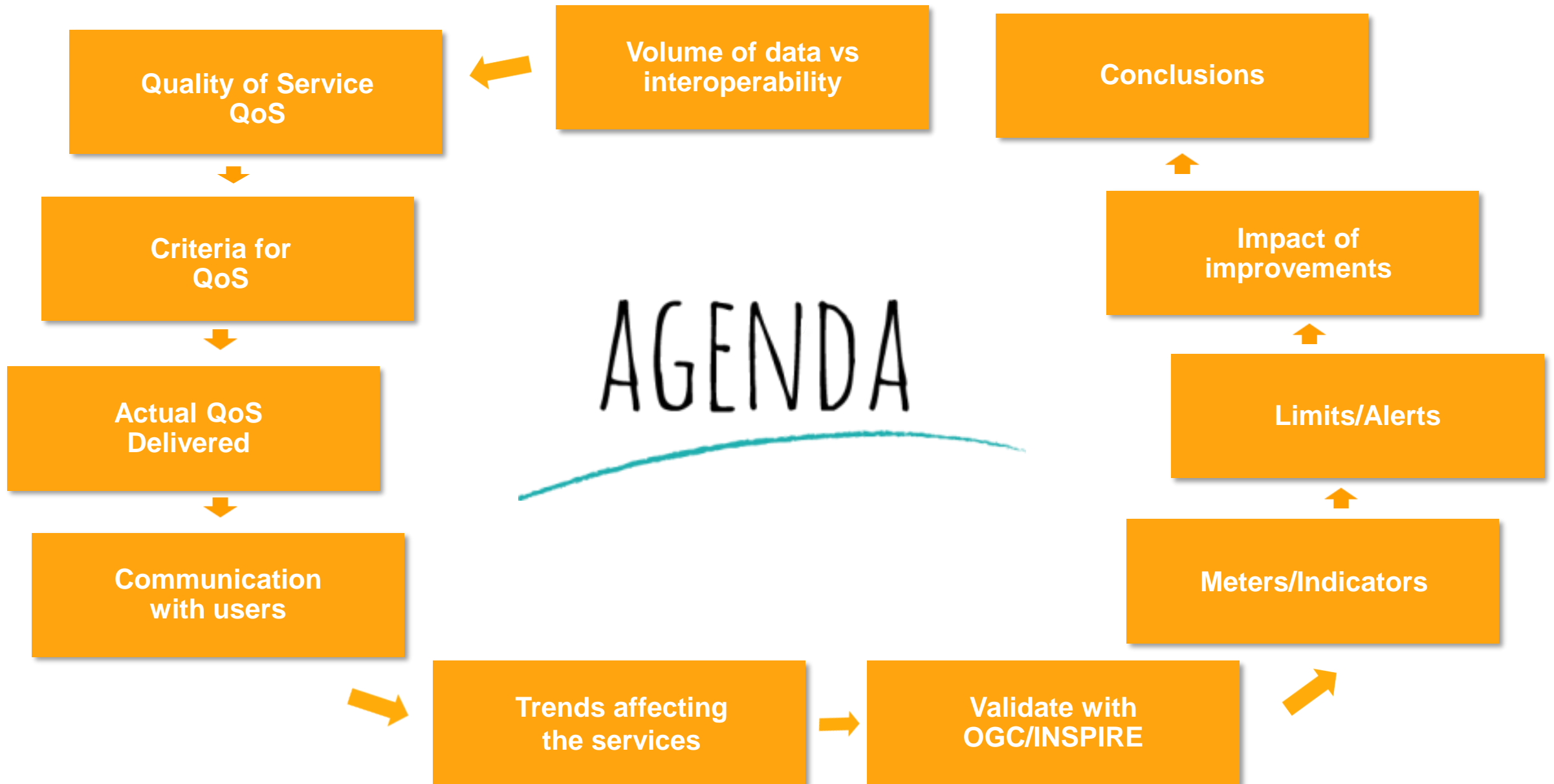


# **Quality Assurance & Usage Analytics**

## **for INSPIRE Services**

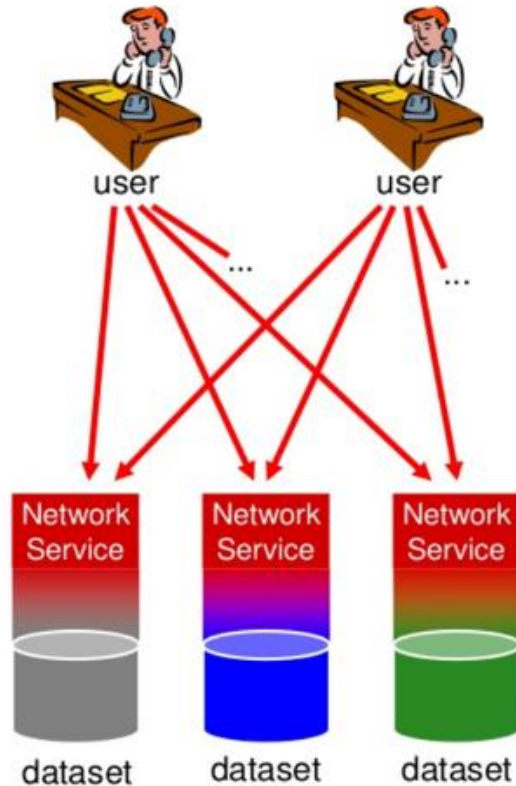
**Fabio Bittencourt**  
**27th February 2018**  
**Inspirujme se**







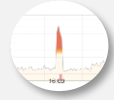
## VOLUME OF DATA VS INTEROPERABILITY



The volume of spatial data collected increases rapidly with ever more powerful ways to simulate the environ and human behavior

A good SDI allows you to find, filter, acquire and interact with spatial data required for a particular use in a reliable, efficient and easy-to-use manner

A good example of this is INSPIRE



## > QUALITY OF SERVICE



### CENIA/cenia\_koupaci\_vody\_2006\_2010

[http://geoportal.gov.cz/arcgis/services/CENIA/cenia\\_koupaci\\_vody\\_2006\\_2010/MapServer/WmsServer](http://geoportal.gov.cz/arcgis/services/CENIA/cenia_koupaci_vody_2006_2010/MapServer/WmsServer)

Kvalita koupacích vod v koupací sezóně v letech 2006-2010

#### Available map layers (80)

##### koupací vody 15.5. - 25.5.2006 (1)

koupací vody 15.5. - 25.5.2006

Layer metadata ([xml](#))

##### koupací vody 19.5. - 1.6.2006 (2)

koupací vody 19.5. - 1.6.2006

Layer metadata ([xml](#))



Follow in  
Spatineo Monitor



<b>Service health</b>	Now: ●	Last 7 days	Year 2018
Availability		100%	99.9%
Total downtime		0.1 hours	1.1 hours
Pre-announced service interruptions		0 hours	0 hours
<b>Unexpected downtime</b>		<b>0.1 hours</b>	<b>1.1 hours</b>



**CRITERIA FOR  
QUALITY OF SERVICE**



**CRITERIA FOR QoS**

**AVAILABILITY**

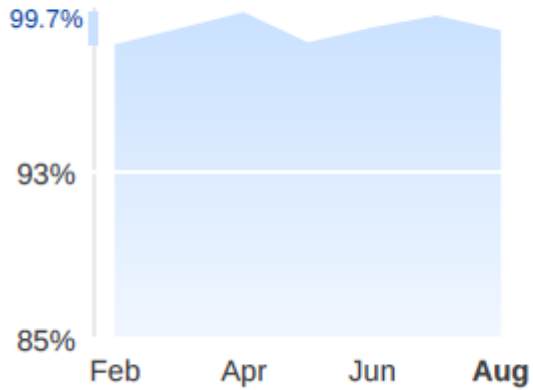
**PERFORMANCE**

**CAPACITY**



## CRITERIA FOR QoS - AVAILABILITY

### Average service availability %



This month

98.9%

-0.7%

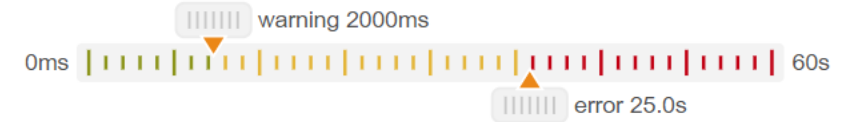
### Alert settings

Meter name Network.HydroNode (wkid:3067, 256x256px, PNG, export)

Indicator name

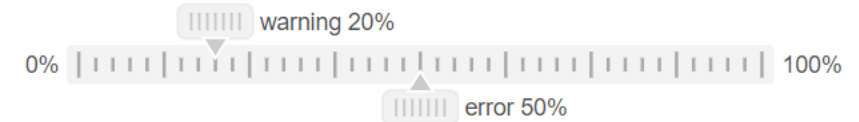
### Error & warning thresholds

#### 1h average response time use to trigger alerts



Note: You can also use the above settings to change the warning and alert coloring of the meter's response time graphs in the application.

#### % of errors in 1h use to trigger alerts



### Alert message recipients

SMS

Email

Cancel Ok



## CRITERIA FOR QoS - PERFORMANCE

Service: Hydrografia #28038

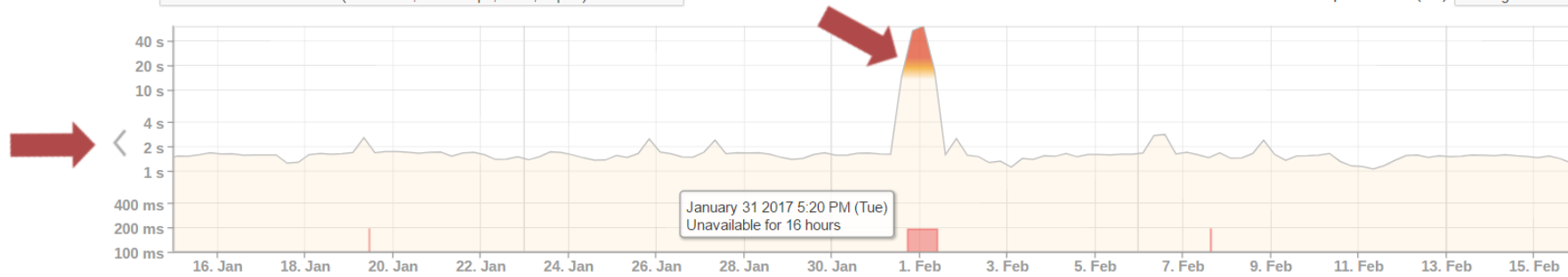
[http://paikkatieto.ymparisto.fi/arcgis/rest/services/INSPIRE/SYKE\\_Hydrografia/MapServer](http://paikkatieto.ymparisto.fi/arcgis/rest/services/INSPIRE/SYKE_Hydrografia/MapServer) Spatineo Directory page

Assigned to service groups: SYKE, SYKE MapServer REST [Edit groups](#)

[Stop following ser](#)

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

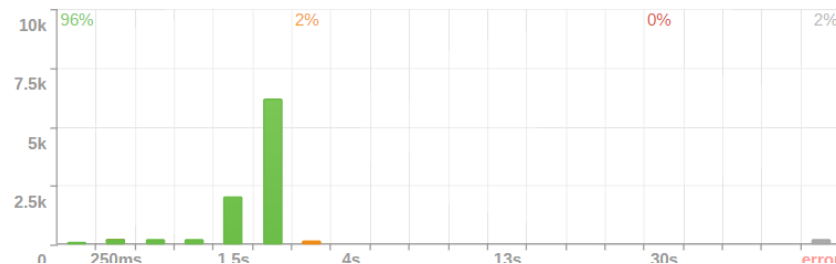
Meter: Network.WatercourseLink (wkid:3067, 256x256px, PNG, export) Response time (ms) average



Period: 1/15/2017 - 2/15/2017 [Download](#) [Zoom out](#) [Last day](#) [Last week](#) [Last month](#)

### Service availability

97.8% of the selected time period



### Response times

Response time (ms)	Request time	Result
53409	2/6/2017 2:25 PM	✓ open request
28192	2/6/2017 3:15 PM	✓ open request
21259	2/6/2017 1:45 PM	✓ open request
11514	1/19/2017 11:18 AM	✓ open request
6435	2/6/2017 2:45 PM	✓ open request
5403	2/1/2017 9:40 AM	✓ open request
4687	1/24/2017 8:39 AM	✓ open request
3825	2/15/2017 10:27 AM	✓ open request
3708	2/14/2017 5:41 PM	✓ open request
3537	2/15/2017 9:17 AM	✓ open request



## CRITERIA FOR QoS - CAPACITY

Setup

Test timeline

Result analysis

Name

Generate load for  with  ramp-up to maximum load  
*Specify the maximum loads for the included meters in the table below*

Simulation only

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

### Test setup assistant

#### Select layer to test

Layer	PhysicalWaters.Catchments.RiverBasin
Projection/CRS	EPSG:3067
Image size	256x256 px
Image format	image/png

Test name

Finish the assistant by giving the new test a name to help you find it later. Note that you can fine-tune the given test parameters and add new meters before you start the test.

### Services & meters to include

INSPIRE\_SYKE\_Hydrografia #5

Load (req/s)

Limit request to a bounding box:

Lower corner X:  Y:

Upper corner X:  Y:

INSPIRE\_SYKE\_Hydrografia #5

Load (req/s)

+ Add new meter





## CRITERIA FOR QoS - CAPACITY

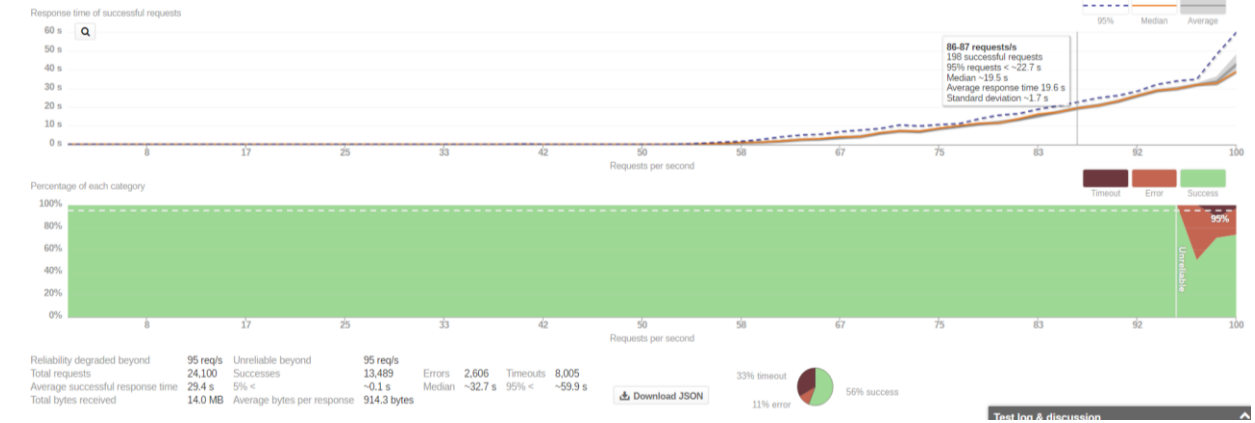
Setup | **Test timeline** | Result analysis | Test status: Setup | Preparing | In progress | **Completed**

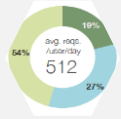
### Response time and status during test



### WFS DescribeFeatureType: tiger\_roads

Service: Spatineo Legacy Geoserver WFS #13985  
 Service endpoint: <http://ec2-54-73-122-159.eu-west-1.compute.amazonaws.com:8080/geoserver/ows>  
 Maximum load: 100 requests per second





**Actual QoS DELIVERED**

### Est. requests hindered by service interruptions



### Longest service interruptions

Date	Service title	Time
11/8	WMS Basemap service	2.5 h
11/20 ×	Ortophoto service (WMTS)	1.1 h
11/20	WMS Basemap service	18 min
11/7	WMS Basemap service	6 min

× marks announced interruptions

5 service interruptions with a combined duration of 12 hours, out of which 12 hours were unannounced


Monitoring the availability based both on the interruption records and the blocked requests due to service interruptions, shed some light on what is the level of service actually delivered to users

## COMMUNICATION WITH USERS


### Availability widgets

Example Widget


Preview

**Status now** Up   
Availability last 30 days  


99%

✓ No recent notifications  
Monitored by  **Spatineo**

Preview

**Status now** Up   
Availability last 30 days  

99%

✓ No recent notifications  
Monitored by  **Spatineo**

Announcements of maintenance or interruptions

Name

Widget enabled

Time period

Language

Color theme

Background color

Allowed only on domains

Separate domains with a comma (\*.mydomain.com, another.domain.info)

#### Widget loader snippet

```
<script type="text/javascript" src="https://monitor.spatineo.com/widgets/bootstrap.js"></script>
```

Copy this piece of code in the head of more Spatineo widgets. Note that JavaScript order is important to display the widget.

#### Widget element snippet

```
<div class="spatineo-widget" data-widgetid="200-125-5450fec54e36fd5f1cea8b82"></div>
```

Add this code inside the content part of the widget. Note that you don't have to update the widget ID.



## COMMUNICATION WITH USERS




Liikennevirasto

Service status




### Availability last 30 days

### Availability last 12 months




Liikennevirasto avoin WMS

Status now **Up**   
 Availability last 30 days  
 98%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto avoin WFS

Status now **Up**   
 Availability last 30 days  
 98%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto avoin WMS

Status now **Up**   
 Availability last 12 months  
 96%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto avoin WFS

Status now **Up**   
 Availability last 12 months  
 98%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto rajoitettu WMS

Status now **Up**   
 Availability last 30 days  
 98%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto rajoitettu WFS

Status now **Up**   
 Availability last 30 days  
 98%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto rajoitettu WMS

Status now **Up**   
 Availability last 12 months  
 97%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto rajoitettu WFS

Status now **Up**   
 Availability last 12 months  
 98%  
 ✓ No recent notifications  
 Monitored by 




FTA INSPIRE - View Service (WMS) for Transport Networks

Status now **Up**   
 Availability last 30 days  
 98%  
 ✓ No recent notifications  
 Monitored by 




FTA INSPIRE - Download Service (WFS) for Transport Networks

Status now **Up**   
 Availability last 30 days  
 98%  
 ✓ No recent notifications  
 Monitored by 


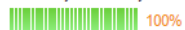

FTA INSPIRE - View Service (WMS) for Transport Networks

Status now **Up**   
 Availability last 12 months  
 96%  
 ✓ No recent notifications  
 Monitored by 




FTA INSPIRE - Download Service (WFS) for Transport Networks

Status now **Up**   
 Availability last 12 months  
 96%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto WMTS

Status now **Up**   
 Availability last 30 days  
 100%  
 ✓ No recent notifications  
 Monitored by 




Liikennevirasto Primar WMS

Status now **Up**   
 Availability last 30 days  
 99%  
 ✓ No recent notifications  
 Monitored by 

Liikennevirasto WMTS

Status now **Up**   
 Availability last 12 months  
 98%  
 ✓ No recent notifications  
 Monitored by 

Liikennevirasto Primar WMS

Status now **Up**   
 Availability last 12 months  
 98%  
 ✓ No recent notifications  
 Monitored by 



**TRENDS AFFECTING THE SERVICES**

**Most used services**

Service title	Requests	Users	Transfer	Type	Service ID
National Mapping Agency basemaps	22M	62k	51 GiB	WMTS	#1
NMA Ortophoto service	1.5M	5.1k	2.4 GiB	WMS	#2
NWA combined for mobile access	251k	1.3k	431 MiB	WFS	#3

**Services with the biggest speed changes**

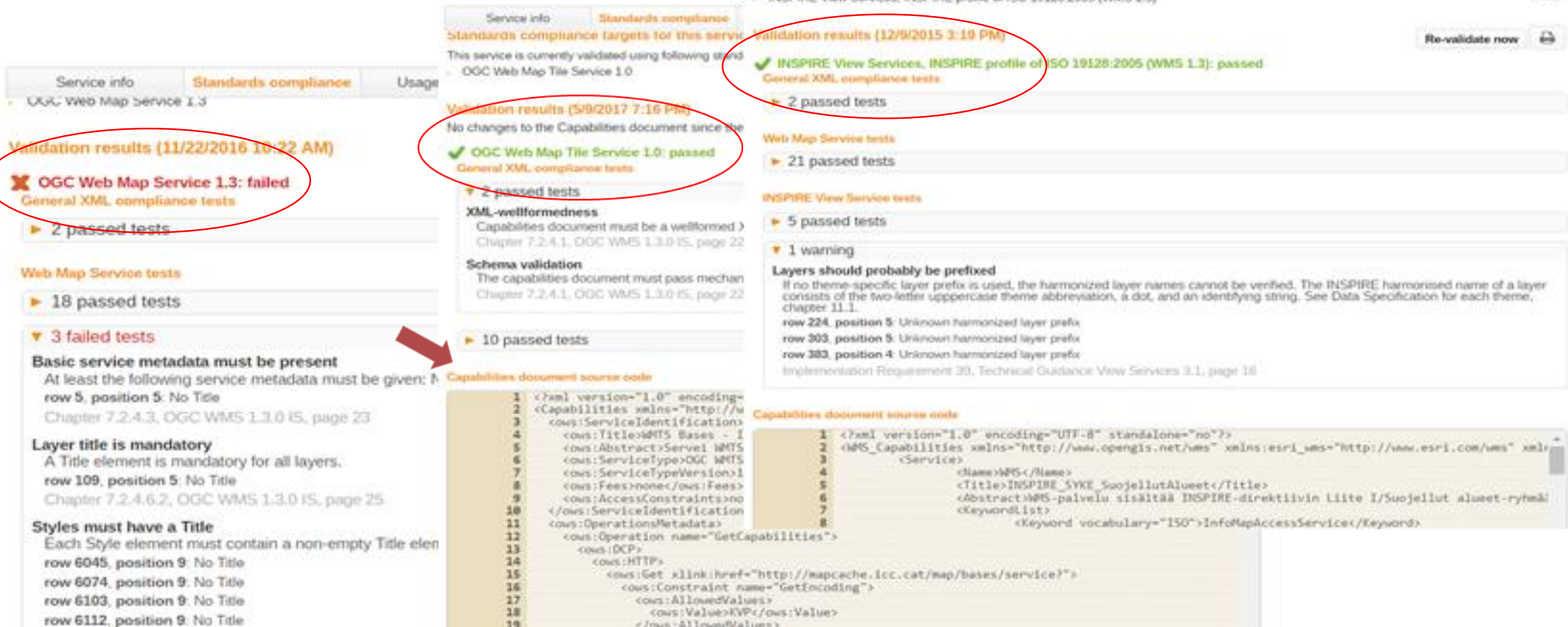
Compared to Oct 2015

Service title	Response time		No. of users	
NMA Ortophoto service	460 ms	-7.5%	41k	+5.4%
National Mapping Agency basemaps	2 sec	-6.1%	16k	-2.1%
NWA combined for mobile access	252 ms	-1.1%	16k	+10%

Combining the information of the most popular services with those with biggest changes in speed in the same period, let us do correlations that help making more effective decisions by identifying the most likely origin of the performance issues



## VALIDATE WITH OGC/INSPIRE



**Standards compliance targets for this service**

This service is currently validated using following standardization test suites:

- INSPIRE View Services, INSPIRE profile of ISO 19128:2005 (WMS 1.3)

**Validation results (12/9/2015 3:19 PM)**

- INSPIRE View Services, INSPIRE profile of ISO 19128:2005 (WMS 1.3): passed

**General XML compliance tests**

- 2 passed tests

**Web Map Service tests**

- 21 passed tests

**INSPIRE View Service tests**

- 5 passed tests
- 1 warning

**Layers should probably be prefixed**

If no theme-specific layer prefix is used, the harmonized layer names cannot be verified. The INSPIRE harmonised name of a layer consists of the two-letter uppercase theme abbreviation, a dot, and an identifying string. See Data Specification for each theme, chapter 11.1.

- row 224, position 5: Unknown harmonized layer prefix
- row 303, position 5: Unknown harmonized layer prefix
- row 383, position 4: Unknown harmonized layer prefix

Implementation Requirement 20, Technical Guidance View Services 3.1, page 18

**Service info** | **Standards compliance** | Usage

URL: Web Map Service 1.3

**Validation results (11/22/2016 10:22 AM)**

- OGC Web Map Service 1.3: failed

**General XML compliance tests**

- 2 passed tests

**Web Map Service tests**

- 18 passed tests

**3 failed tests**

**Basic service metadata must be present**

At least the following service metadata must be given:

- row 5, position 5: No Title

Chapter 7.2.4.3, OGC WMS 1.3.0 IS, page 23

**Layer title is mandatory**

A Title element is mandatory for all layers.

- row 109, position 5: No Title

Chapter 7.2.4.6.2, OGC WMS 1.3.0 IS, page 25

**Styles must have a Title**

Each Style element must contain a non-empty Title element.

- row 6045, position 9: No Title
- row 6074, position 9: No Title
- row 6103, position 9: No Title
- row 6112, position 9: No Title

**Standards compliance**

**Standards compliance targets for this service**

This service is currently validated using following standardization test suites:

- OGC Web Map Tile Service 1.0

**Validation results (5/9/2017 7:16 PM)**

No changes to the Capabilities document since the last validation.

- OGC Web Map Tile Service 1.0: passed

**General XML compliance tests**

- 2 passed tests

**XML-wellformedness**

Capabilities document must be a wellformed XML document.

Chapter 7.2.4.1, OGC WMS 1.3.0 IS, page 22

**Schema validation**

The capabilities document must pass mechanical validation.

Chapter 7.2.4.1, OGC WMS 1.3.0 IS, page 22

- 10 passed tests

**Capabilities document source code**

```
1 <?xml version="1.0" encoding="UTF-8" standalone="no"?>
2 <Capabilities xmlns="http://www.opengis.net/wms" xmlns:esri_wms="http://www.esri.com/wms" xmlns:ogc="http://www.opengis.net/ogc" >
3   <Service>
4     <Name>WMS</Name>
5     <Title>INSPIRE_5YKE_SuojellutAlueet</Title>
6     <Abstract>WMS-palvelu sisältää INSPIRE-direktiivin Liite I/Suojellut alueet-ryhmän</Abstract>
7     <ServiceType>OGC WMS</ServiceType>
8     <ServiceTypeVersion>1.0</ServiceTypeVersion>
9     <Fees>none</Fees>
10    <AccessConstraints>no</AccessConstraints>
11  </ows:ServiceIdentification>
12  <ows:OperationsMetadata>
13    <ows:Operation name="GetCapabilities">
14      <ows:DCP>
15        <ows:HTTP>
16          <ows:Get xlink:href="http://mapcache.icc.cat/map/Bases/service?">
17            <ows:Constraint name="GetEncoding">
18              <ows:AllowedValues>
19                <ows:Value>KVP</ows:Value>
20              </ows:AllowedValues>
21            </ows:Get>
22          </ows:HTTP>
23        </ows:DCP>
24      </ows:Operation>
25    </ows:OperationsMetadata>
26  </ows:Capabilities>
27 </Capabilities>
```



**VALIDATE WITH  
OGC/INSPIRE**

Open Geospatial Consortium Inc.

Date: 2006-03-15

Reference number of this document: OGC® 06-042

Version: 1.3.0

Category: OpenGIS® Implementation Specification

Editor: Jeff de la Beaujardiere

## **OpenGIS® Web Map Server Implementation Specification**

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## VALIDATE WITH OGC/INSPIRE

### Capabilities document source code

```

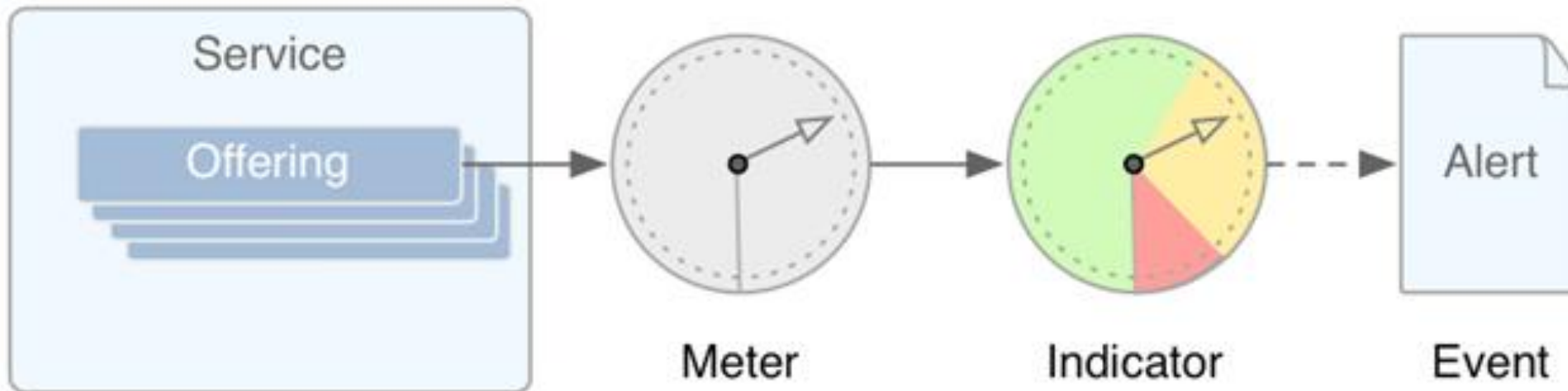
211         <Format>image/png</Format>
212         <OnlineResource xlink:href="http://paikkatieto.ympari
213         </LegendURL>
214     </Style>
215     <MaxScaleDenominator>18898809.523810</MaxScaleDenominator>
216     <MinScaleDenominator>9449.404762</MinScaleDenominator>
217 </Layer>
218 <Layer queryable="1">
219     <Name>Reporting.WFDLake</Name>
220     <Title><![CDATA[VPD Järvi]]></Title>
221     <Abstract><![CDATA[VPD Järvi]]></Abstract>
222     <CRS>CRS:84</CRS>
223     <CRS>EPSG:4326</CRS>
224     <CRS>EPSG:2393</CRS>
225     <CRS>EPSG:4258</CRS>
226     <CRS>EPSG:3034</CRS>
227     <CRS>EPSG:3035</CRS>
228     <CRS>EPSG:3046</CRS>
229     <CRS>EPSG:3047</CRS>
230     <CRS>EPSG:3048</CRS>
231     <CRS>EPSG:3067</CRS>
232     <EX_GeographicBoundingBox>
233     <westBoundLongitude>16.384607</westBoundLongitude>
234     <eastBoundLongitude>33.079527</eastBoundLongitude>
235     <southBoundLatitude>59.724297</southBoundLatitude>
236     <northBoundLatitude>70.035181</northBoundLatitude>
237 </EX_GeographicBoundingBox>
238     <BoundingBox CRS="CRS:84" maxx="33.079527" maxy="70.035181" minx="16.
239     <BoundingBox CRS="EPSG:4326" maxx="70.035181" maxy="33.079527" minx="
240     <BoundingBox CRS="EPSG:2393" maxx="7773112.500000" maxy="3732599.3370
241     <BoundingBox CRS="EPSG:4258" maxx="70.035181" maxy="33.079527" minx="

```





## METERS/INDICATORS



The limit values of error % and response time for a service are shown through an indicator. The indicators take the information produced by a meter and and aufer the value of the current status of QoS for a service, based on the results of the monitoring produced by the meter



## LIMITS/ALERTS

When an indicator change the status of the QoS from Ok to “Warning” or “Error”, it creates an alert and records the alert in the monitoring database

### Alert settings

Meter name Network.HydroNode (wkid:3067, 256x256px, PNG, export)

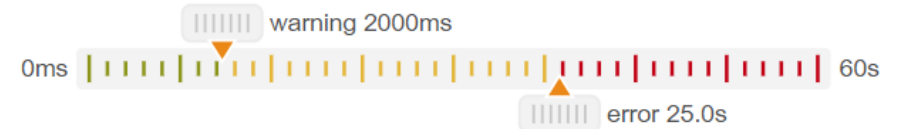
Indicator name

### Error & warning thresholds



#### 1h average response time

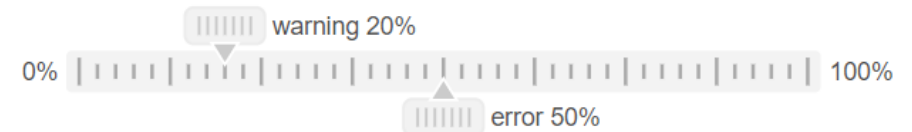
use to trigger alerts



Note: You can also use the above settings to change the warning and alert coloring of the meter's response time graphs in the application.

#### % of errors in 1h

use to trigger alerts



### Alert message recipients

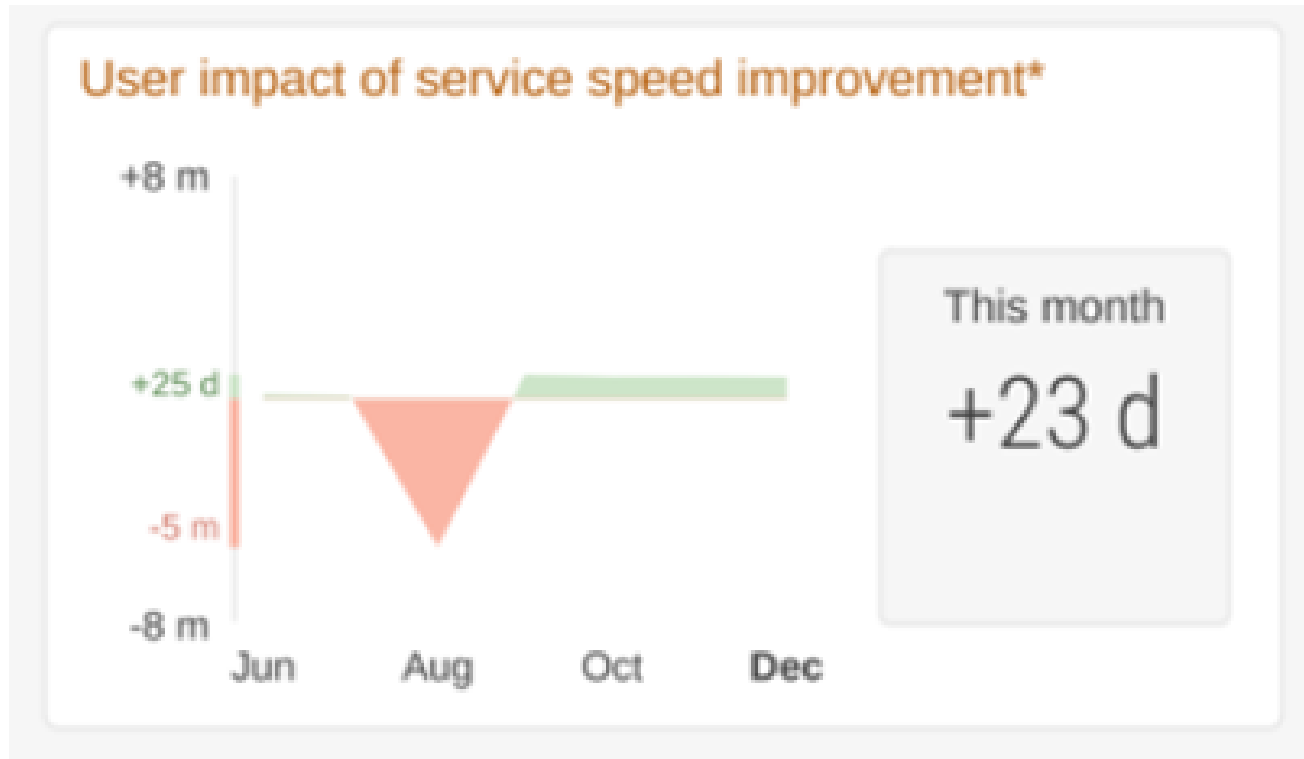
SMS

Email

Cancel Ok



IMPACT OF IMPROVEMENTS



A very useful measurement is the impact of the amount of time saved by users. Graph shows the variation on a specific month against the average over the previous 6 months (based on the response time multiplied by the number of monthly requests)



## CONCLUSIONS

- Without a high level of availability of services, the effort made to build a SDI has low value
- Data driven impact assessment to track the progress reveals how successful the implementation is
- Assure availability, performance and capacity levels, while optimizing investments
- Intelligence analysis with good visualization of indicators aligned with your strategy is key to succeed
- Prove the value of spatial services, promoting development!







**Děkuji!**

**Fabio Bittencourt**  
**fabio.bittencourt@spatineo.co**



**m**

**S 58 40 632 6828**

**fabioavbit**

