VLAAMSE MILIEUMAATSCHAPPIJ

Waterinfo.be

integrated data and information portal for floods & droughts in Flanders

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Overview

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2. Before the portal
3. Objectives
4. Building the portal
5. Demo
    a. Concepts
    b. Content:
        - Actual & forecasted waterinfo on floods & droughts
        - Historic waterinfo
        - Dashboards
6. Conclusions

1. About VMM

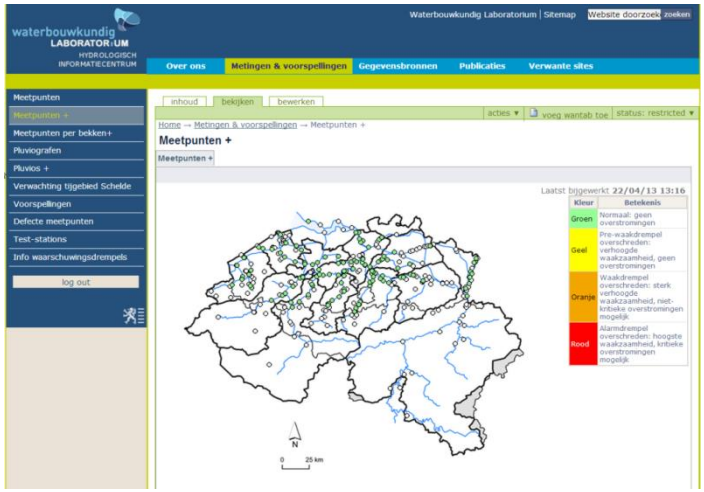
- **VMM = Flemish Environment Agency competent for**
  - Waterquality (monitoring, reporting, economic & ecologic supervision on waste water treatment infrastructure, …)
  - Air quality, Environmental reporting (MiRa)
  - Ground Water (quantity & quality)
  - Waterquantity
  - 1000 FTE

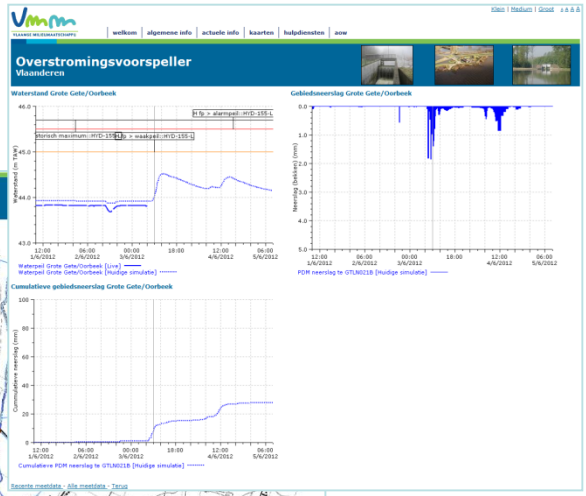
- **Division Operational Watermanagement (AOW)**
  - Operates 1400 km of non-navigable watercourses of 1° category
  - Maintenance, investments & renovations **works**.
  - 250 FTE – 25 mio EUR/y

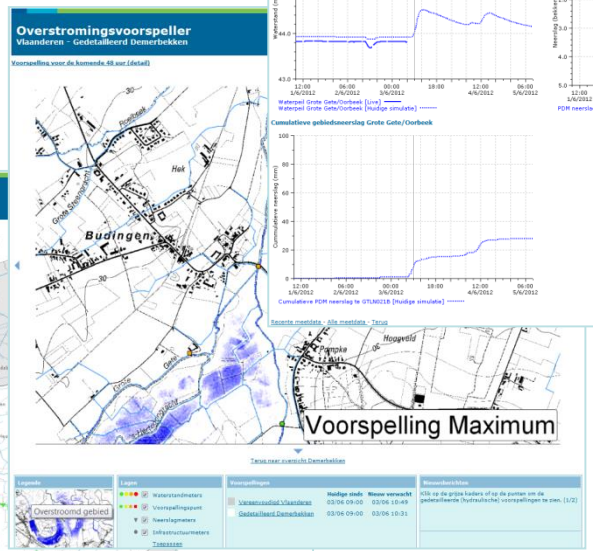
- **Unit Floodmanagement**
  - Operates hydrologic **telemetry** network (+400 sites) & off-line + real-time hydraulic **models** (4200 km) + www.waterinfo.be
  - R&D unit with about 30 engineers & scientists
  - 3 mio EUR/y

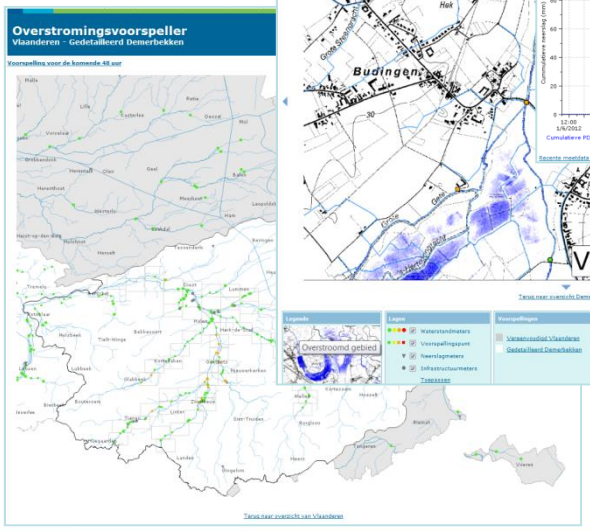
2. Before the portal

- 2 organisations showing 2 different web 1.0 sites
- Heavily used during crisis:
  (80.000 hits/hr – 3 mio hits for flood nov2010)
- 8 years old









3. Objectives

- **Build one single portal allowing full hydrological content integration:**
  - all measurements, all forecasts and all maps (flood, radar, NWP, ...)
  - for all watercourses in Flanders & coast.

- Make portal **context-aware** for fluvial-, tidal-, pluvial flood & drought crisises

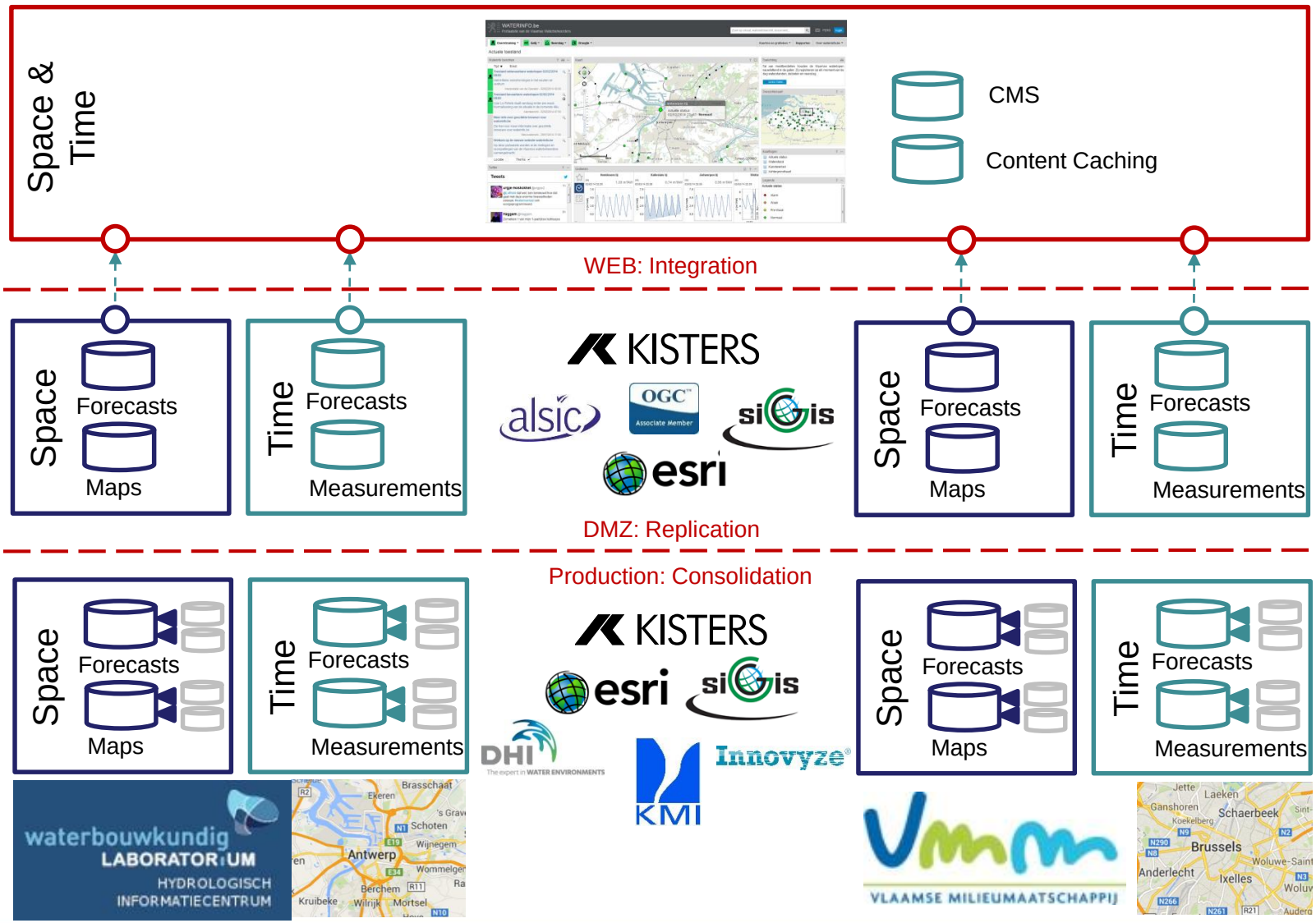
- Seperate between **Public vs professional portal** (dashboards)

- **Innovation for a Next-Gen "front-end"**:
  - Use latest technologies (webservices, widgets)
  - Spatial – temporal integration: Dynamic time-enabled mapping
  - Integrate social content
  - Branding: Flanders State of the art

4. Building the portal

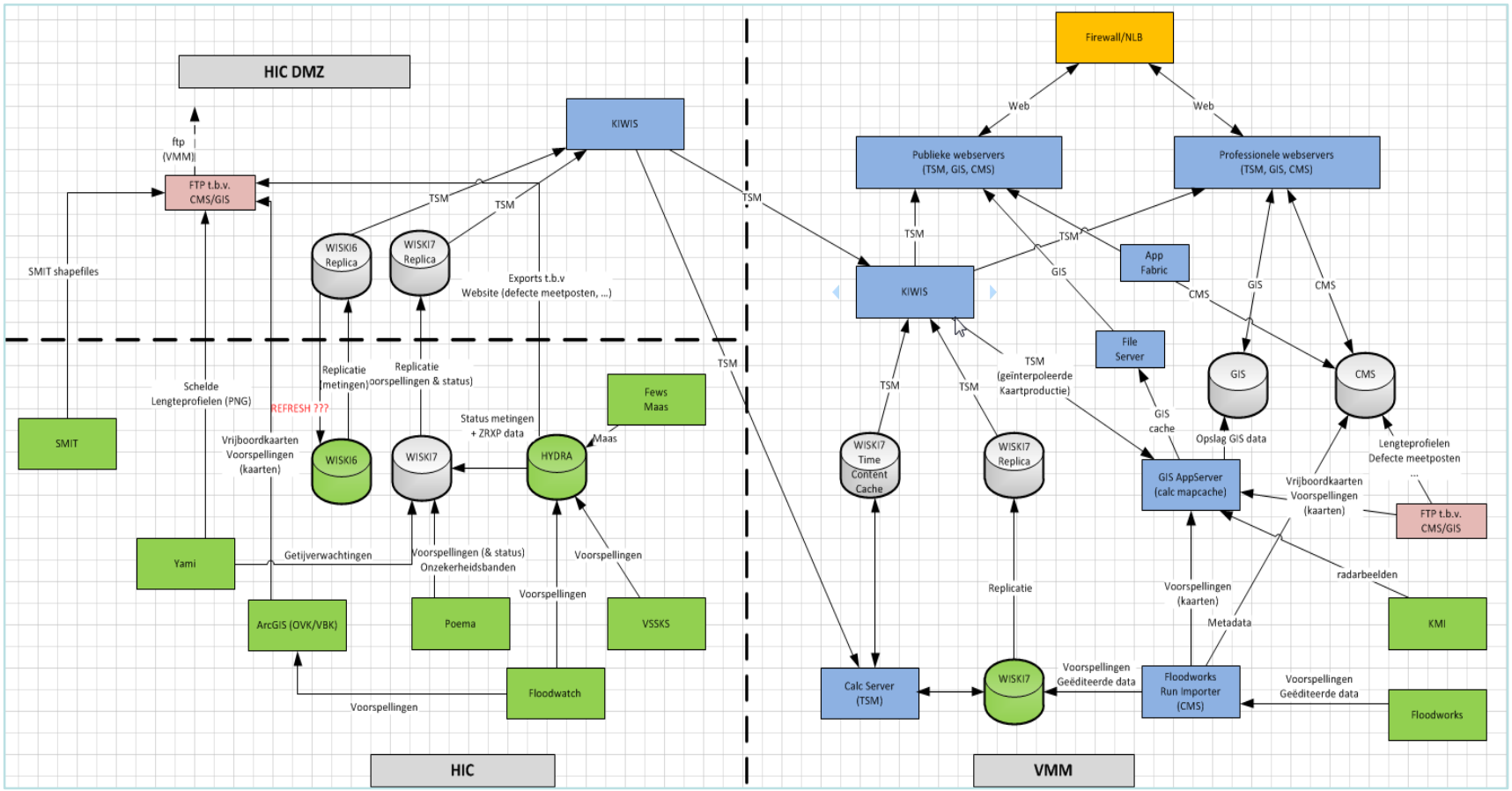
- **Practical**
  - Project start: 1/9/2012
  - Portal launch: 29/1/2014
  - Budget: 1.3 mio EUR (excl. hardware & licences)
- **Contractor: THV Aquaportalis:**
  - Content Management Systeem (CMS): ALSIC bvba
  - Geografisch Informatie Systeem (GIS): SIGGIS nv
  - Time Series Management System (TSM): Kisters AG
- **Projectgroup + workgroups & steering + feedback group.**
  - + 50 projectmeetings

4. Building the portal



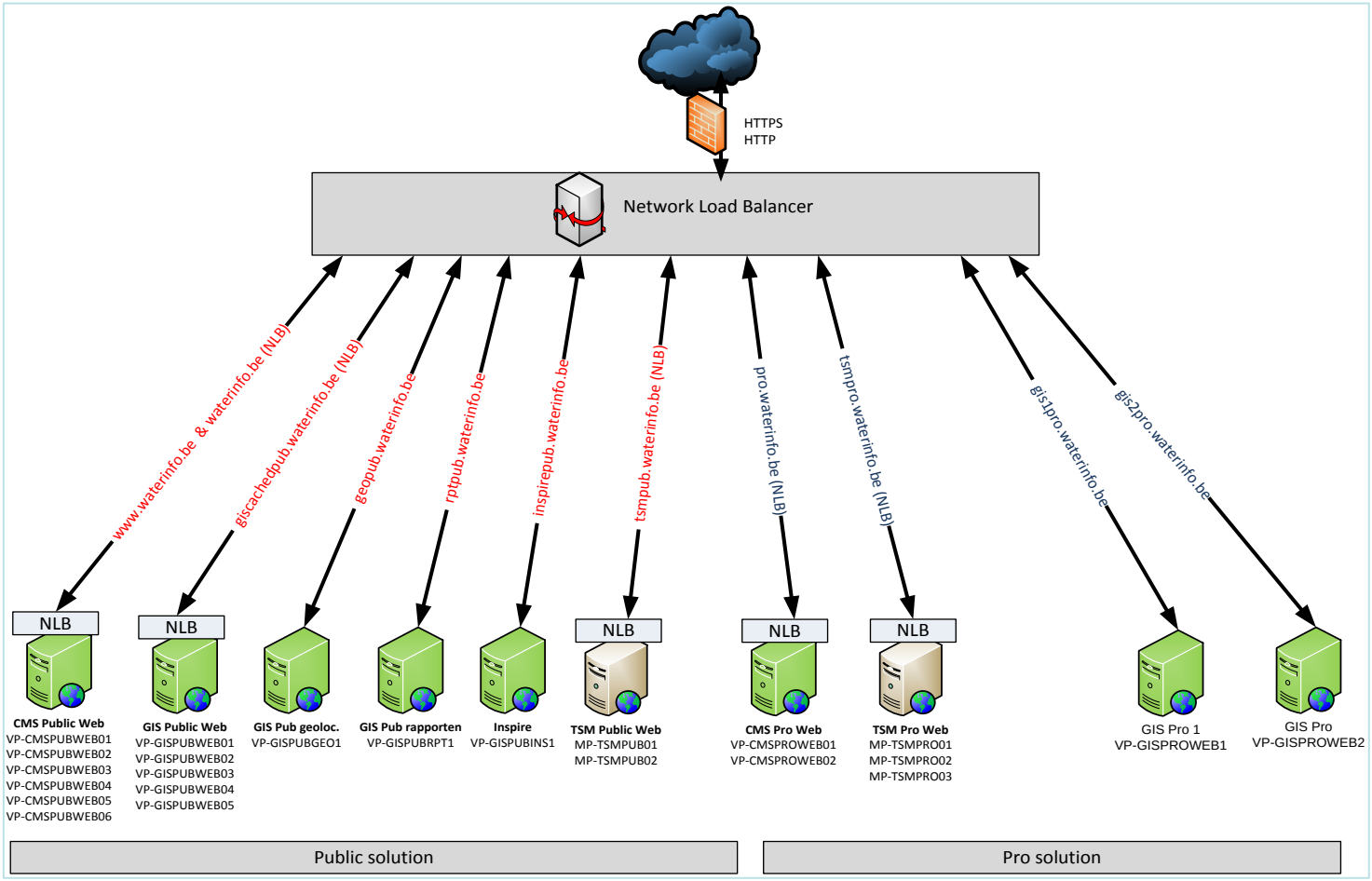
4. Building the portal

- **Simplified IT-infrastructure** (LAN- and DMZ-portal server zones @ VMM and HIC)



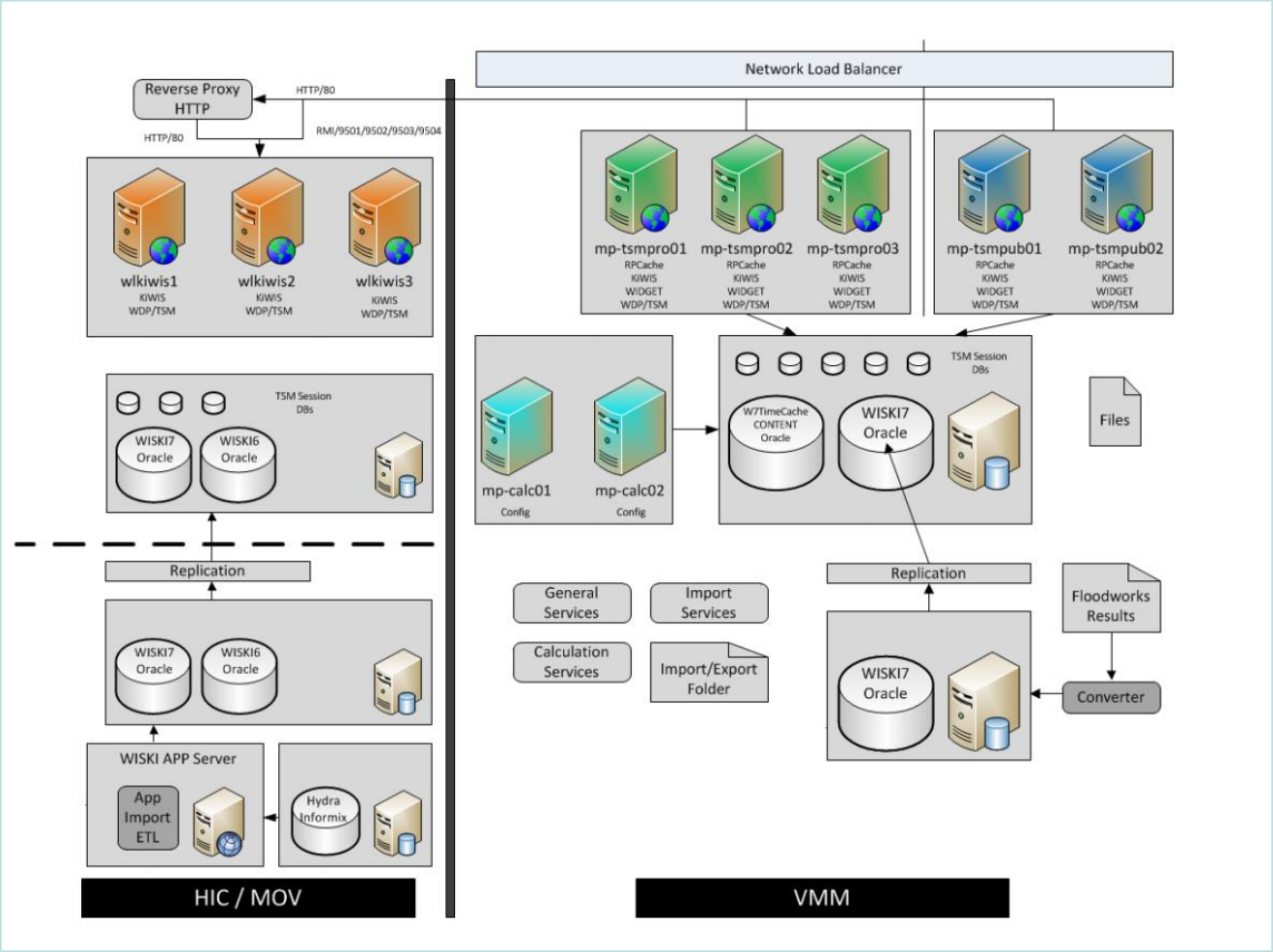
4. Building the portal

- **Load balanced webserver farms**



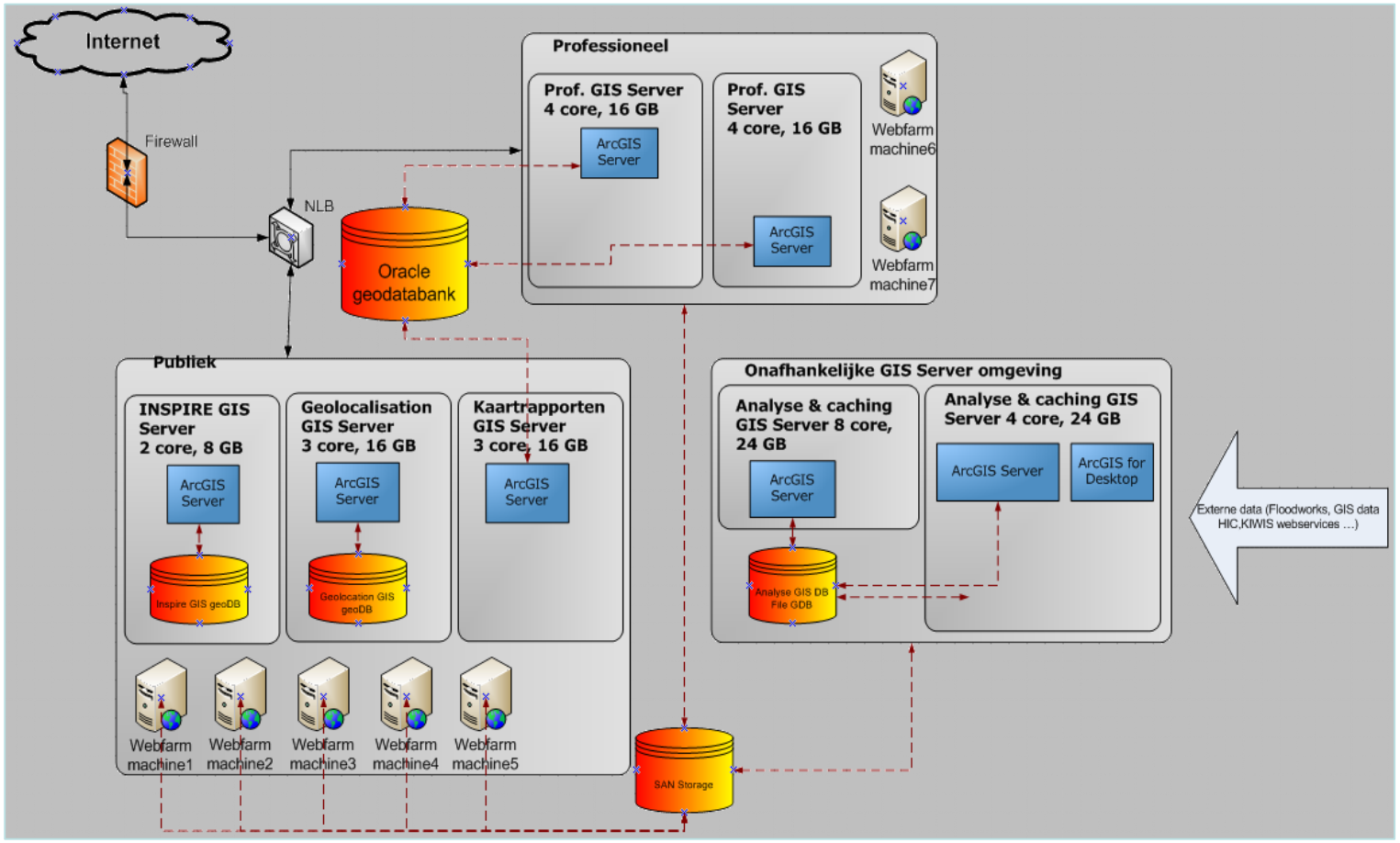
4. Building the portal

- **TSM-architecture** (3+5 KiWIS = Kisters Web Interoperability System)



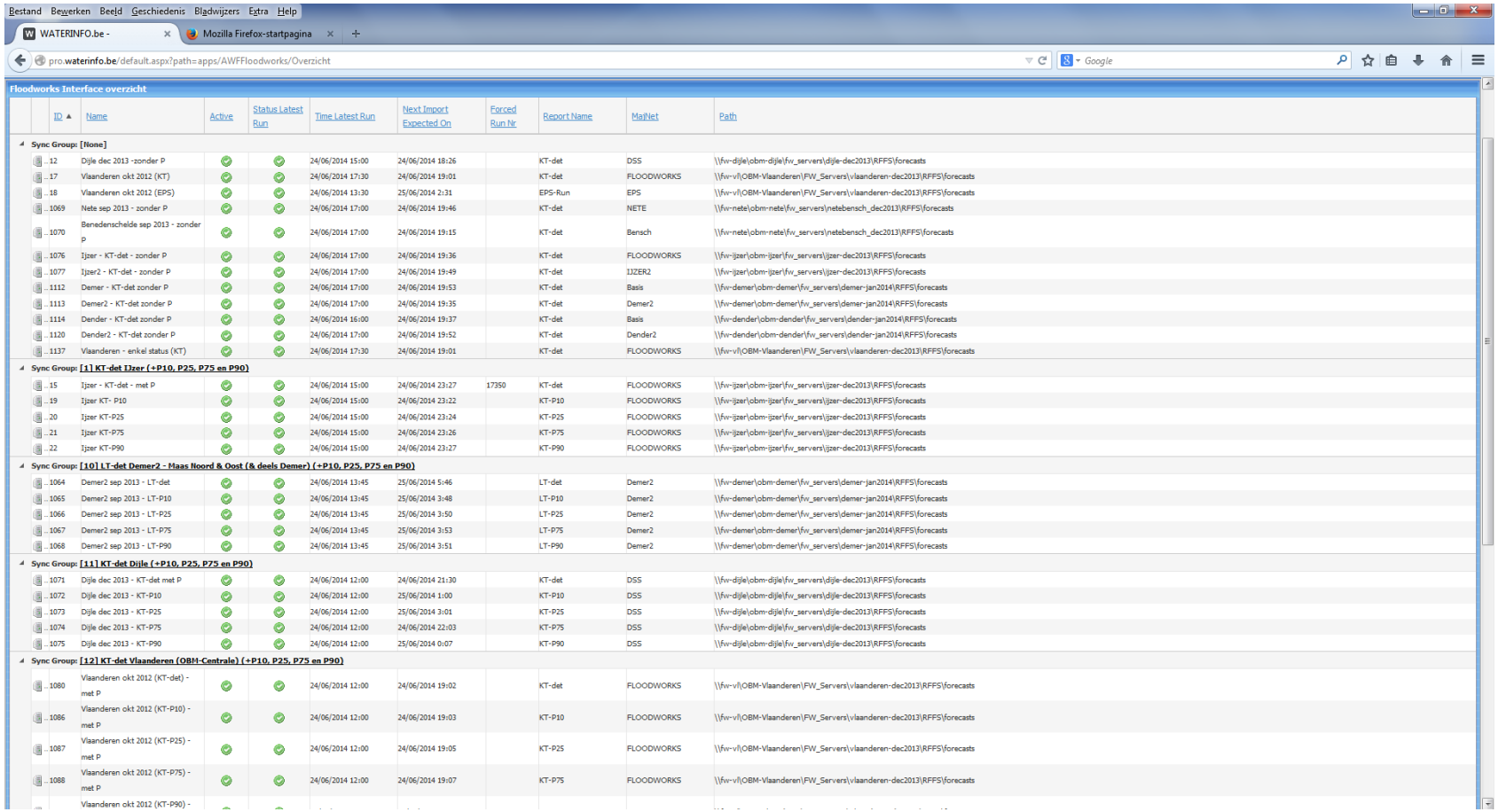
4. Building the portal

- **GIS-architecture** (ArcGIS server 10.1 servers)



4. Building the portal

- **FloodWorks importer** (6 FW-servers, 1 det. run/hour + 4 perc. runs/6hours = 240 runs/day @ 100Mb/run)



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1112	Demer - KT-det zonder P	✓	✓	24/06/2014 17:00	24/06/2014 19:53		KT-det	Basis	\\fw-demer\obm-demer\fw_servers\demer-jan2014\RFFS\forecasts
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1120	Dender2 - KT-det zonder P	✓	✓	24/06/2014 17:00	24/06/2014 19:52		KT-det	Dender2	\\fw-dender\obm-dender\fw_servers\dender-jan2014\RFFS\forecasts
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1074	Dijle dec 2013 - KT-P75	✓	✓	24/06/2014 12:00	24/06/2014 22:03		KT-P75	DSS	\\fw-dijle\obm-dijle\fw_servers\dijle-dec2013\RFFS\forecasts
1075	Dijle dec 2013 - KT-P90	✓	✓	24/06/2014 12:00	25/06/2014 0:07		KT-P90	DSS	\\fw-dijle\obm-dijle\fw_servers\dijle-dec2013\RFFS\forecasts
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1087	Vlaanderen okt 2012 (KT-P25) - met P	✓	✓	24/06/2014 12:00	24/06/2014 19:05		KT-P25	FLOODWORKS	\\fw-vl\OBM-Vlaanderen\FW_Servers\vlaanderen-dec2013\RFFS\forecasts
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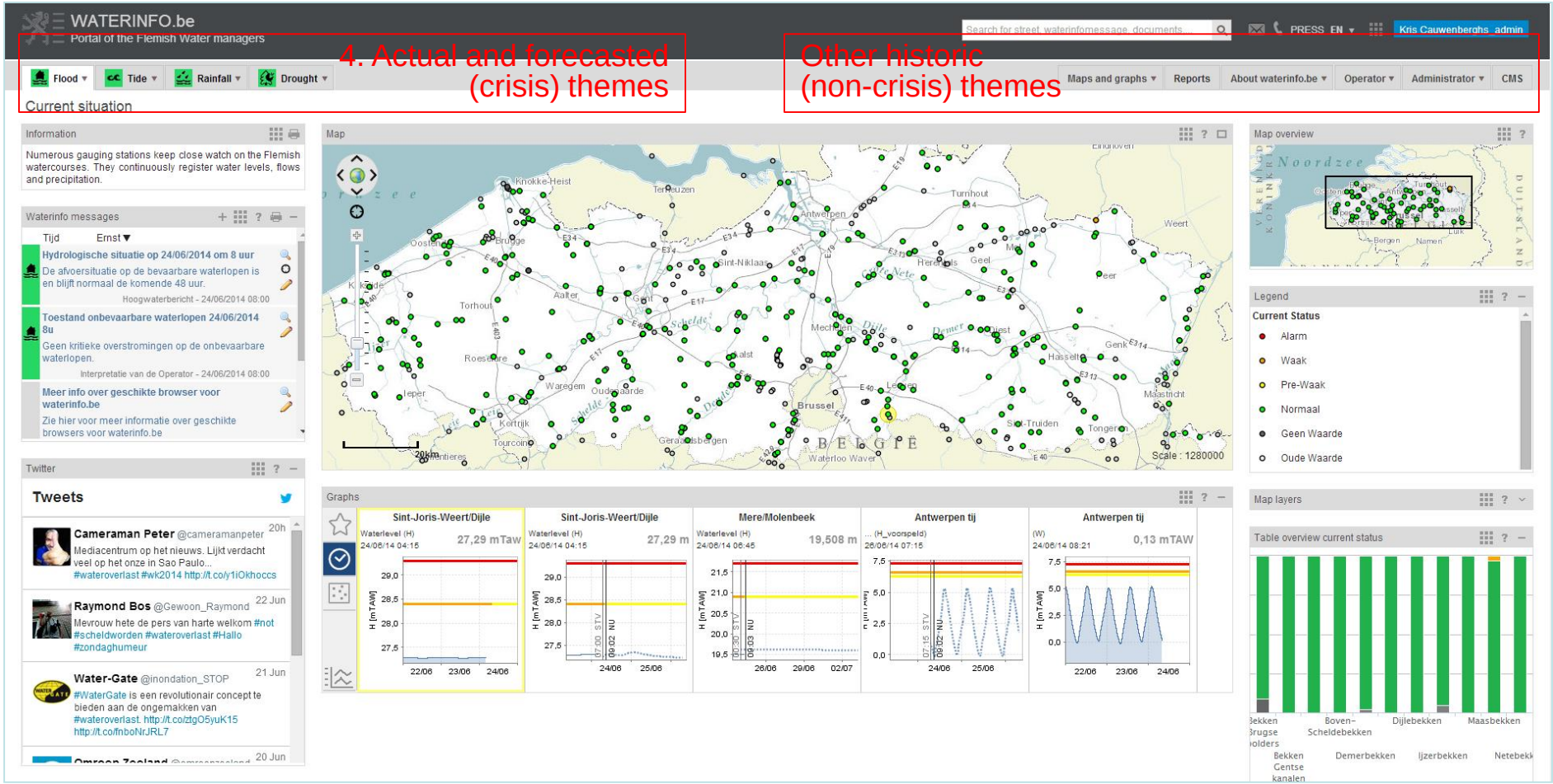
	Vlaanderen okt 2012 (KT-P90) -								

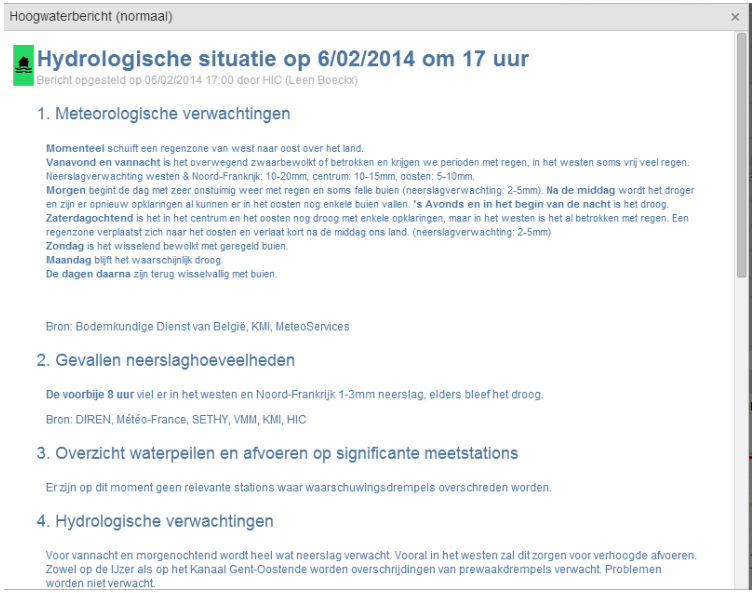
5. Demo



Live-demo: *show nearby stations, play animation for short-term forecasts, add LT-chart from Station page-widget to dashboard, widget-settings in dashboard, search for …, « about waterinfo.be », …*

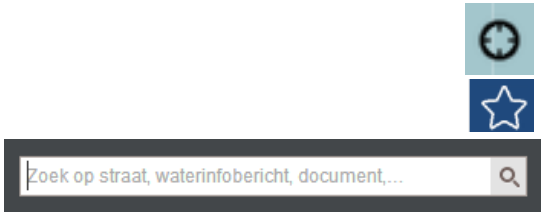
5a. Demo concepts

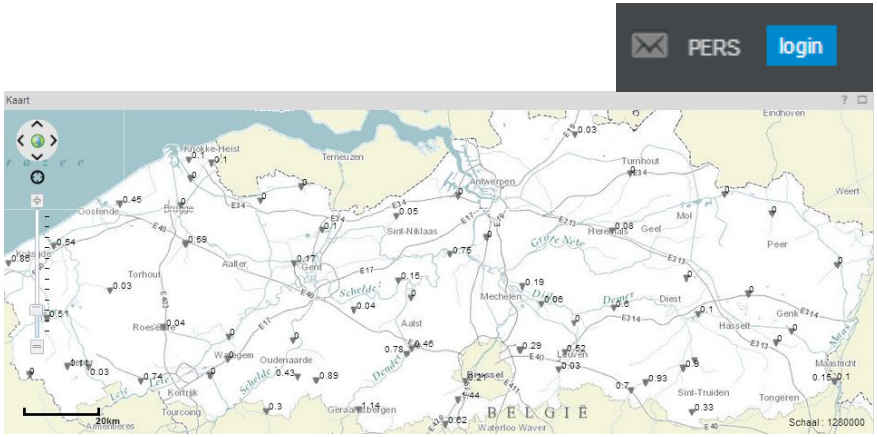
- **Portal theme =** Page with selected content (widgets, maps, parameters, ...)
- Crisis themes: changing **colours and symbols** according situation => changed home-page.
- Colours & symbols repeated in the « **waterinfo-messages** » = hydrologists interpretation

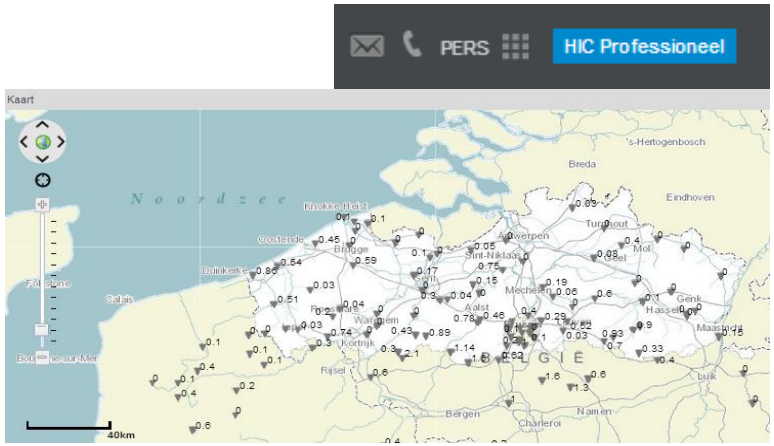


5a. Demo concepts

- **Customizable portal**
  - Geolocalise: “show waterinfo near me”
  - Favorites: “ remember my waterinfo”
  - Search: on city, street, river, station, document, …
  - Move and/or hide widgets
  - ! Dashboard for pro’s : “show my pre-configured waterinfo”
  - ! More info available for professional users (pro.waterinfo.be)





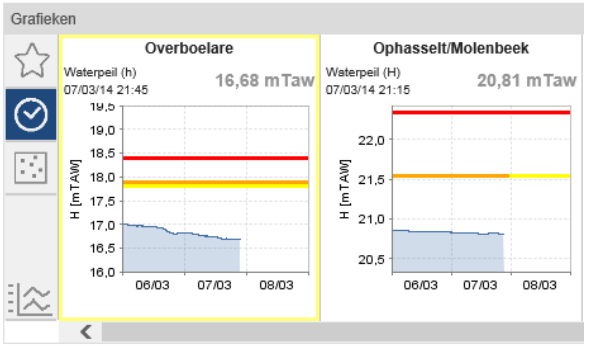


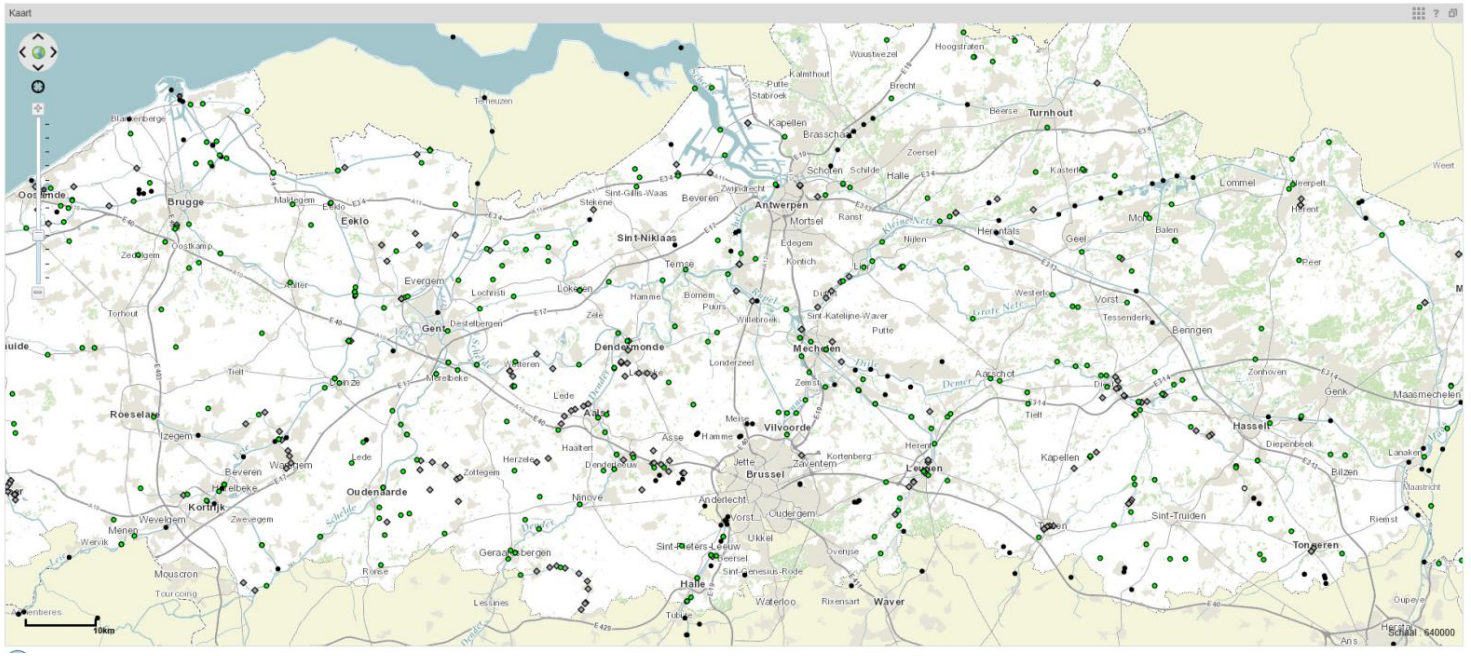
5b. Demo: actual waterinfo

Stations

- 358 sensors showing **alarmstatus** on real-time stage or flow (15')
- 150 **gate and weir** observations (1')
- 122 **raingauges** in and around Flanders
- 1232 model nodes
- \+ meteo, rainfall shortage, stream velocity, sediment, …

! + sensors outside Flanders (Wallonia, France, Netherlands, …)





5b. Demo: actual waterinfo

Station page widget:

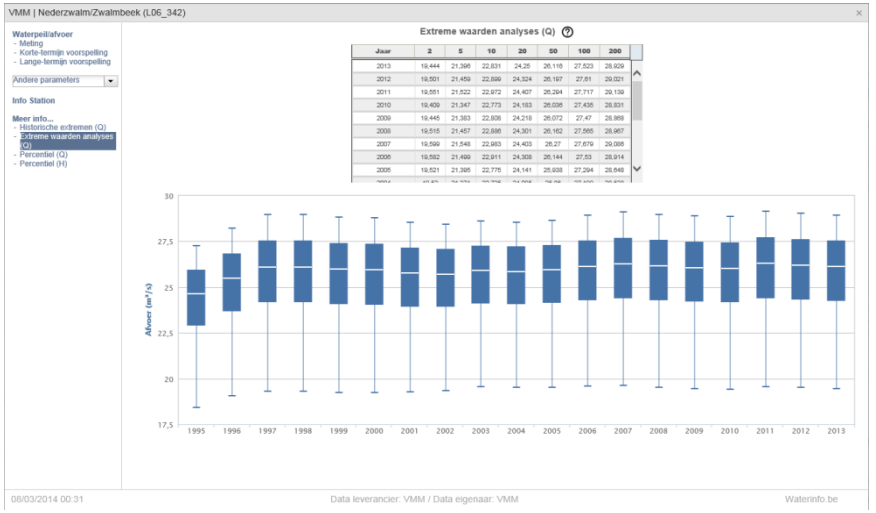
- **Three rich charts**: areal rainfall+stage+flow
- **Options** for:
  - Tabulating latest timestamps
  - Plotting top-5 historic stage maxima
  - Embedding & downloading this info

! Time period remembered per session

- **Station info**: map, picture, …

- **More (statistic) info**:
  - Empiric return periods
  - Trend in extreme values
  - Trend in percentiles

  Also available for rainfall statistics

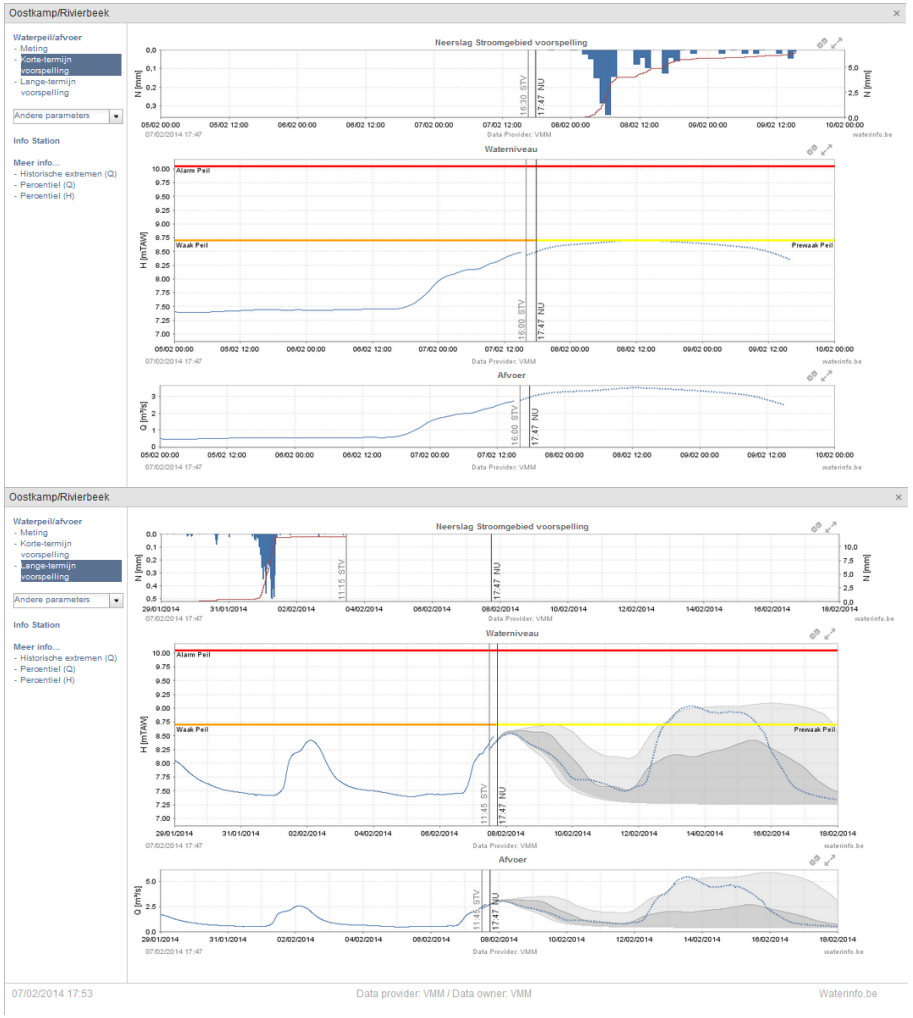


5b. Demo: forecasted waterinfo

Station page widget

- **Short-term forecast** (48hrs ahead)
- 3 forecasts for areal rainfall + stage + flow
- NU = Time now
- STV = Start Tijdstip Voorspelling (Time of Forecast)

- **Long term forecast** (10 days ahead)
- Uncertainty bands
  (4 real-time hydraulic percentile-runs based upon ECMWF P10, 25, 75, 90 rain)



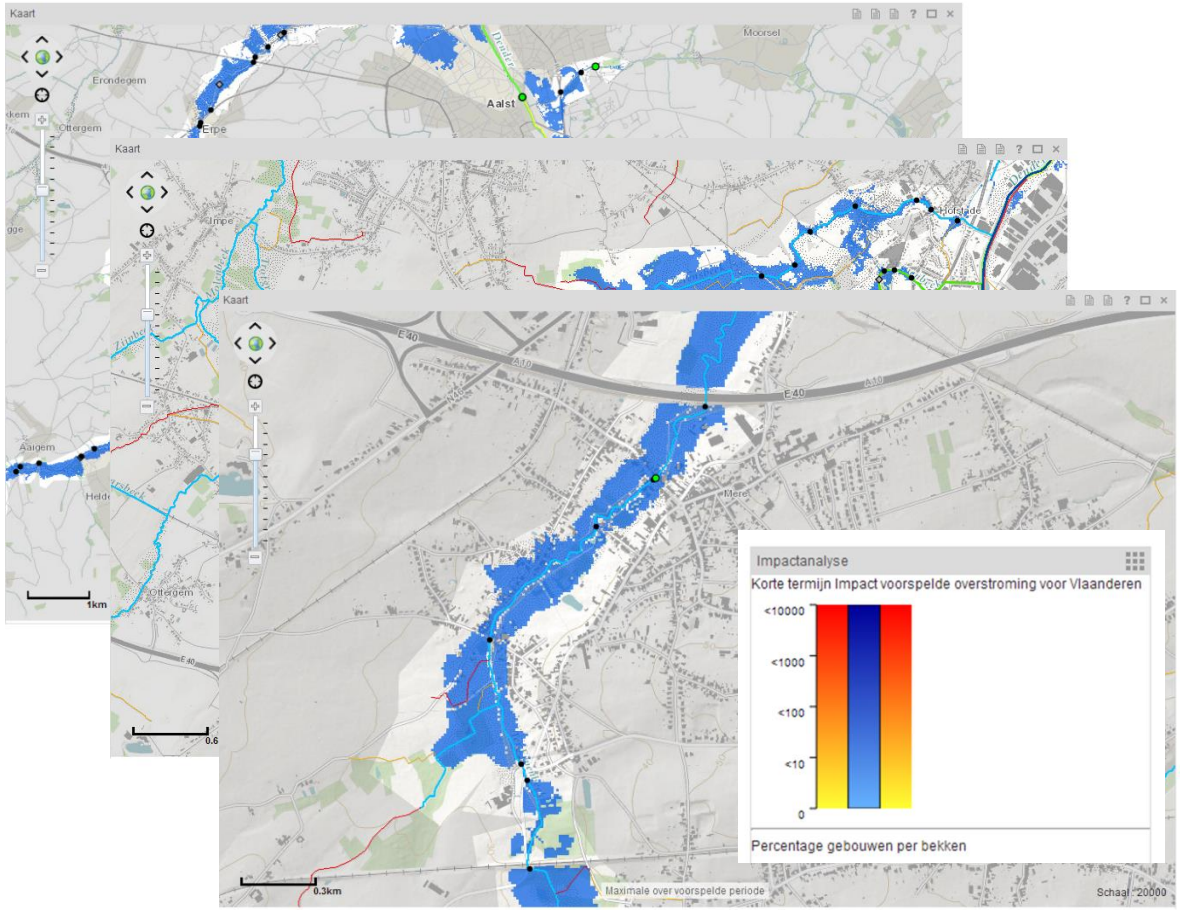
5b. Demo: forecasted waterinfo

Real-time Flood maps

- **Flood extent maps** (1 depth)
- For over 3000 km
- Till scale: 1:20.000
- With time-animation (3 hrs)

- Year round: **2 hourly** generated **map cache** out of all FloodWorks (VMM) & FloodWatch (HIC) modelled floodcontours

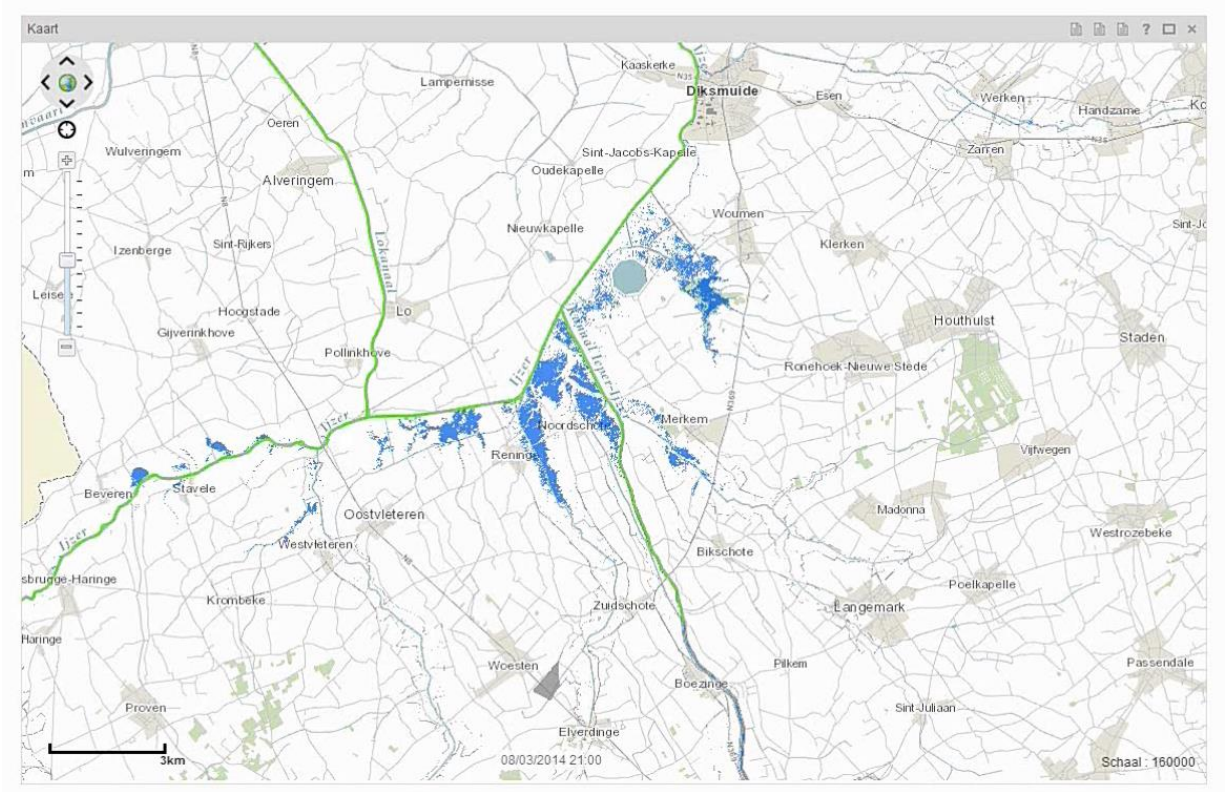
! Floodextents used for calculating (WPS) **real-time** the **floodimpact** = number of flooded buildings



5b. Demo: forecasted waterinfo

Flood Animation

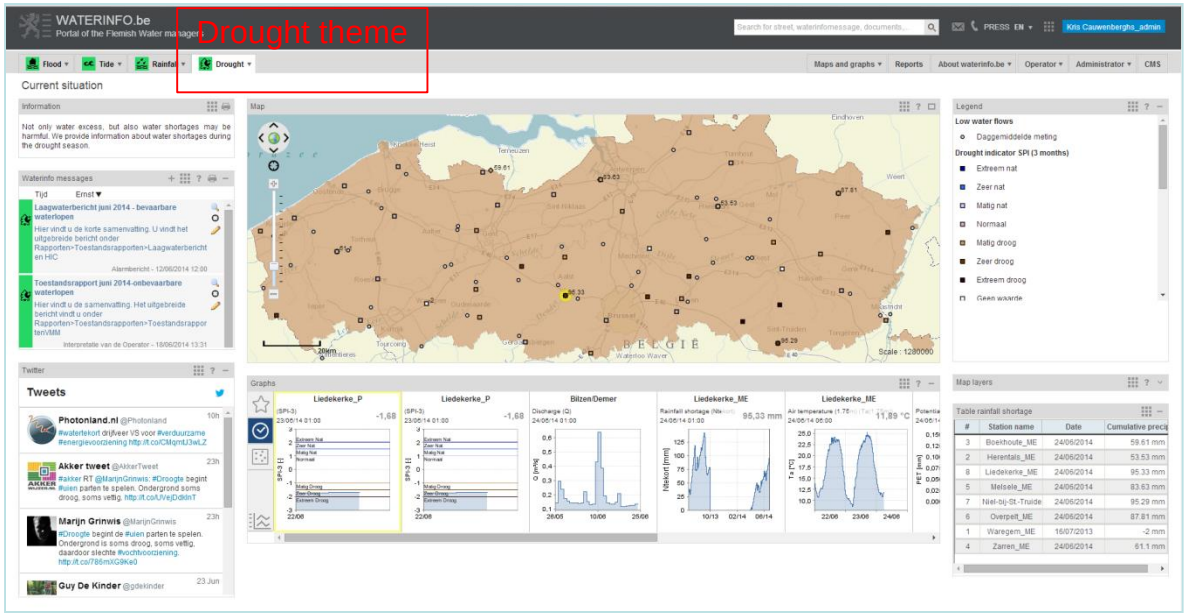
- River Ijzer: real-time flood contours based upon test-run (80mm rain last winter)

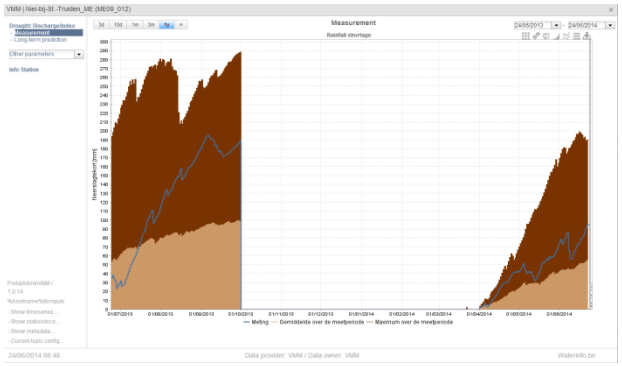


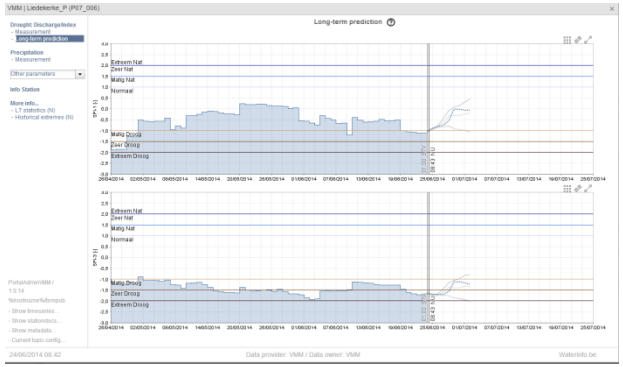
5b. Demo: forecasted waterinfo

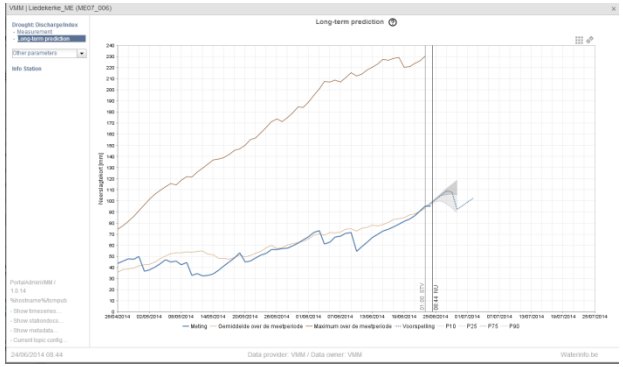
Drought info

- Interpolated background map of current rainfall shortage
- SPI-I en SPI-III charts (actual+forecasted)
- Low water regime (daily flows last month)









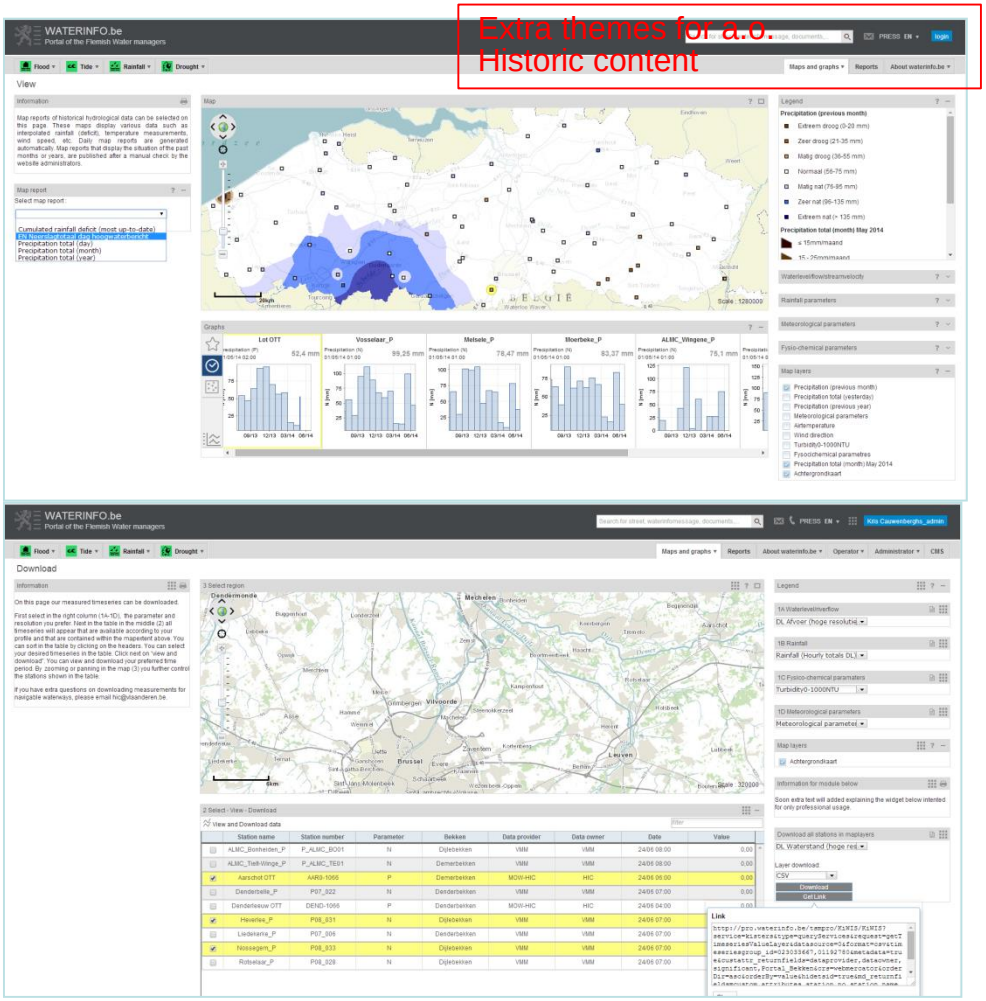
5b. Demo: historic content

Hydro-meteorological archive

- Map reports showing e.g. rainfall totals for last day(s), month(s), year(s)
- Free consuming of the entire data-archive (all parameters)

Download & share

- Download into Csv, ascii, html, waterML 2.0
- Get link:



http://test.waterinfo.be/tsmtest/KiWIS/KiWIS?service=Kisters&type=queryServices&request=getTimeseriesValues&datasource=1&format=wml2&ts_id=22609042&period=P5Y

http://test.waterinfo.be/tsmtest/KiWIS/KiWIS?service=kisters&type=queryServices&request=getTimeseriesValueLayer&datasource=0&format=ascii&timeseriesgroup_id=01178048&metadata=true&custattr_returnfields=dataprovider,dataowner,significant,Portal_Bekken&crs=webmercator&orderDir=asc&orderBy=value&hidetsid=true&md_returnfields=custom_attributes,station_no,station_name,ts_name,stationparameter_name,ts_unitsymbol,parametertype_name

5b. Demo: historic waterinfo

Geo-portal

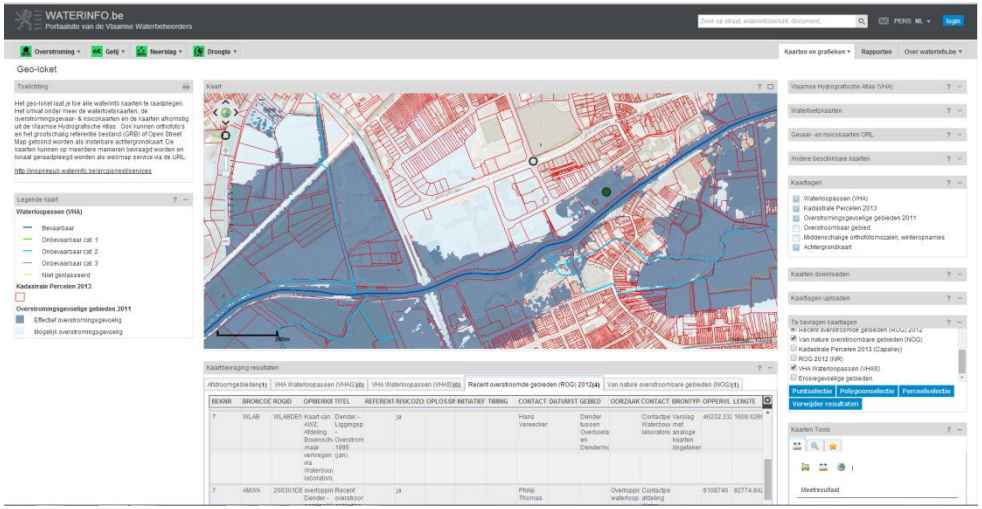
- Historic flood maps (incl. Floods directive maps, inspire-wms)
- Hydrographic network (VHA)
- Cadastral maps, …

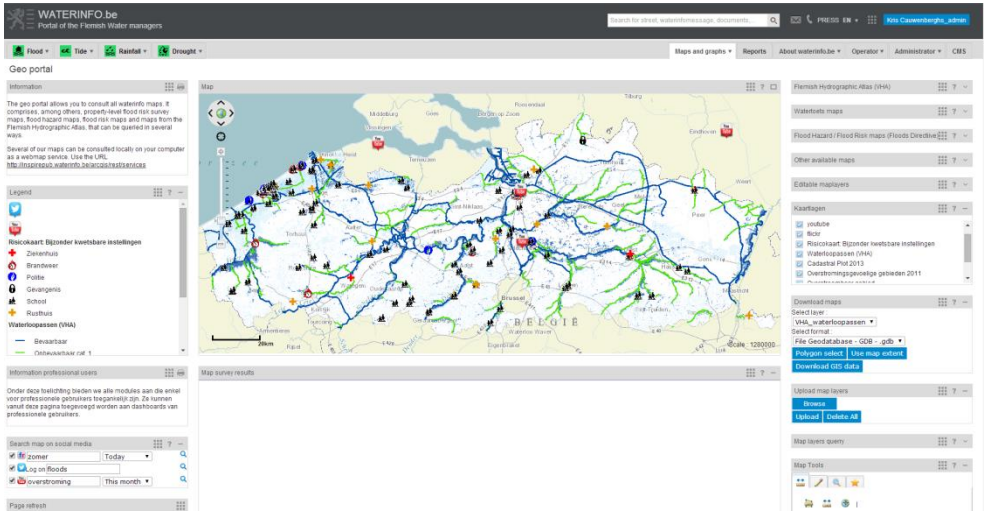
- Consult & querry maps (+ pdf-print)
- Download shape and geo-database

! Setup transparancy + change order layers

! Only for professional users

  - Uploaden client shape-files
  - Web gis-editing tools

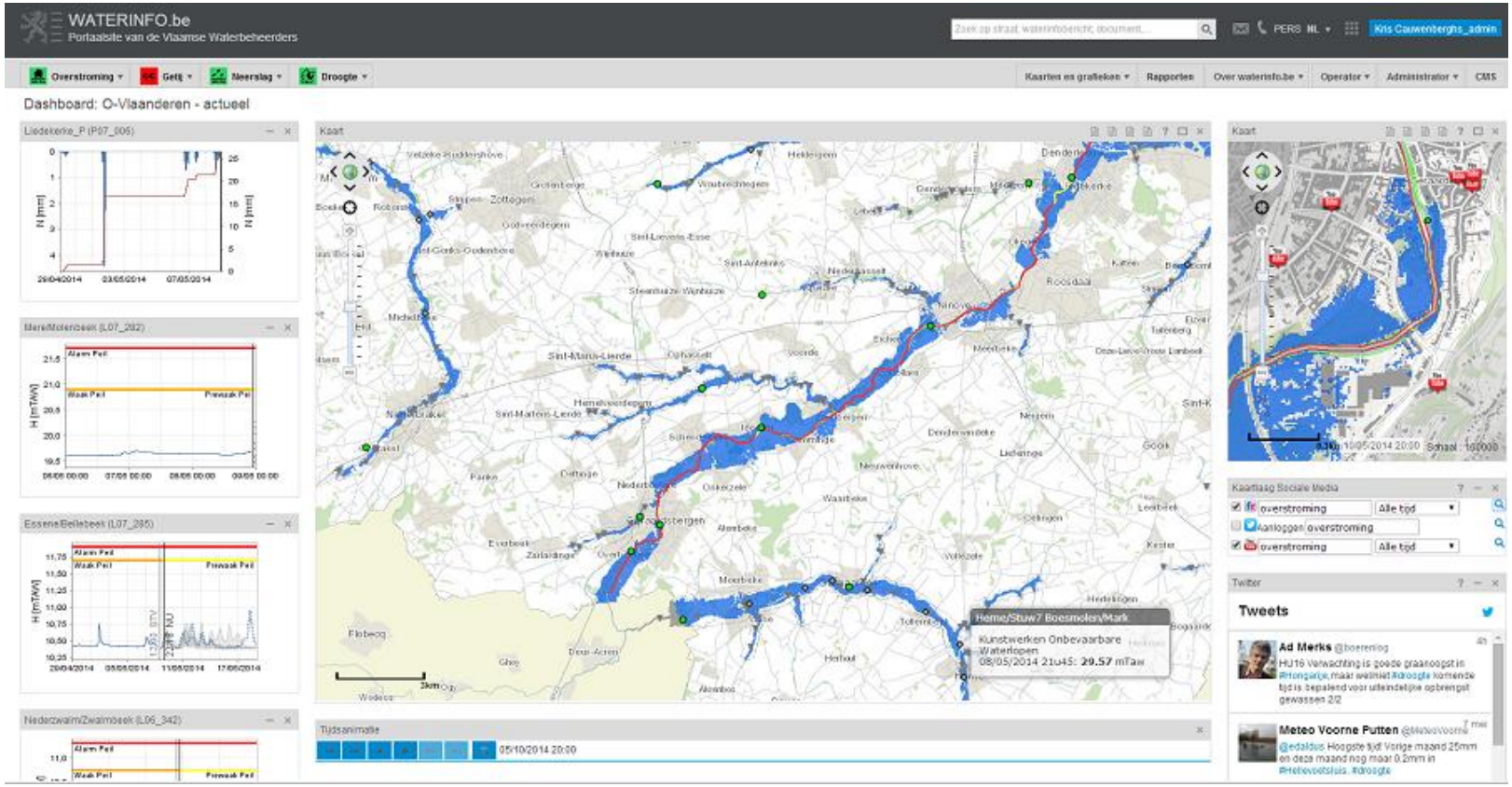




5b. Demo: dashboards

Local dashboard example

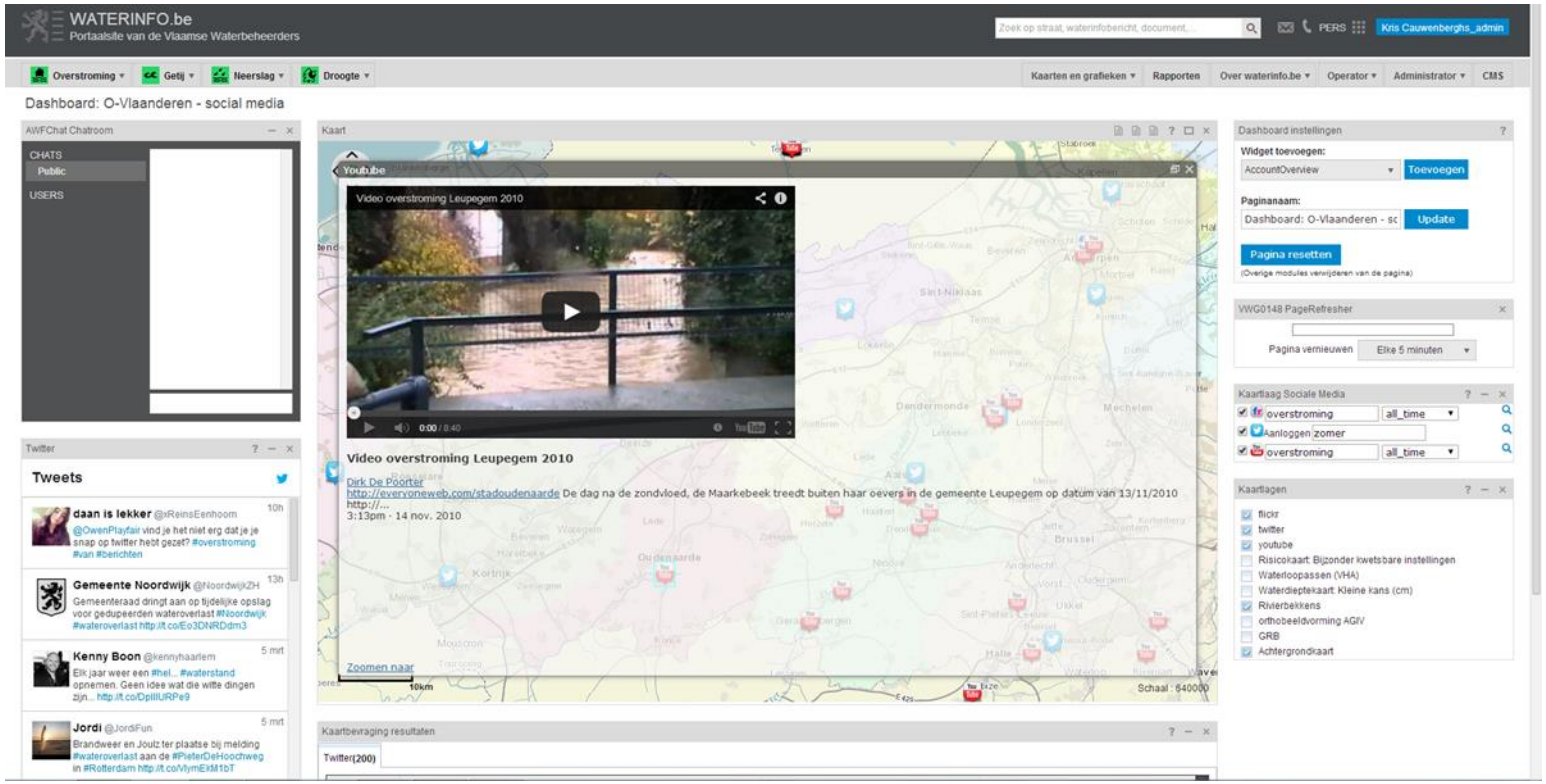
- ! Individual content selection
  - Multiple graphs (observed and forecasted timeseries)
  - Multiple maps (different zoomlevels)



5b. Demo: dashboards

Social media dashboard example

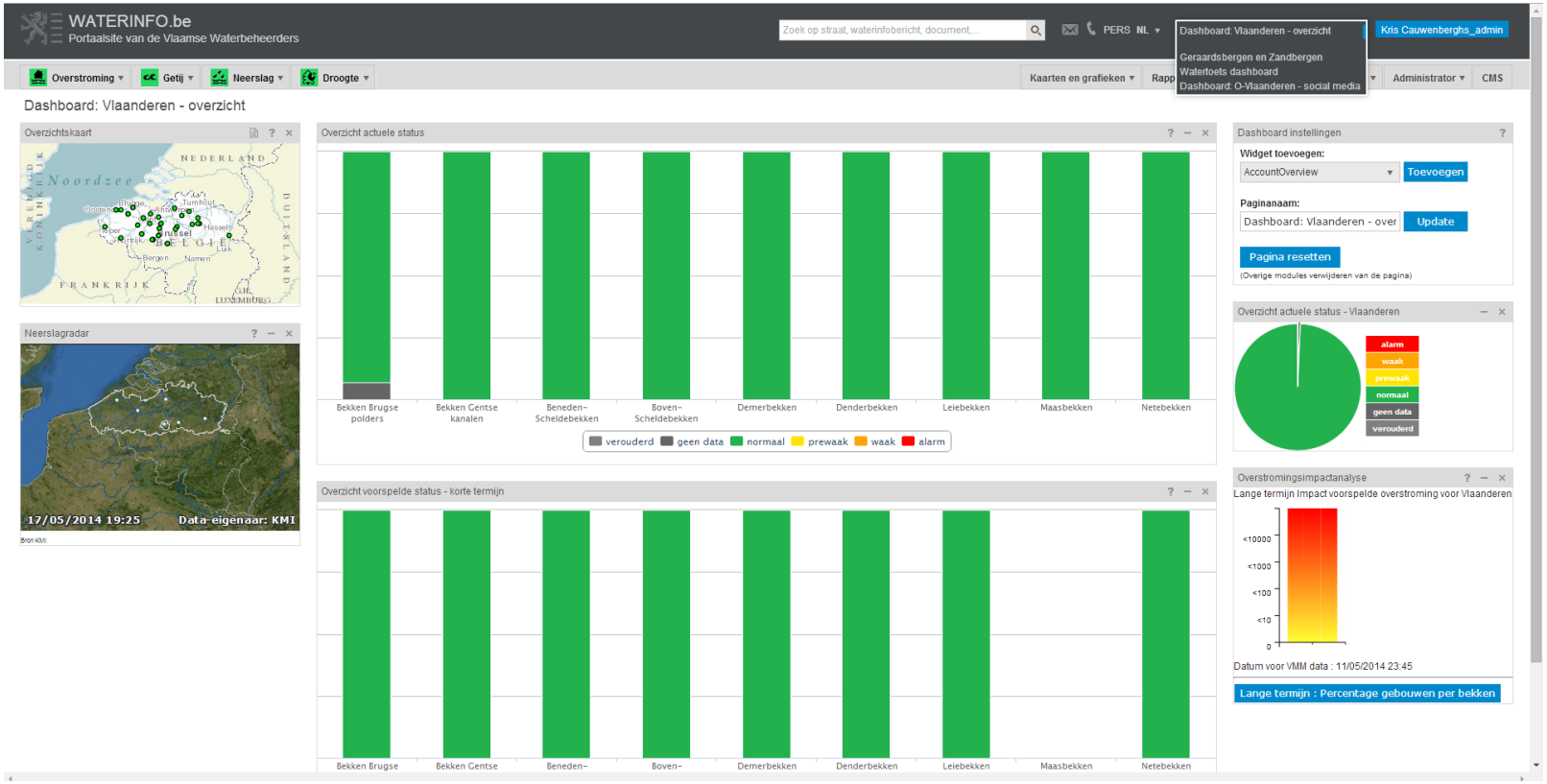
- Central map: showing Flickr, Twitter and You-tube results on selectable keywords + period
- Twitter-feed on keywords like: flooding, stormsurge, drought, …
- Chat-module (only for operators)



5b. Demo: dashboards

Regional dashboard example

- Clickable bar- and pie-diagrams showing alarm overview



6. Conclusions

1. In less then 2 years a state-of-the art portal has been build (running stable and fast, also under crisis situations)

2. Current web-technology gives huge possibilities for serving lot's and complex information to different audiences.

3. Big data processing also within medium size organisations possible.

4. Portal can easily extented with other info on waterquality calamities, groundwater info, …

5. Portal is inspiration for a Next-Generation backend (running models, sensors, … in a (service oriented) Water Data Infrastructure

Questions ?

Thank you !

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