

Enhancing spatial webservices with analytics – case LNE

DATABANK ONDERGROND VLAANDEREN

Database of the soil and subsoil of Flanders
MercatorNet cooperation

GWF, 25/05/2016

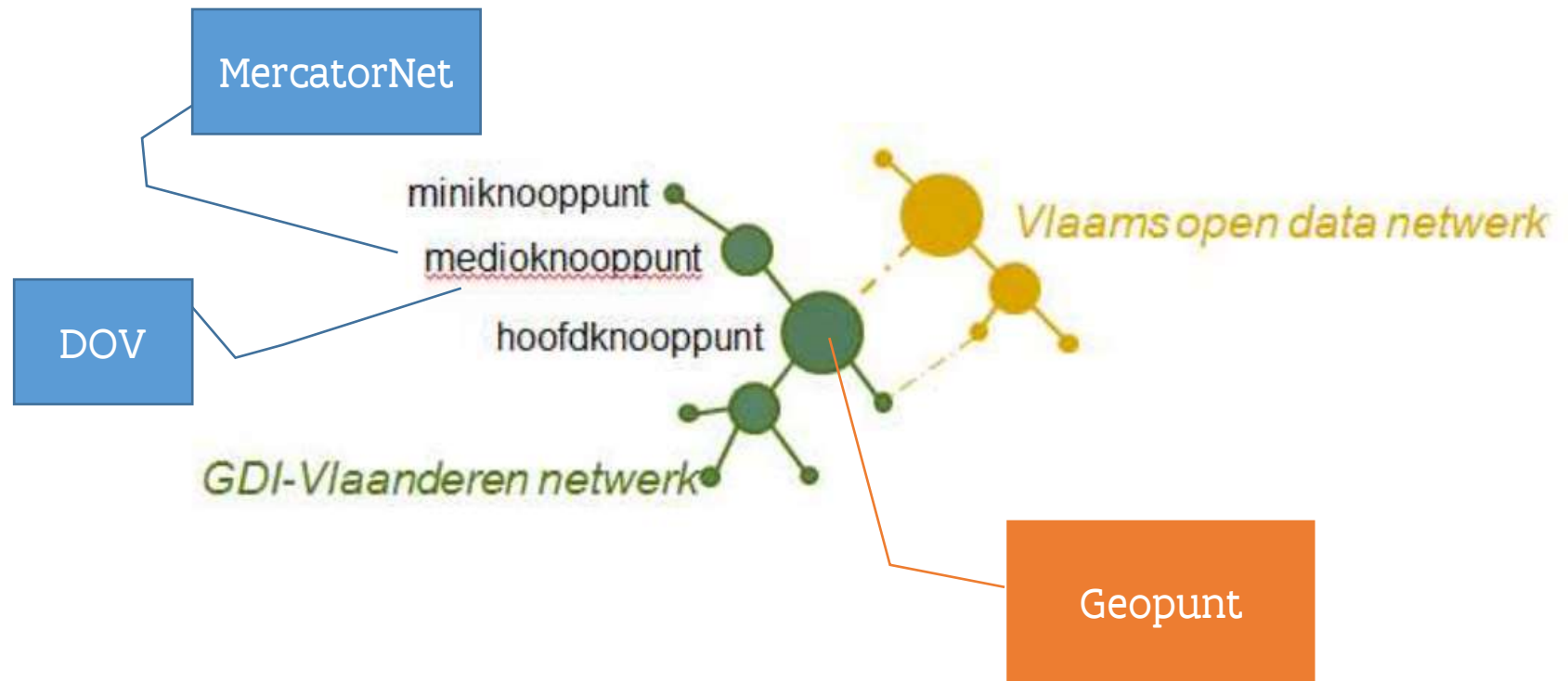
Marleen Van Damme

DOV- and MercatorNet coordinator

Overview

- ▶ Situation of the case LNE
 - Open data in Flanders
 - What is DOV?
 - What is MercatorNet ?
- ▶ Enhancing spatial web services of LNE with analytics
 - Sesam
 - Kibana
 - Zabbix
 - Google monitor
 - Spatineo Monitor
- ▶ Conclusions

Open data in Flanders versus SDI



What is DOV?

- ▶ URL: <http://dov.vlaanderen.be>
- ▶ DOV is a cooperation in Flanders:
 - First established in 1996
 - Open data online since 2002
 - 3 entities are the core partners:
 - Mobility and Public Works Department (MOW)
 - Environment, Nature and Energy Department (LNE)
 - Flemish Environment Agency (VMM)

MISSION Structuring and managing all data and information concerning the soil and subsoil of Flanders and make them available

VISION DOV is a cooperation of partners that mobilizes data and information concerning the soil and subsoil of Flanders, guards and reports on their quality and makes them accessible in an integrated way.
DOV works according to Flemish decrees and international agreements, in the most effective, efficient and flexible way.

Which data in DOV?

DOV offers data and information on thematic areas related to soil and subsoil:

groundwater



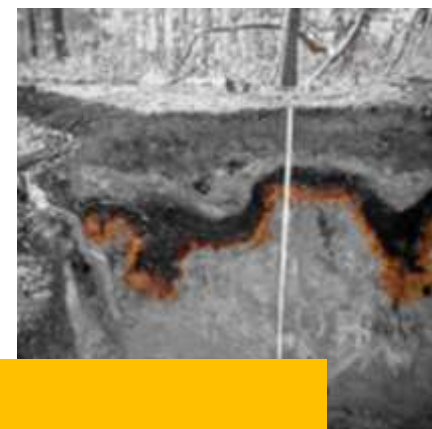
geology



geotechnics



soil



All data is available as **open data**

Reuse is allowed

“gratis open data licentie Vlaanderen V1.2”

What is MercatorNet

- ▶ Cooperation within the government of Flanders
 - Mobility and Public Works (BD MOW)
 - Environment, Nature and Energy (BD LNE)
 - Physical Planning (BD RWO)
- ▶ Common infrastructure to support all GIS users of the partners involved
 - ArcSDE Database to be replaced by new Read Only databases (PostGis)
- ▶ Common infrastructure to support publication of geodata via services

All data is available as **open data**

Reuse is allowed

“gratis open data licentie Vlaanderen V1.2”

Architecture for DOV/MercatorNet

Both DOV and MercatorNet

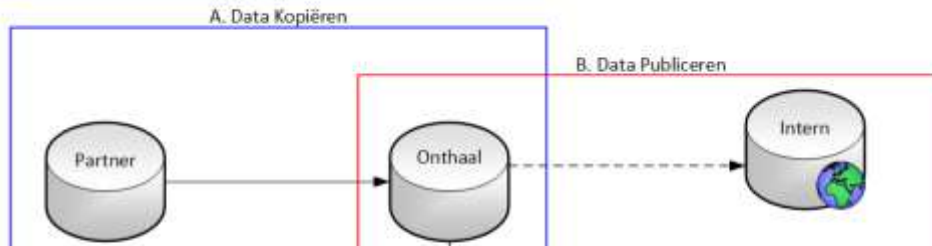
- ▶ **PostgreSQL, PostGIS**
- ▶ **Services**
 - Catalog (Geonetwork): CSW
 - × DOV: >1000 metadata files
 - × MercatorNet: 980 files
 - OGC-services (Geoserver) : WMS, WFS/WCS, WMTS –
 - × DOV: 470 layers
 - × MercatorNet: 130 layers
- ▶ **Common application for publication: called**
 - × “Mercurius” for DOV
 - × “Ariadne” for MercatorNet

DOV only:

- ▶ **Applications for datamanagement and viewing**
 - Java, GWT
 - Geotools, Geomajas
 - [Verkenner](#)

Mercurius / Ariadne

Selecteer het type Klik op de juiste kader



Configuratie Stijlen George Vandenack

Volg nieuwe configuratie toe Zoek naar onder (naam, bron en type) Laad metadatasetinstellingen op deze pagina

233 resultaten gevonden

Naam	Bron	Type	Proces	Status dataset	Status metadata	Acties
ec_h_31a_1q	RWO_ADMIN LA_TRAO_LANDSCH	ArcSDE	Kopiëren	ec_h_31a_1q		
ec_h_31nmap_1q_1f	RWO_ADMIN PRORUP_DEF_CT	ArcSDE	Kopiëren	ec_h_31nmap_1q_1f		
ec_h_31nmap_1q_1tbls	RWO_ADMIN PRORUP_DEF_CTSPEC	ArcSDE	Kopiëren	ec_h_31nmap_1q_1tbls		
ec_h_31nmap_1q_1q	RWO_ADMIN PRORUP_DEF_DG	ArcSDE	Kopiëren	ec_h_31nmap_1q_1q		
ec_h_31nq	RWO_ADMIN V_WUG_ATLAS	ArcSDE	Kopiëren	ec_h_31nq		
ec_jf_belder_jern_1q	SDE10.SDE PERCELEN	ArcSDE	Kopiëren	ec_jf_belder_jern_1q		
ec_jf_belder_straat_vlak	BOE10.SDE STEUNZONES	ArcSDE	Kopiëren	ec_jf_belder_straat_vlak		
ec_jf_belder_1q	SDE10.SDE TERREINEN	ArcSDE	Kopiëren	ec_jf_belder_1q		
o_1q_1tbls	1q_1tbls	PostGIS	Publiceren	1tbls 1tbls	Intern	
o_1q_1tbls	1q_1tbls	PostGIS	Publiceren	1tbls 1tbls	Intern	
o_1q_1tbls	1q_1tbls	PostGIS	Publiceren	1tbls 1tbls	Intern	
o_1q_1tbls	1q_1tbls	PostGIS	Publiceren	1tbls 1tbls	Intern	
o_1q_1tbls	1q_1tbls	PostGIS	Publiceren	1tbls 1tbls	Intern	
o_1q_1tbls	1q_1tbls	PostGIS	Publiceren	1tbls 1tbls	Intern	
o_1q_1tbls	1q_1tbls	PostGIS	Publiceren	1tbls 1tbls	Intern	

1 2 3 4 5 6 7 8 9 10 11 12 Volgende Laatste pagina

Analitics – several tools in use

▶ **Sesam since 2011**

- Logging of all requests on Geonetwork and geoserver
- Own application developed in 2011 – still running

▶ **Monitoring Website's Uptime with Google Docs**

- Real time uptime check, request every 5 min

▶ **Spatineo since 2015**

- Real time monitoring of response times, request every 5 min
- Usage analitics : based on own logfiles, shipped to Spatineo

▶ **Kibana**

- Logging
- Real time monitoring

▶ **Zabbix**

- monitoring

Usage of DOV – Sesam compared to Spatineo

SESAM					
Jaar	CSW	WMS	WFS	WCS	zips
2011	250.000	500.000	0	0	na
2012	1.114.595	2.826.549	23.318	0	na
2013	24.135	8.789.788	2.561.662	2.281	na
2014	1.201.828	47.206.065	26.815.979	6.337	na
2015	1.504.838	60.401.191	26.723.257	2.148.405	1.531

Further investigation needed to understand the differences



Spatineo-rapport INSPIRE 2015 spreadsheet

Web service type	Number of requests	Data transferred (MiB)	Availability	Hours of maintenance
WMS	36.281.193	515.145	97.3%	0
WFS	15.389.579	2.527.837	97.4%	0

Spatineo Monitor – meters and alert settings

The screenshot displays the Spatineo Monitor interface. The main view shows a service named 'DOV_main WMS' with a meter 'quarta:quarta_200k (EPSG:4326, 800x600px, image/png, GetMap)'. The 'Alert settings' dialog is open, showing the following configuration:

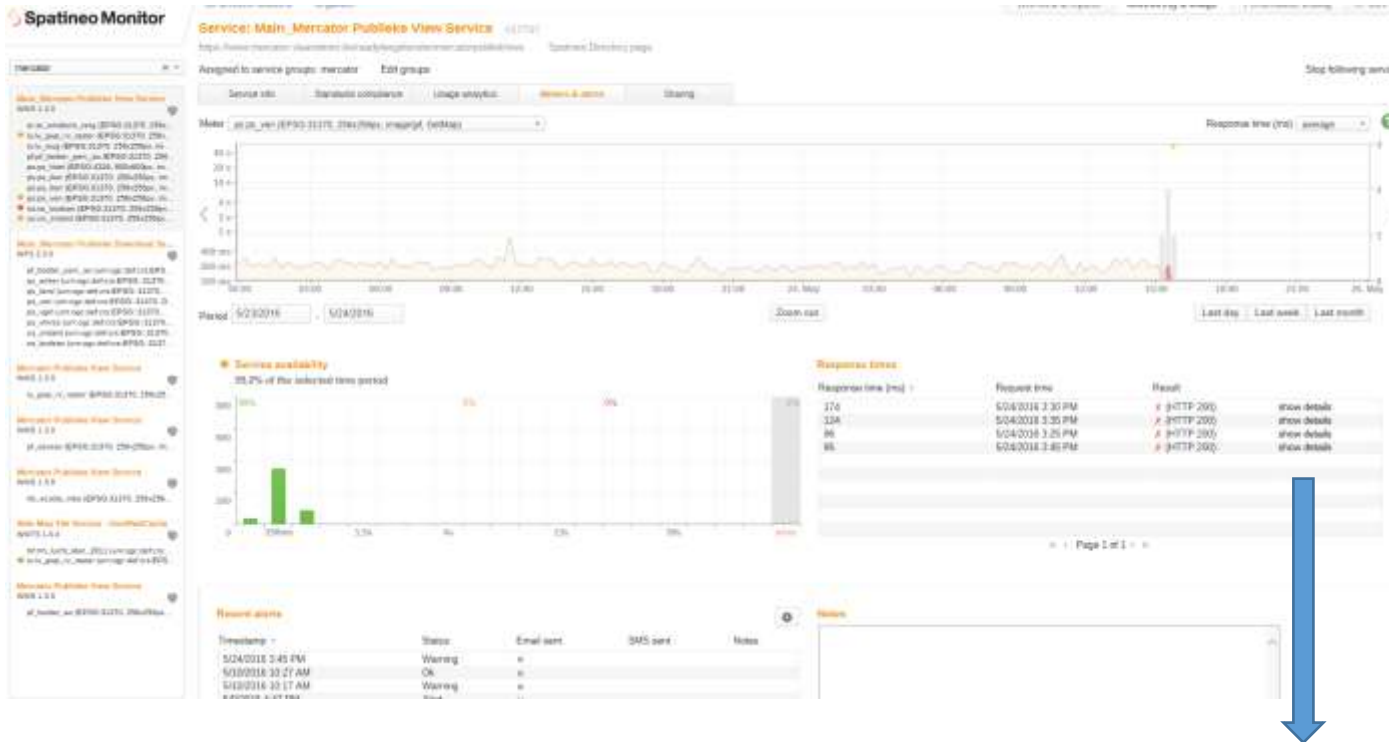
- Meter name:** quarta:quarta_200k (EPSG:4326, 800x600px, image/png, GetMap)
- Indicator name:** quarta:quarta_200k
- Error & warning thresholds:**
 - 1h average response time:** use to trigger alerts (checked). Warning at 2000ms, error at 25.0s.
 - % of errors in 1h:** use to trigger alerts (checked). Warning at 20%, error at 50%.
- Alert message recipients:**
 - SMS
 - Email: marleen.vandamme@lne.vlaanderen.be

The background shows a response time graph with a 'Zoom out' button and filters for 'Last day', 'Last week', and 'Last month'. A table of response times is visible below the graph:

Response time (ms)	Request time	Result	
60138	5/23/2016 9:55 AM	-	show details
60125	5/23/2016 5:00 PM	-	show details
60118	5/23/2016 4:30 PM	-	show details
60112	5/23/2016 3:35 PM	-	show details
95	5/23/2016 4:35 PM	✗ (HTTP 500)	show details



Spatineo – warnings and alerts



```
<?xml version="1.0" encoding="UTF-8"?>
- <ServiceExceptionReport xsi:schemaLocation="http://www.opengis.net/ogc https://www.mercator.vlaanderen.be/raadpleegdienstenme
instance" xmlns="http://www.opengis.net/ogc" version="1.3.0">
  <ServiceException> java.io.IOException: No such resource: ps_ven_std.sld No such resource: ps_ven_std.sld </ServiceException>
</ServiceExceptionReport>
```

All warnings combined in one mailbox – who's the first ?

Van: marleensm.vandamme@gmail.com (103 items)

1	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.com	Site https://www.dov.vlaanderen.be/geoserver/web/ is up	di 24/05/2016 16:33	21 kB	do 19/05/2016 20:24
2	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	Spatineo Monitor	WARNING: quartair_0506		do 19/05/2016 20:22
3	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	Spatineo Monitor	WARNING: dov-pub-bodem:Bodemassociatiekaart		do 19/05/2016 20:18
4	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is up		do 19/05/2016 20:12
5	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is down		do 19/05/2016 19:33
6	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is up		do 19/05/2016 19:13
7	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	Spatineo Monitor	ALERT: dieptecriteria:dieptecriteria_53_8_2013		do 19/05/2016 19:09
8	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	Spatineo Monitor	ALERT: quartair_0506		do 19/05/2016 19:08
9	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is down		do 19/05/2016 19:07
10	Website Monitoring with Google Docs - by ctrlq	marleensm.vandamme@gmail.c	Spatineo Monitor	ALERT: dov-pub-bodem:Bodemassociatiekaart		do 19/05/2016 19:07

Assigned to service groups: DOV Edit groups Stop following service

Service info Standards compliance Usage analytics **Meters & alerts** Sharing

Meter: quartair:quartair_200k (EPSG:4326, 800x600px, image/png, GetMap) Response time (ms) average

Period: 5/19/2016 - 5/19/2016 Zoom out Last day Last week Last month

501	5/15/2016	Down : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	WARNING: quartair_0506	do 19/05/2016 17:45
502	5/15/2016	Up : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	ALERT: quartair_0506	do 19/05/2016 17:34
503	5/17/2016	Down : https://www.dov.vlaanderen.be/geoserver/web/	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is up	do 19/05/2016 17:33
504	5/17/2016	Up : https://www.dov.vlaanderen.be/geoserver/web/	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is down	do 19/05/2016 17:31
505	5/18/2016	Down : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	ALERT: quartair:quartair_200k	do 19/05/2016 17:30
506	5/18/2016	Up : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	WARNING: dov-pub-bodem:Bodemassociatiekaart	do 19/05/2016 17:22
507	5/19/2016	Down : https://www.dov.vlaanderen.be/geoserver/web/	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is up	do 19/05/2016 16:59
508	5/19/2016	Up : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	WARNING: quartair:quartair_200k	do 19/05/2016 16:55
509	5/19/2016	Down : https://www.dov.vlaanderen.be/geoserver/web/	marleensm.vandamm...	Site https://www.dov.vlaanderen.be/geoserver/web/ is down	do 19/05/2016 16:48
510	5/19/2016	Up : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	WARNING: dieptecriteria:dieptecriteria_53_8_2013	do 19/05/2016 16:44
511	5/19/2016	Down : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	OK: quartair:quartair_200k	do 19/05/2016 16:35
512	5/19/2016	Up : https://www.dov.vlaanderen.be/geoserver/web/	Spatineo Monitor	WARNING: quartair:quartair_200k	do 19/05/2016 15:36

Flanders

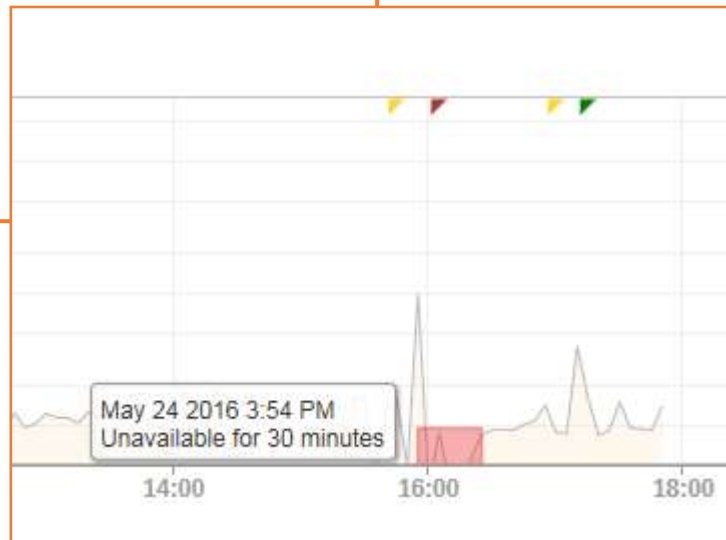
State of the Art

Zabbix versus Spatineo

Onderwerp: FW: Mercator - productie: Te weinig lagen: PROBLEM

Op 24/05/16 15:53 schreef zabbex@milieuinfo.be <zabbex@milieuinfo.be>:

>Trigger: Te weinig lagen
>Trigger status: PROBLEM
>Trigger severity: Average
>
>Item: Wms Capabilities: aantal lagen
>Value: 1



What happend yesterday ?



DOV and MercatorNet were down for 30 à 50 minutes



Spatineo - Performance testing

DOV

MercatorNet

Generate load for 20 min with 10 min ramp-up to maximum load
Specify the maximum loads for the included users in the table below

Simulation only
Run this test using simulated service responses (learning mode). No requests will be made to the actual servers. Running a simulated test does not cost you test credits.

Services & users to include

DOV_main_WMS <input type="checkbox"/>	WMS GetMap: quarair_quair_200k (EPSG:4326, 800x800px, image/png)	Vector complex legend
DOV_main_WMS <input type="checkbox"/>	WMS GetCapabilities	Cap. 470 layers
DOV_main_WFS <input type="checkbox"/>	WFS GetFeature: beschermingszones_2014 (urn:ogc:def:crs:EPSG::31370, GML2)	WFS – GML2
DOV_main_WMS <input type="checkbox"/>	WMS GetMap: depecciteria_depecciteria_53_8_2013 (EPSG:31370, 256x256px, image/png)	raster
Main_Mercator Publieke View Service <input type="checkbox"/>	WMS GetMap: ps_su_bosman (EPSG:31370, 256x256px, image/png)	Vector light legend
Main_Mercator Publieke View Service <input type="checkbox"/>	WMS GetMap: pfpf_bosman_perc_ap (EPSG:31370, 256x256px, image/png)	Vector light legend
Main_Mercator Publieke Download Service <input type="checkbox"/>	WFS GetFeature: ps_anker (urn:ogc:def:crs:EPSG::31370, application/gml+xml; version=3.2)	WFS – app/gml+xml

► Testscenario

- DOV: 50 req/s in total
- MercatorNet: 56 req/s in total

► First test on 19/04/2016

- Initial set up knowing existence of performance issues

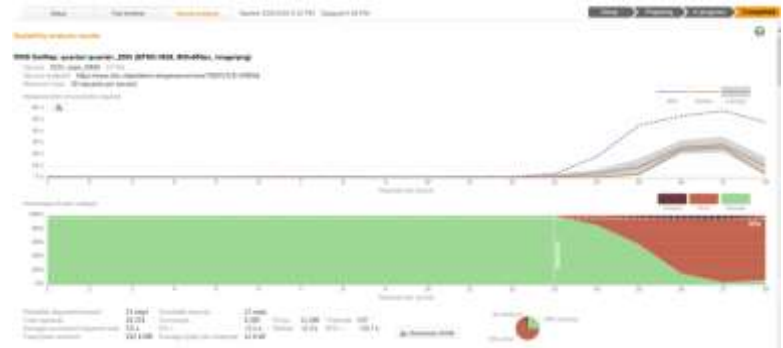
► Second test on 24/05/2016

- MercatorNet – no changes – Geoserver running on 2 nodes
- DOV – Geoserver running on 4 nodes in stead of 2

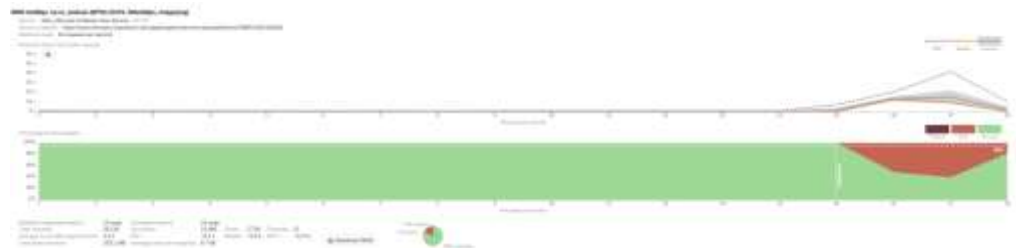
Spatineo - Performance testing – results on 19/04/2016



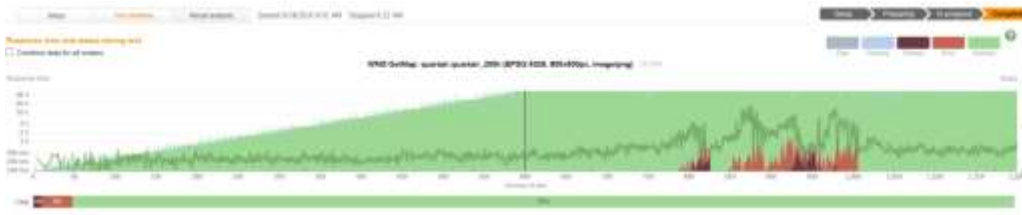
DOV



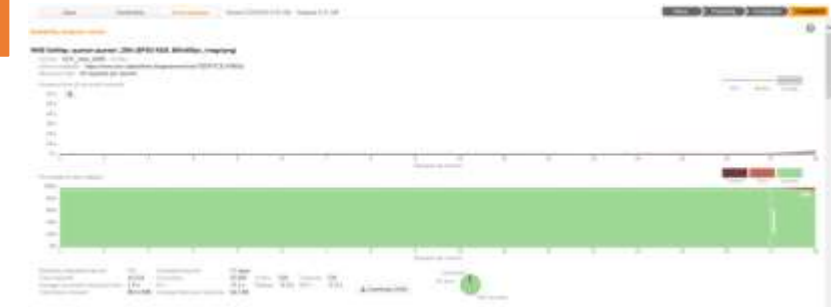
MercatorNet



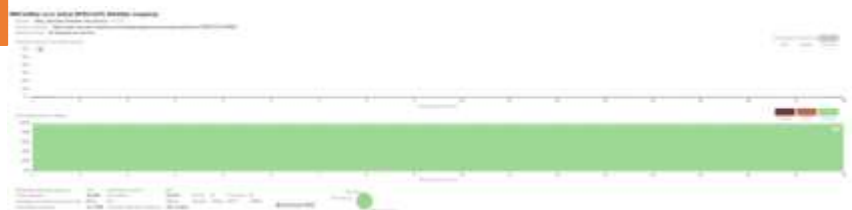
Spatineo - Performance testing - results on 24/05/2016



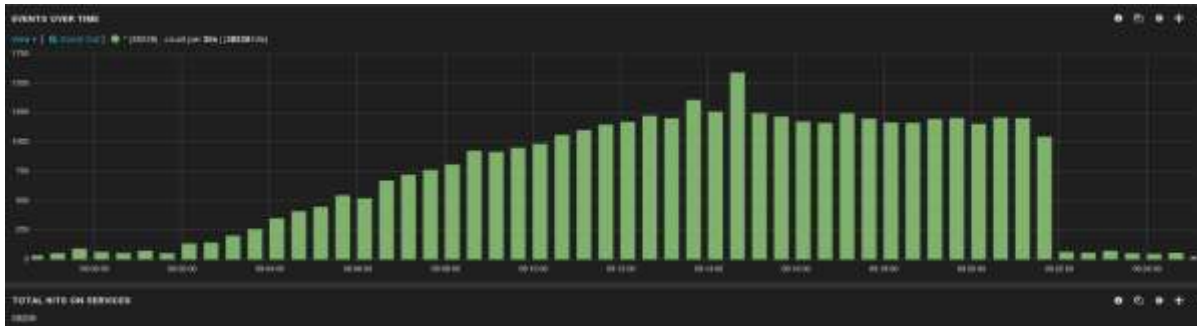
DOV



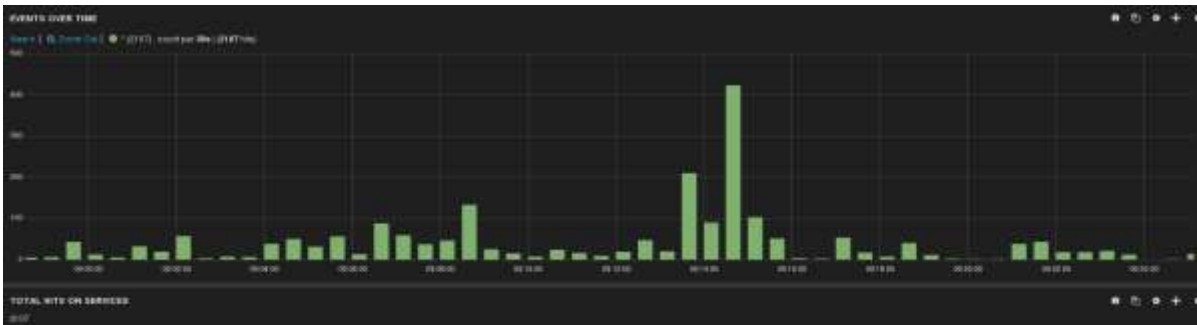
MercatorNet



Kibana during the test compared to regular usage

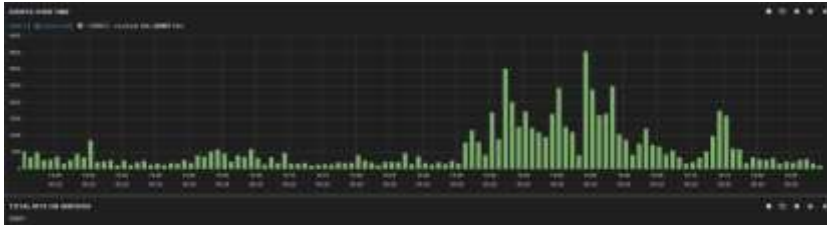


DOV - Requests from spatineo monitoring and performance test included



DOV – requests from “real” users during the testing time window

Kibana versus Spatineo

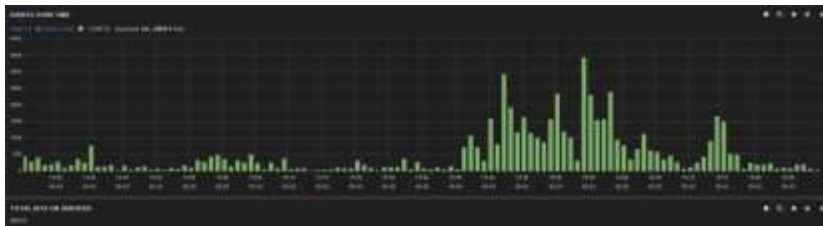


Spatineo monitor included

10.000 requests from Spatineo during the visible time frame



Corresponding views in Spatineo for the same day



Spatineo monitor not included

Max: 3500 requests per min >>> almost 60 requests per second



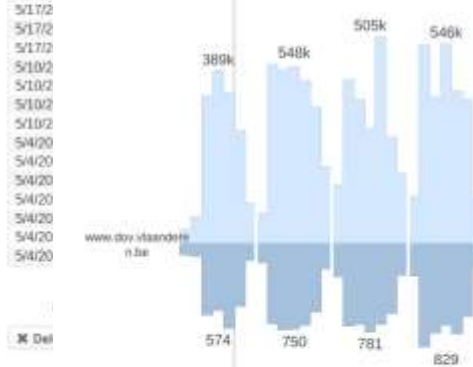
Kibana: all req on geoserver DOV

Spatineo: Only req. on WMS DOV

Reporting with Spatineo

Report archive

Created on	Type	Name
5/24/2016 12:00 AM	Graphical	DOV WMS per referer graphic
5/24/2016 12:00 AM	Graphical	DOV_executive_QoS
5/24/2016 12:00 AM	Graphical	DOV_executive
5/24/2016 12:00 AM	Graphical	Mercator_executive
5/23/2016 5:57 PM	Graphical	DOV_executive_QoS
5/17/2016 12:00 AM	Graphical	DOV WMS per referer graphic



Referring site	Nov	Jan	Mar	May
www.dov.vlaanderen.be	574	750	781	829
maps.geopunt.be	20k	22k	21k	21k
N/A	14k	20k	16k	20k
onblikkel.dov.vlaanderen.be	97	108	126	107
Others	5.4k	9.1k	3.7k	3.9k

March 14 April 15 16 17

Users and service usage

Number of users*

Number of requests

This month: **2,657** (-2%)

Quality of Service and network traffic

Average service availability %

This month: **97.9%** (-2%)

User impact of service speed improvement*

This month: **-14 h**

Usage compared to previous years

Year	Users	Requests
2016	23k	12M
2015	16k	9.3M
2014	0.0	0.0
2013	0.0	0.0
2012	0.0	0.0

Yearly total: January - May

Most popular data sets

Name	Users	Requests
Bodentypes	144k	144k
Grondwaterwingebieden en beschermingszones (2014)	85k	85k
Boringen	79k	79k

Trending data sets

Name	Users	Change
Krijt Ispochten	4	+300%
G3Dv2_0311_boringen met basis Fm van...	3	+200%
dov-pub-bodem:Erosiegevoeligheid_Vlaam...	5	+150%

Most used services

Service title	Requests	Users	Transfer	Type	Service ID
DOV_main_WMS	1.1M	2.6k	15 GB	WMS	#17494
DOV_main_WFS	57k	47	5.4 GB	WFS	#17496

Services with the biggest speed changes

Service title	Response time	No. of users	Change
DOV_main_WMS	818 ms	2.6k	-15%
DOV_main_WFS	376 ms	47	+1.3%

Services with the biggest error rates

Service title	Error %	No. of users	Change
DOV_main_WFS	2.72	47	-30%
DOV_main_WMS	1.57	2.6k	-48%



Flanders
State of the Art

Conclusions

- ▶ Providing open data is challenging
- ▶ Using the same services that had been set up for publication of data in own applications leads to even more need to have insight in usage and performance
 - Several tools from different points of view have to be in place
- ▶ Positive feedback from users is motivating
 - Having the possibility to use DOV, our users “enjoy” paying taxes
- ▶ Due to open data policy in Europe – governmental tasks related to it have become vital for the whole society. Costs are worth spending due to gain for all involved target users.



QUESTIONS ?

Contact us at dov@vlaanderen.be



Flanders
State of the Art

**ENVIRONMENT
NATURE &
ENERGY
DEPARTMENT**