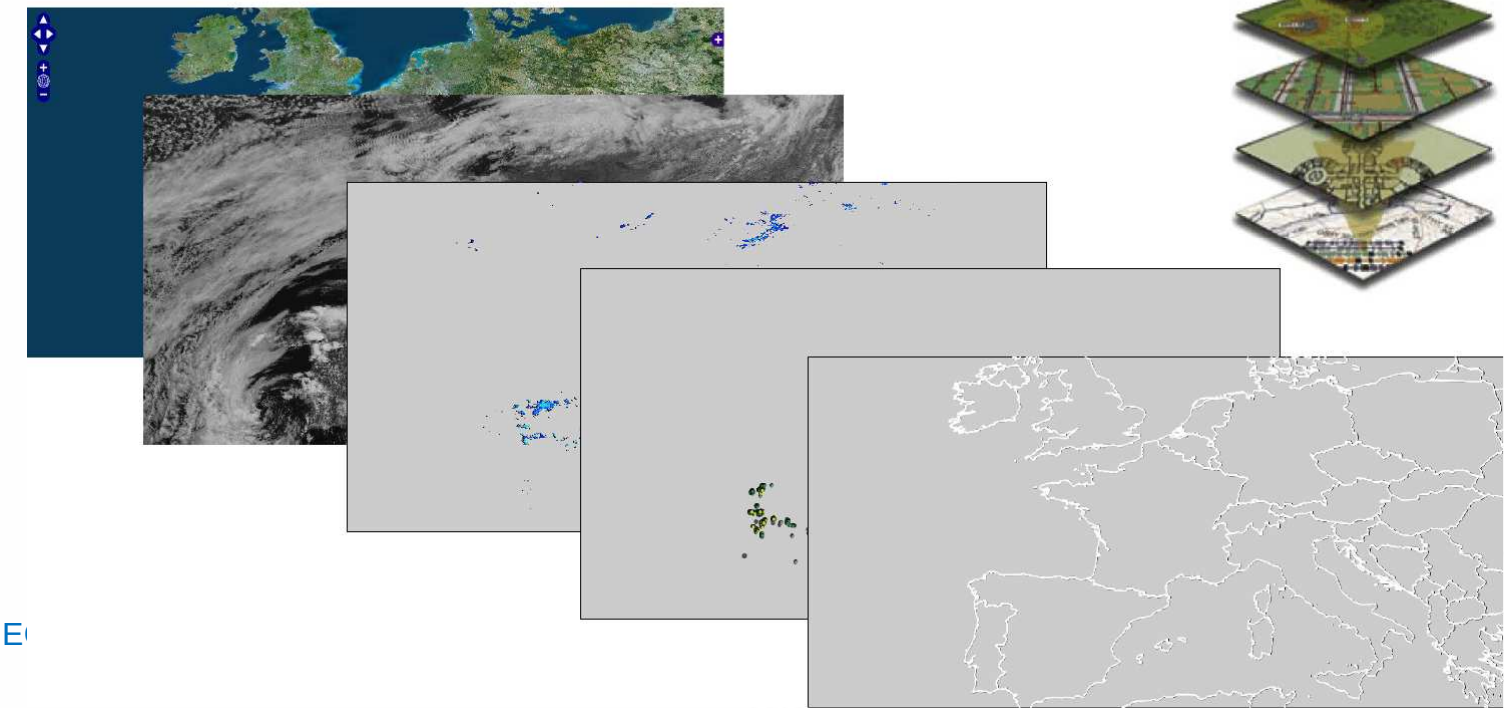
- (2) « Java Web Start » thin client :
  - (really) Multi-Platform
  - Automatic deployment
  - No fight with « Internet Explorer » !
  - Generic workstation :
    - » No data, profile or configuration stored locally
    - » Everything comes from the server infrastructure depending on the user login/profile
    - » Only cache

The server infrastructure acts as a « cloud service »

Technical foundations

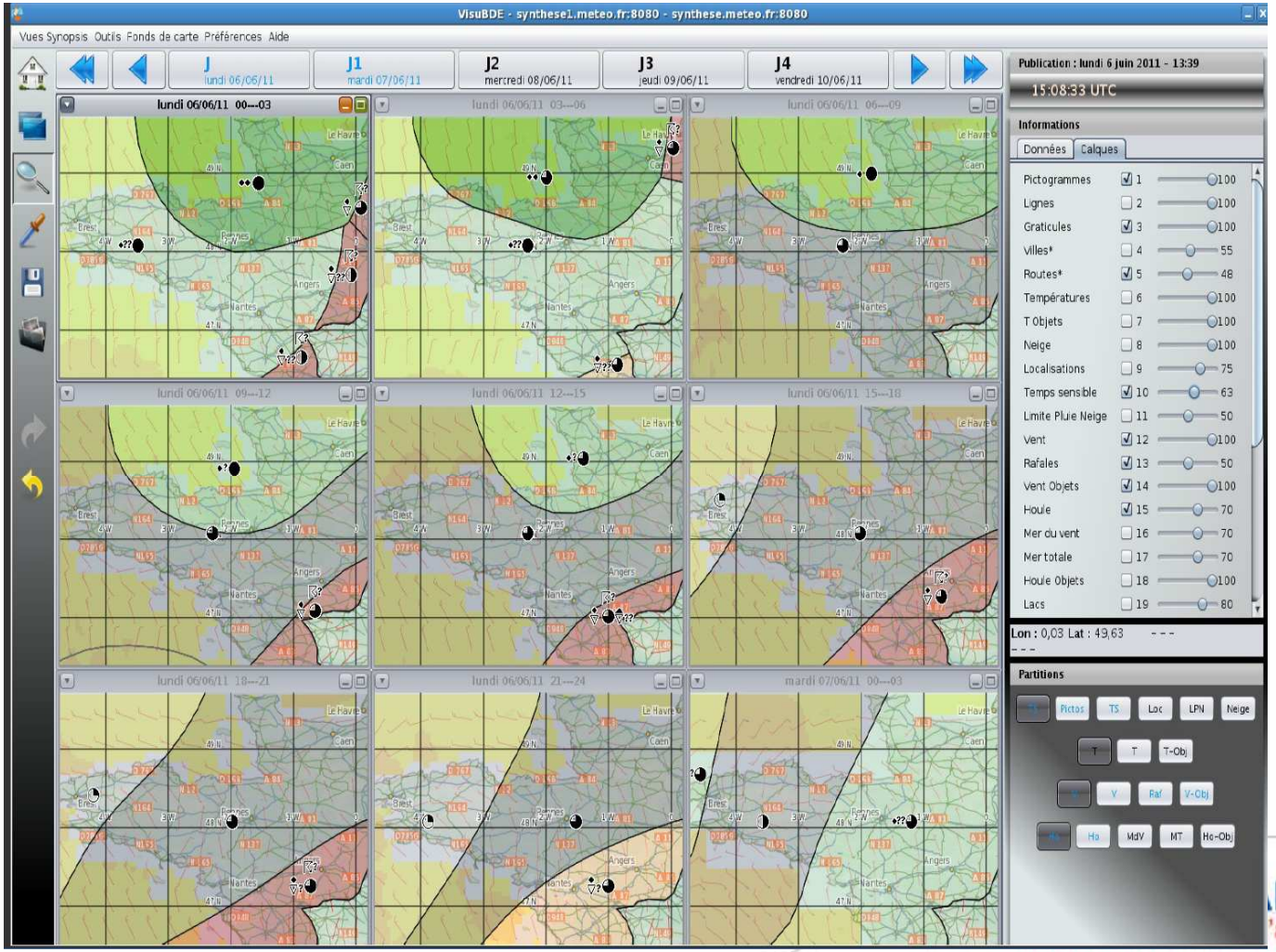
(2) « Java Web Start » thin client:

It requests plots to the server infrastructure as unit WMS layers...



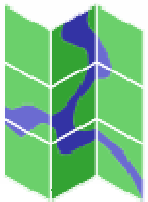
Technical foundations

- Consequences: a lot of WMS requests for a single user playing with something like this...



- (3) Linux only server architecture based on Open Source components

- **Language**: Pithon, C, Java;
- **Basic Tools**: Apache and Gnome projects
- **Data base**: PostgreSQL, PostGIS
- **Bus, caching**: Redis
- **Web**: Django, Nginx, Gunicorn
- **Specific tools**: Mapserver, Proj4, GDAL, Magics++, GRIB API



Server architecture

- Choices :
  - Web Oriented Architecture (WOA)
    SOA reshaped and simplified by RESTful concepts
  - The whole infrastructure is divided in 10 modules
  - Each module is :
    - A dedicated unix user
    - A dedicated home directory
    - A dedicated installation package (RPM)
  - Modules communicate each-other only throw the network (enforced by very restrictive unix permissions)

  => So you can deploy most modules on different servers without any complications

Server architecture

- 10 modules :

3 « dependencies modules » which must be installed on every server of the cluster

- **synext** : SYNopsis EXTernal

External free libraries and binaries

- **syndev** : SYNopsis DEVelopment

Libraries and binaries for development only

- **syncom** : SYNopsis COMmon

Common libraries and binaries (maintained by us)

They don't run anything !

We would like to release them as free software

Server architecture

- 10 modules :

3 modules not « horizontal scalable » :

- **synbase** : SYNopsis dataBASE
- **synadmin** : SYNopsis ADMin

Just classic master/master (by choice)

We plan to use sharding if the base becomes the bottleneck

- **syndata** : SYNopsis DATA

Pre-processing of incoming raw datas

One instance per synbase module

Server architecture

- 10 modules :

3 modules « horizontal scalable » :

- **synfront** : SYNopsis FRONTend

Each incoming request passes through this module

Output cache, security checks, routing

- **synbus** : SYNopsis BUS

Communication bus between modules

Loosely coupling

- **synclient** : SYNopsis CLIENT

Little web portal, distributes the Java Client

Server architecture

- 10 modules :

1 module « hot horizontal scalable » :

- **synserv** : SYNopsis SERVices

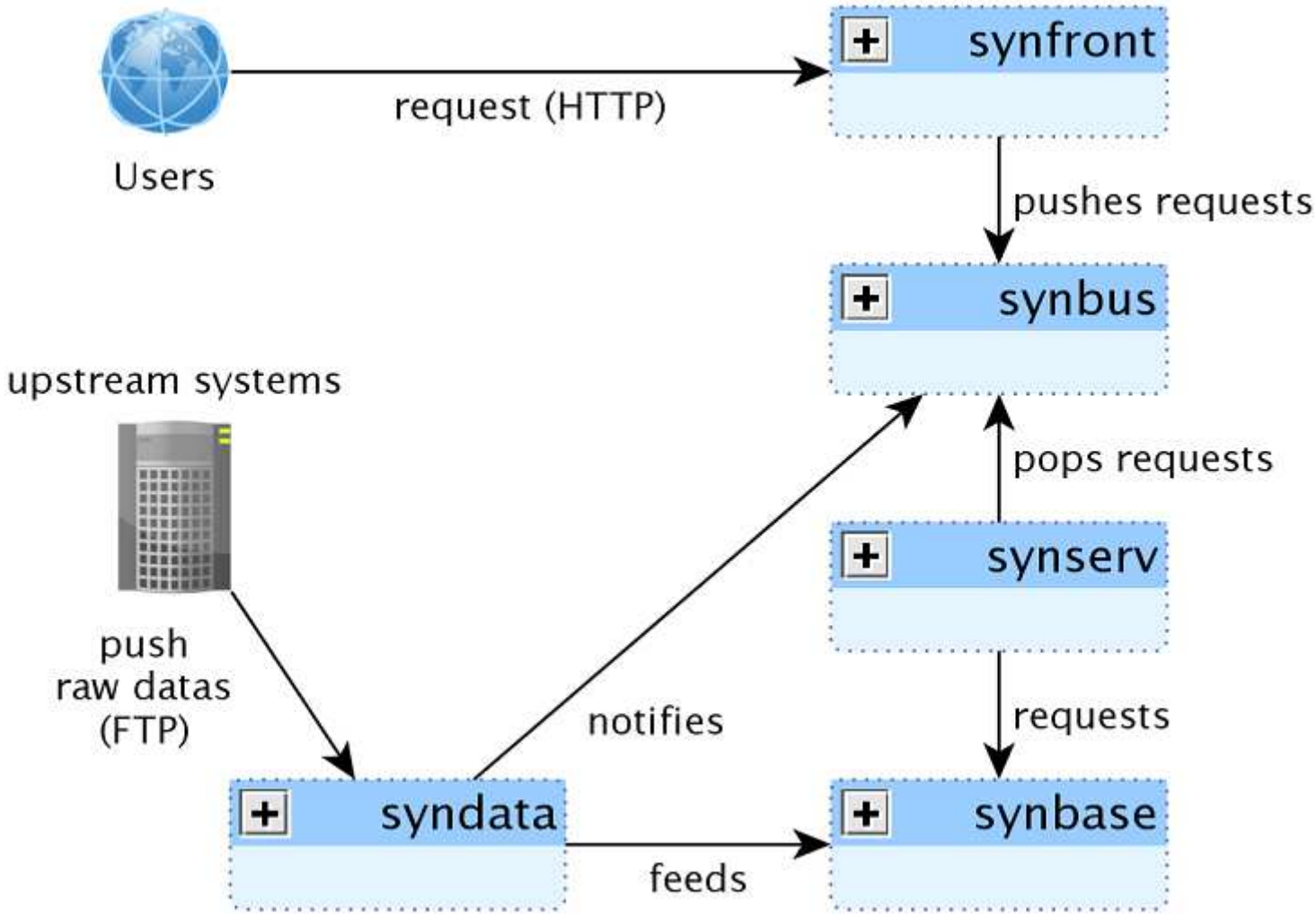
The main module

Deals with non trivial requests

Draws requested maps !

We can hot add or remove instances of this module with no extra-configuration

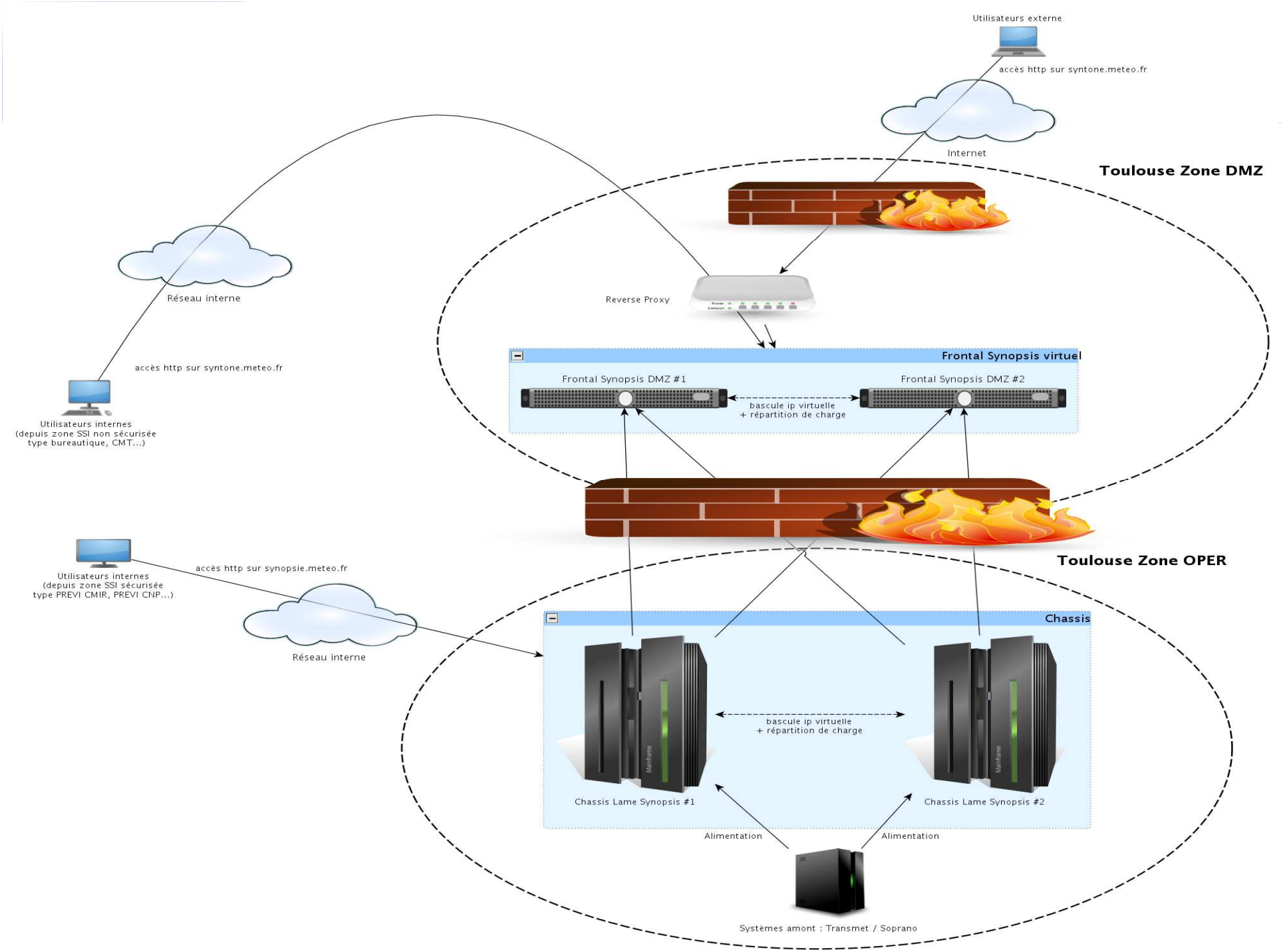
Server architecture (simplified view)



Hardware infrastructure

- Main ideas :
  - As flexible as the software architecture
  - High availability
  - No duplication for DMZ
  - No server doing nothing

- Choices (for starting up the service) :
  - 2 half full blade servers enclosure
  - Just 2 little proxies in DMZ (frontend and bus)
  - Each drawing blades can be dedicated for DMZ, for LAN or shared


Utilisateurs externe
accès http sur syntone.meteo.fr
Internet
Toulouse Zone DMZ
Réseau interne
Reverse Proxy
accès http sur syntone.meteo.fr
Utilisateurs internes
(depuis zone SSI non sécurisée
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Frontal Synopsis virtuel
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Alimentation
Alimentation
Systèmes amont : Transmet / Soprano

Synergie-Next to resume

- Client OS independent and auto installation (eg. java-web-start);
- Server on Linux to:
  - Benefit of ECMWF developments on: Magics++, GRIB API, ..
  - Use software development of **Synergie**
  - Use Open source library
- Cluster or standalone system;
- Easy installation on client and server;
- OGC standards and SOA (Service oriented architecture) for interoperability of forecasters tools.

First results

- Synergie next server is used for our clients web site

Connexion

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Vous êtes sur le site
EXTRANET
DPMSP

Vigilance Météo
Phénomènes dangereux
Consultez la carte
Vigilance "crues" Bison futé

{SYNOPSIS}

V1.13

Atmogramme

- Bagneres
- Toulouse
- Pmedia + pdf vertical
- Phyto
- atmo onglets
- BOLOGNA/BORGO PANIGALE

Enchainement test interfa

- Animation tuile images radar PREVU 03 04
- Animation tuile images radar PREVU 04 01

Carte de surveillance

- obs /prev

test sat

- Dernière Image satellite VIS France HVR
- Dernière Image satellite CC France 1
- Derniere Image IR France 15 min

Synopsis

Date de mise à jour : 06/10/2011 à 12h26

jeudi 10H00 | jeudi 10H15 | jeudi 10H30 | jeudi 10H45 | jeudi 11H00 | jeudi 11H15 | jeudi 11H30 | jeudi 11H45 | jeudi 12H00 | jeudi 12H15

Réglages

RHYTMME

Produits

Images radar

- Lame d'eau 5 minutes
- Cumul pluviométrique
  - 30 min
  - 1H
  - 2H
  - 3H
  - 4H
  - 6H
  - 12H
  - 24H
  - 48H
  - 72H

Aléa pluviométrique

- Synthèse 1h-72h
- Qualification de l'aléa

Aléa hydrologique

- Qualification de l'aléa

Pluviométrie stations

- Carte RR12 / RR3 / RR1
- Tableaux par station
- Tableaux RR12
  - Toutes stations
  - Département 04
  - Département 06

Autres liens RHyTMME

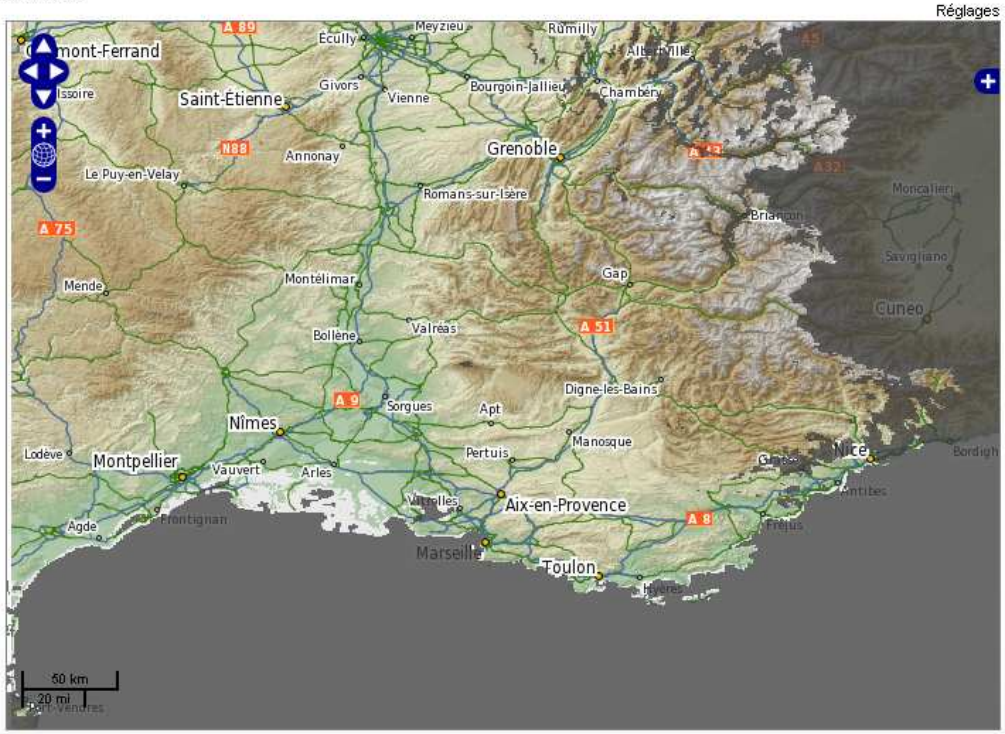
- Site MEDDTL
- Site CEMAGREF
- Site Météo-France

CARTE DE SYNTHÈSE DE L'ALÉA PLUVIOMÉTRIQUE 1H-72H

Date de mise à jour : 13/10/2011 à 17h11

jeudi 16H45

Réglages



Durées de retour

0 — 2 ans — 10 ans — 50 ans

Transparent — donnée manquante

RHYTMME

Produits

Images radar

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Pluviométrie stations

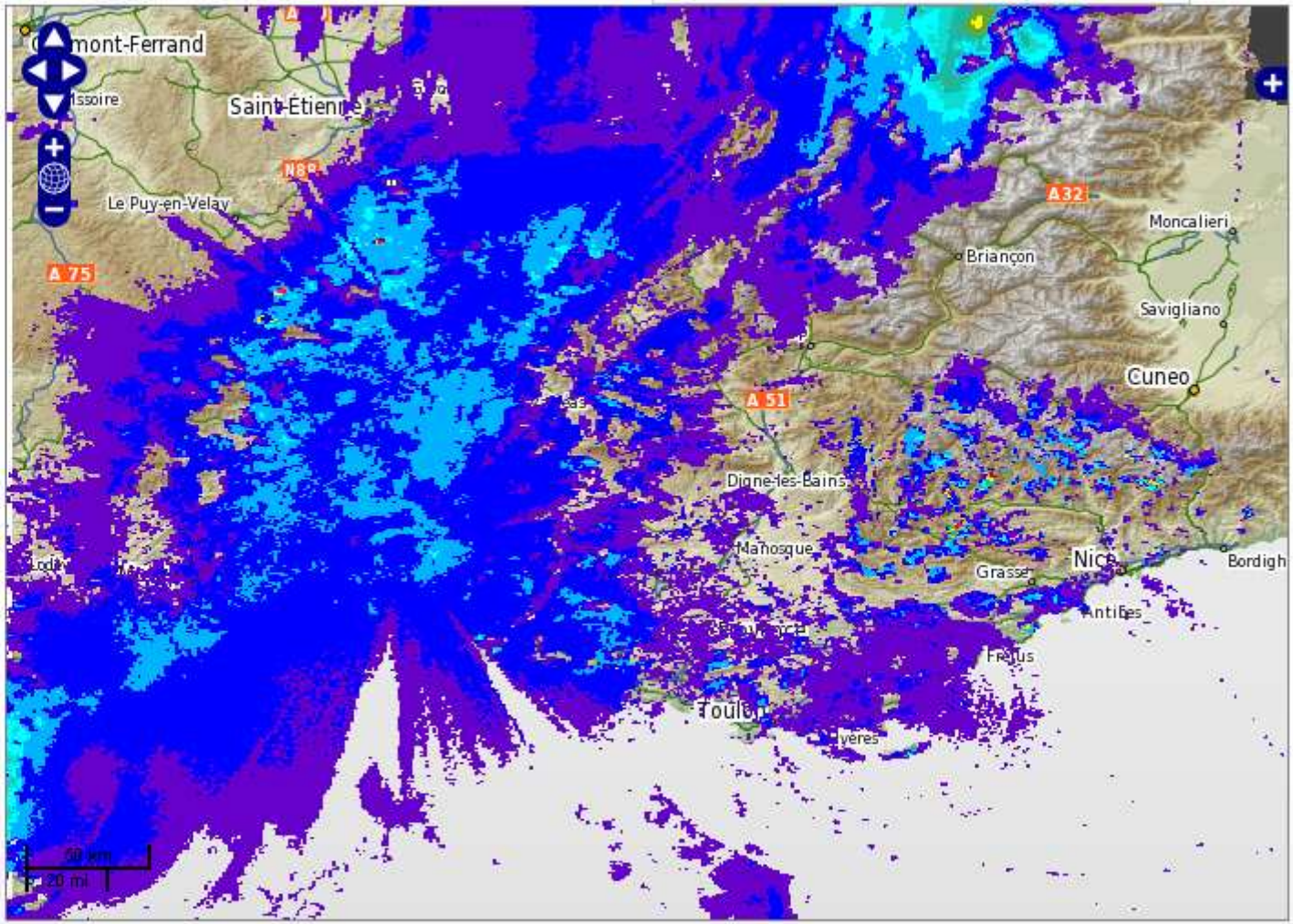
- Carte RR12 / RR3 / RR1
- Tableaux par station
- Tableaux RR12
  - Toutes stations
  - Département 04
  - Département 06

CUMUL PLUVIOMETRIQUE SUR 72H

Date de mise à jour : 13/10/2011 à 17h16

mercredi 23H00 | jeudi 00H00 | jeudi 14H00 | jeudi 15H00 | jeudi 16H00

Palette Standard Lame d'eau pour imagerie générique | Réglages



Lames d'eau Standard (mm)

0,1 1 3 5 7 10 15 20 30 50 70 100 150

Produits

Images radar
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Aléa hydrologique
- Qualification de l'aléa

Pluviométrie stations
- Carte RR12 / RR3 / RR1

QUALIFICATION DE L'ALÉA HYDROLOGIQUE

Date de mise à jour : 14/10/2011 à 09h20

vendredi 09H00

Réglages

RHYTMME

Produits

Images radar

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Pluviométrie stations

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QUALIFICATION DE L'ALÉA HYDROLOGIQUE

Date de mise à jour : 14/10/2011 à 09h20

vendredi 09H00

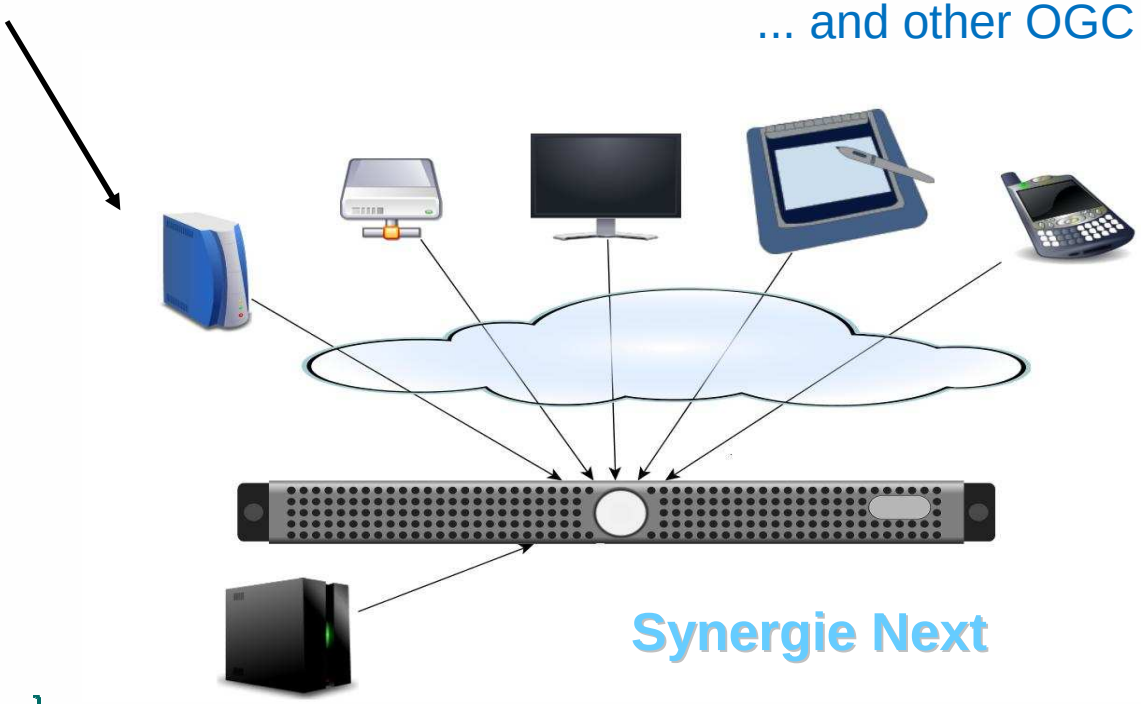
Réglages

From Synergie to Synergie-Next

SynSyn strategy

- All services **Synergie Next** will be available for **Synergie** ….

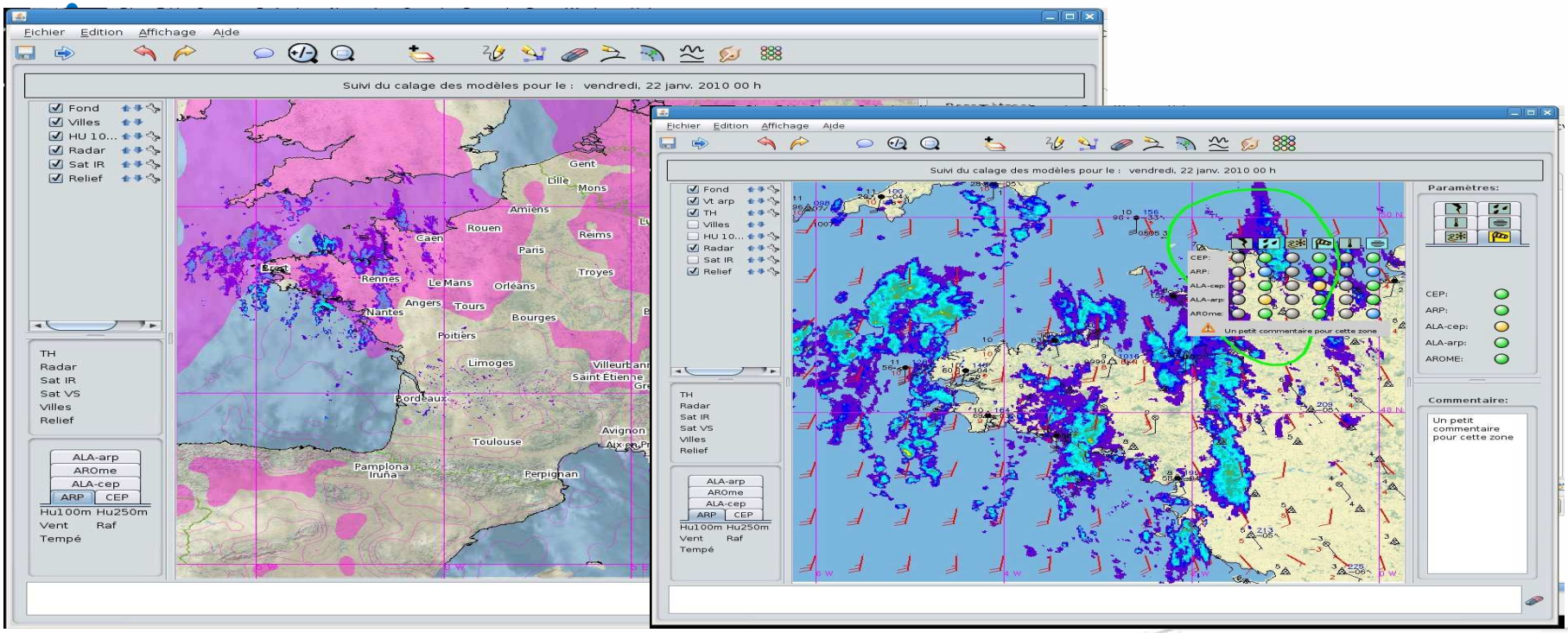
... and other OGC clients



From Synergie to Synergie-Next

SynSyn strategy

- All functionalities of **Synergie** will be available for **Synergie Next** clients (if they run on the same computer)



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Thank you

Any Question?

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