



TinyOWS - The High Performance WFS-T server

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Oslandia

French SME **Open Source GIS company**

PostGIS Experts: Vincent Picavet and Olivier Courtin

Main Focus on:

- **Spatial Databases** (PostGIS, SpatiaLite)
- OGC, ISO, INSPIRE **Standards**
- **Complex analysis**: Routing, Network and Graphs Solutions
- GIS Desktop client with **QGIS**

Oslandia Ecosystem:



Presentation Plan

TinyOWS brief presentation

Performances Thoughts

OGC CITE unit tests

New Features

Future and Conclusions

TinyOWS brief presentation

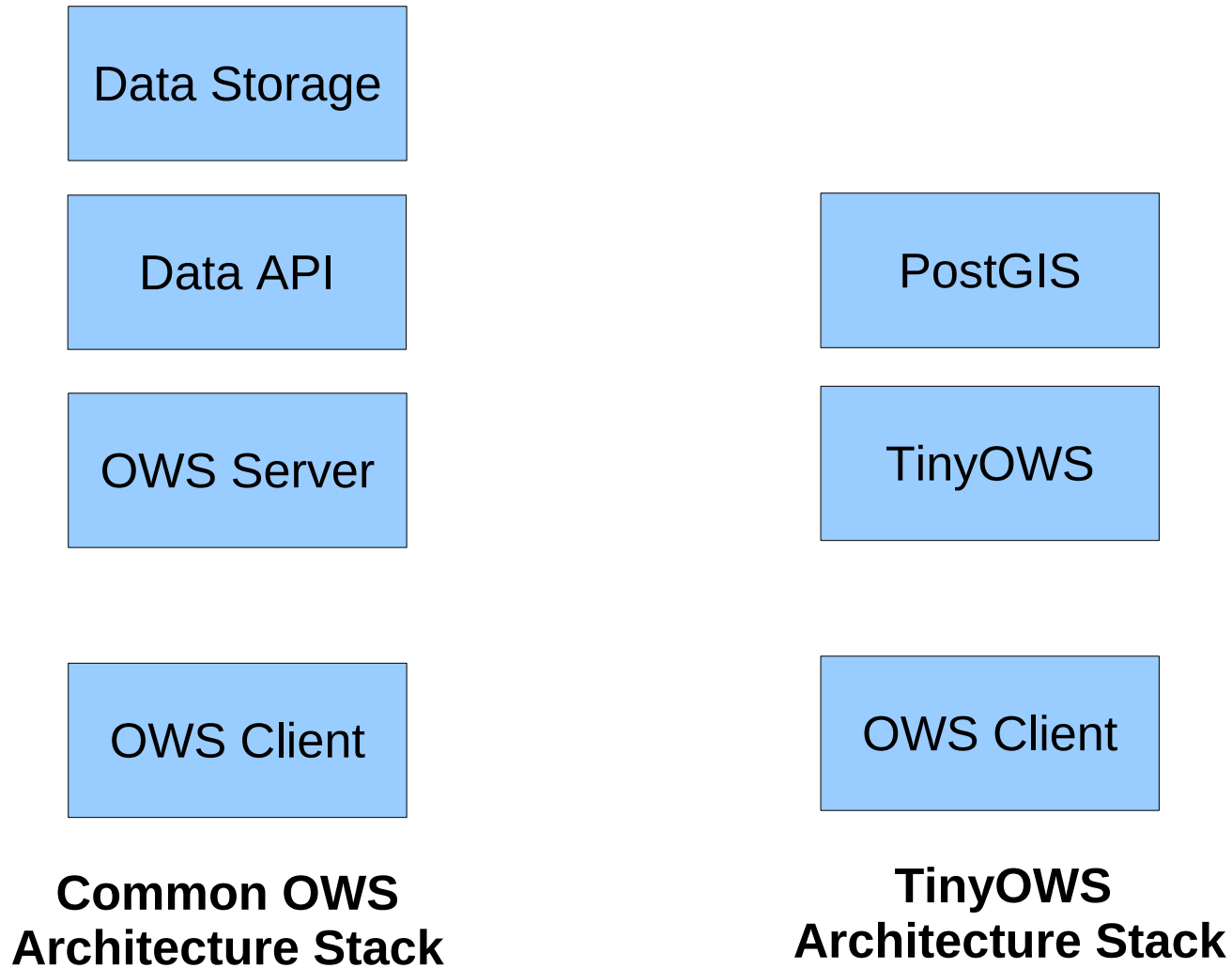
What is TinyOWS ?

- An High performance Web Feature Service Server (WFS-T)
- Open Source Software
(MIT Licence)
- OGC oriented, strict standard implementation
(CITE unit test based)
- CGI or FAST CGI application
(ANSI C based)

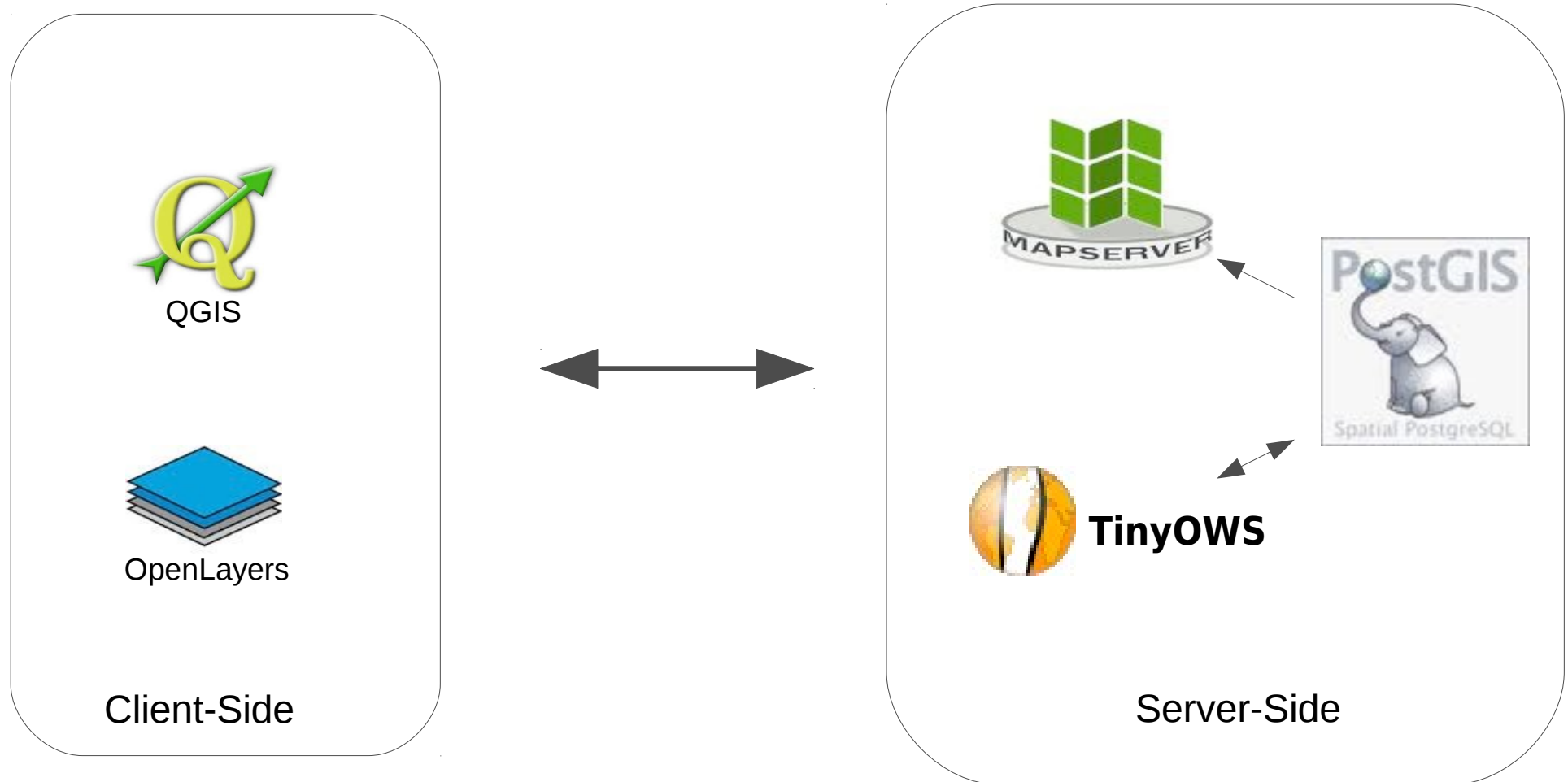
Why TinyOWS ?

- No WFT-T in MapServer
- Do not want to install and maintain Tomcat only for GeoServer
- WFS-T really close to spatial database concepts
PostGIS is a really good choice
- WFS exchanges really need high performances

TinyOWS: reducing the stack



TinyOWS FOSS4G Ecosystem



How does TinyOWS contribute to PostGIS ?

ST_AsGeoJSON

(PostGIS 1.3.5)

Add GeoJSON export function

ST_AsGML

(PostGIS 1.4 to 2.0)

Add precision handling

Add lat/lon GML 3 axis order support

Add OGC urn long format option (urn:ogc:def:crs:EPSG::4326)

ST_GeomFromGML

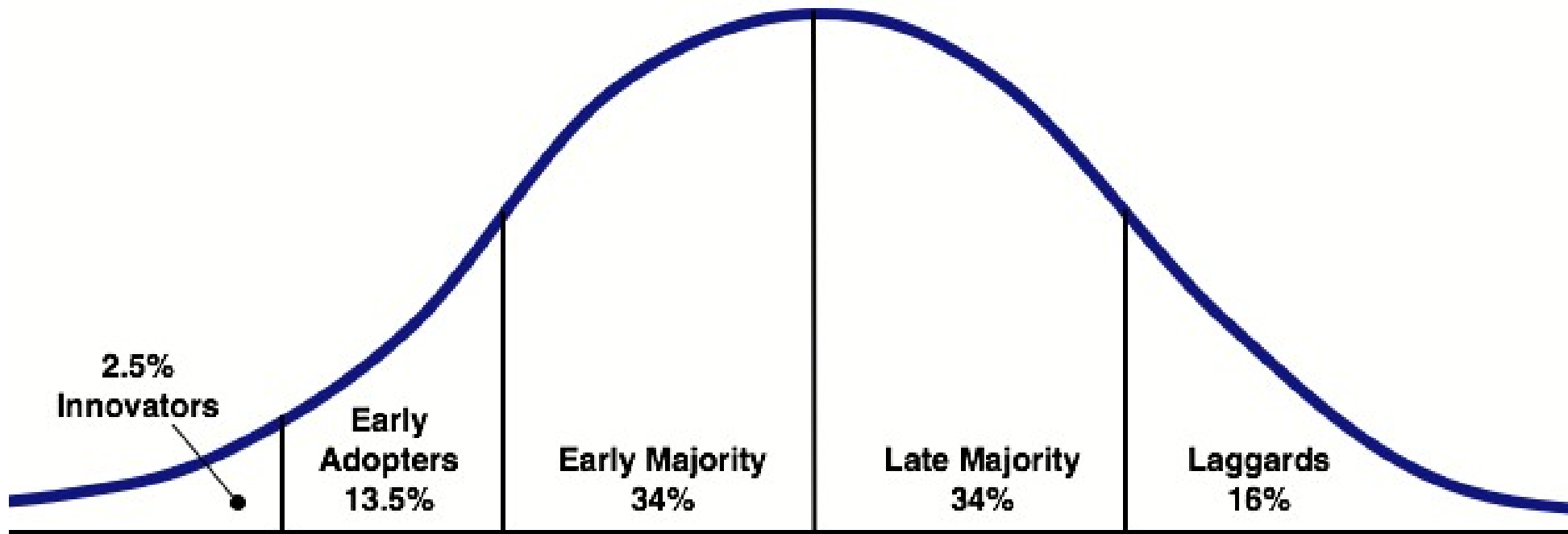
(PostGIS 1.5)

Add GML parser

Support: GML 2.1.2, GML 3.1.1 SF-2, GML 3.2.1 namespace

=> TinyOWS requires (at least) PostGIS 1.5

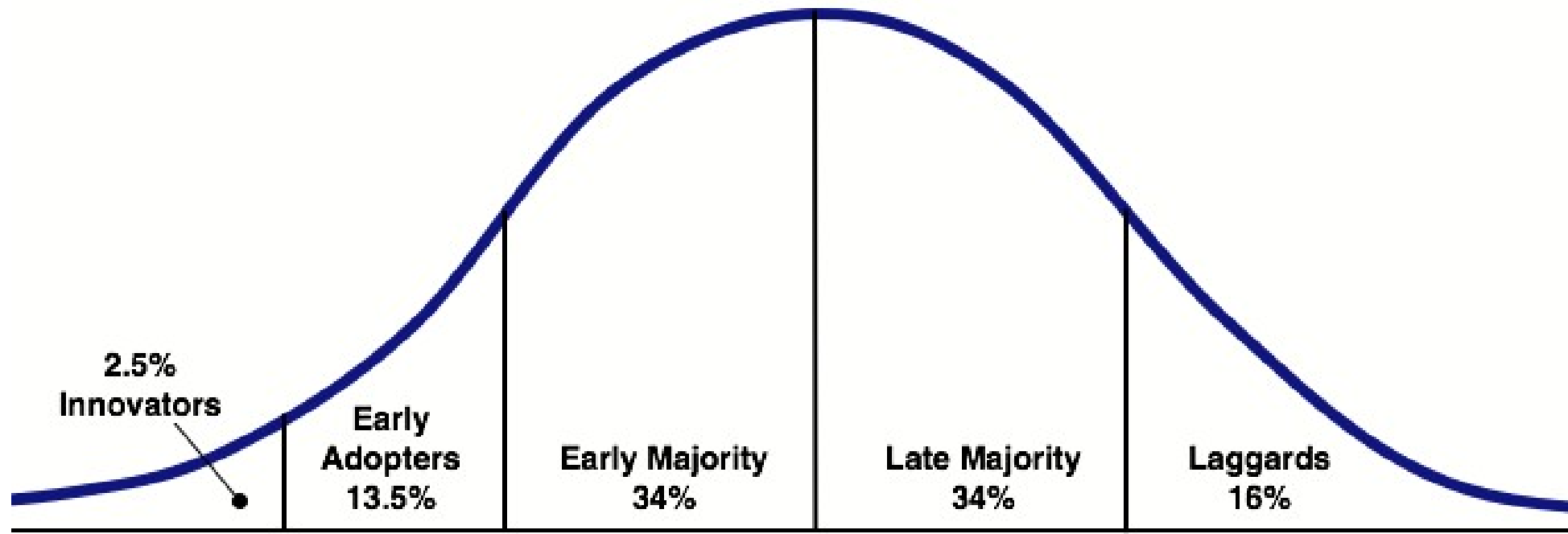
TinyOWS Community



Source: Everett Rogers, Diffusion of Innovations model

TinyOWS users still in
early adopters groups

MapServer TinyOWS Community



Source: Everett Rogers, Diffusion of Innovations model

Now to reach the masses...
with help from MapServer community,

TinyOWS will become, as soon as MapServer 6.2 : **MapServer TinyOWS !**

MapServer Umbrella ?

What does it change ?

- TinyOWS on MapServer dev platform
=> mailing-list, Web Site, GIT, RFC...
- TinyOWS is now «MapServer TinyOWS»
- MapServer PSC is now in charge for TinyOWS orientations

What doesn't change ?

- TinyOWS will still be available as a standalone app
- Olivier will continue leading the project

What's new ?

- MapServer Suite package will provide both apps at once

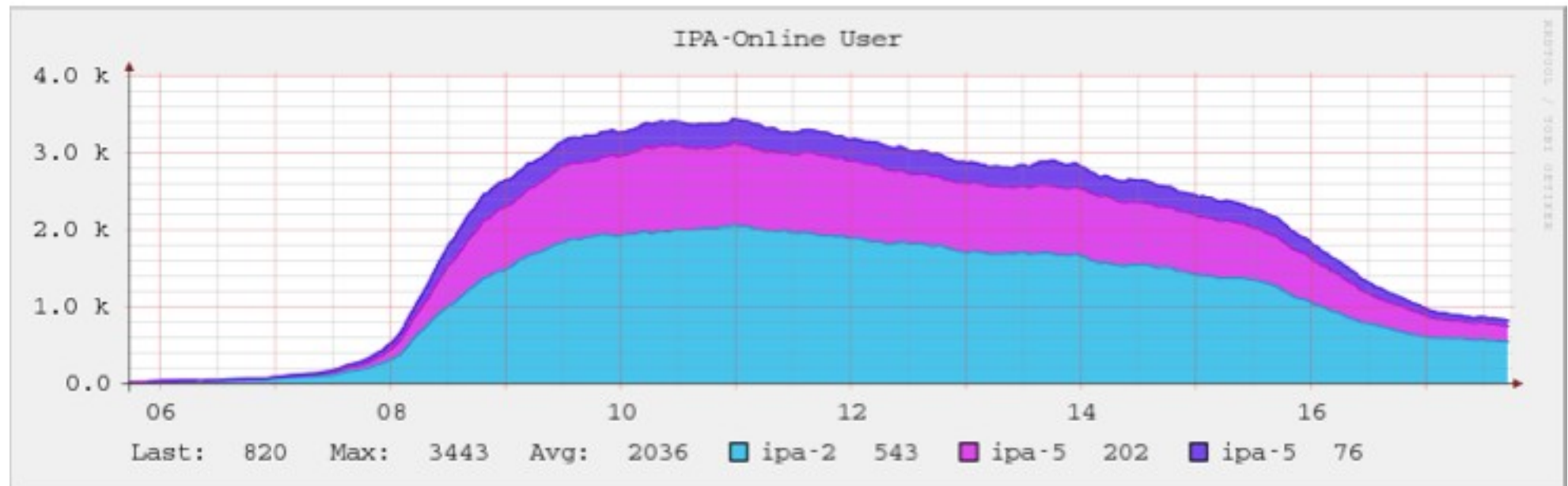
TinyOWS in real world

Romanian Paying Agency for Agriculture (APIA)

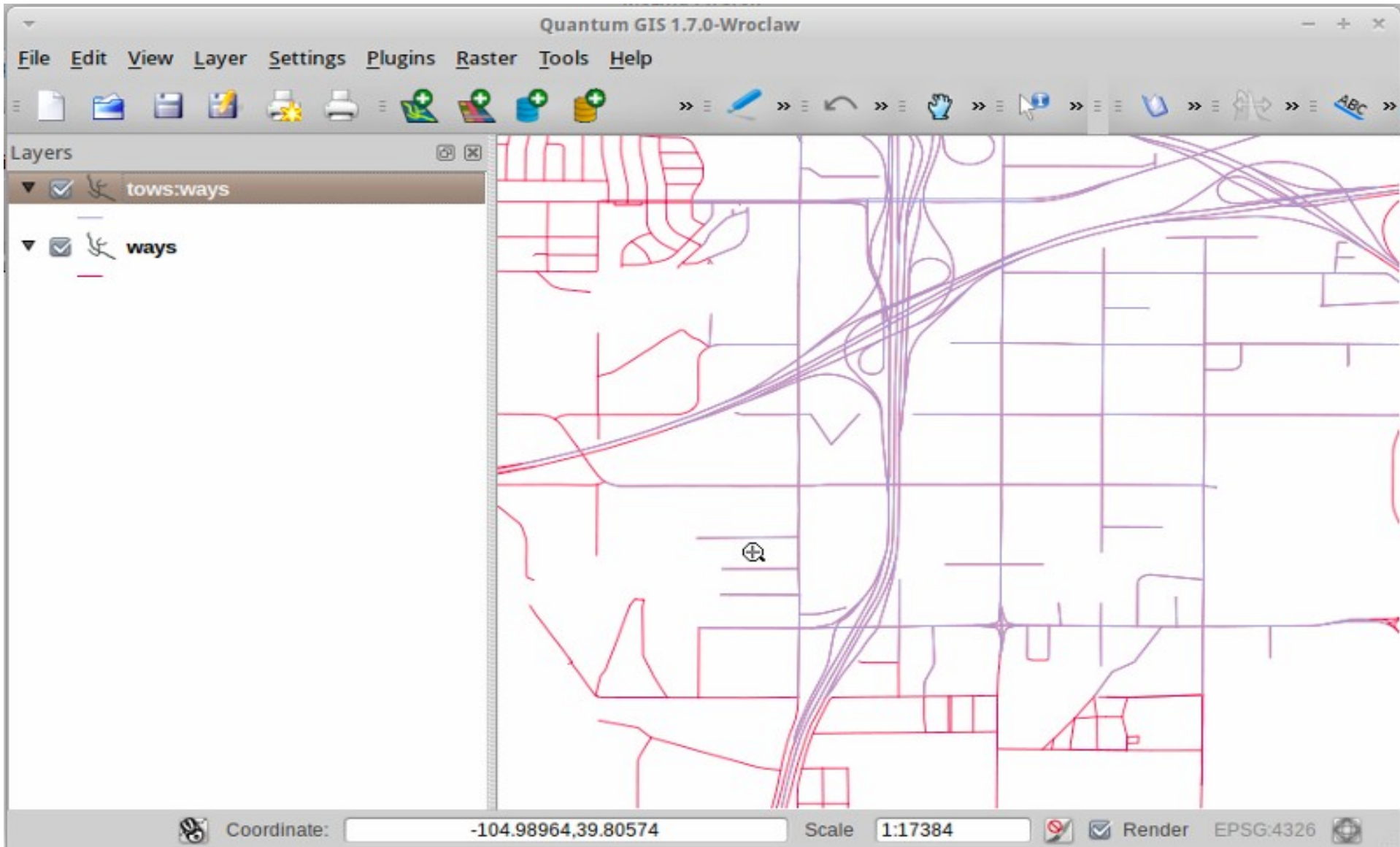
<http://www.apia.org.ro>



Allow farmers (~1.100.000) to get EU subsidies by digitizing their parcels (~6.500.000)
(up to 3.400 concurrent users)



OsGeo Live DVD includes TinyOWS and QGIS



Thanks to Pirmin Kalberer !

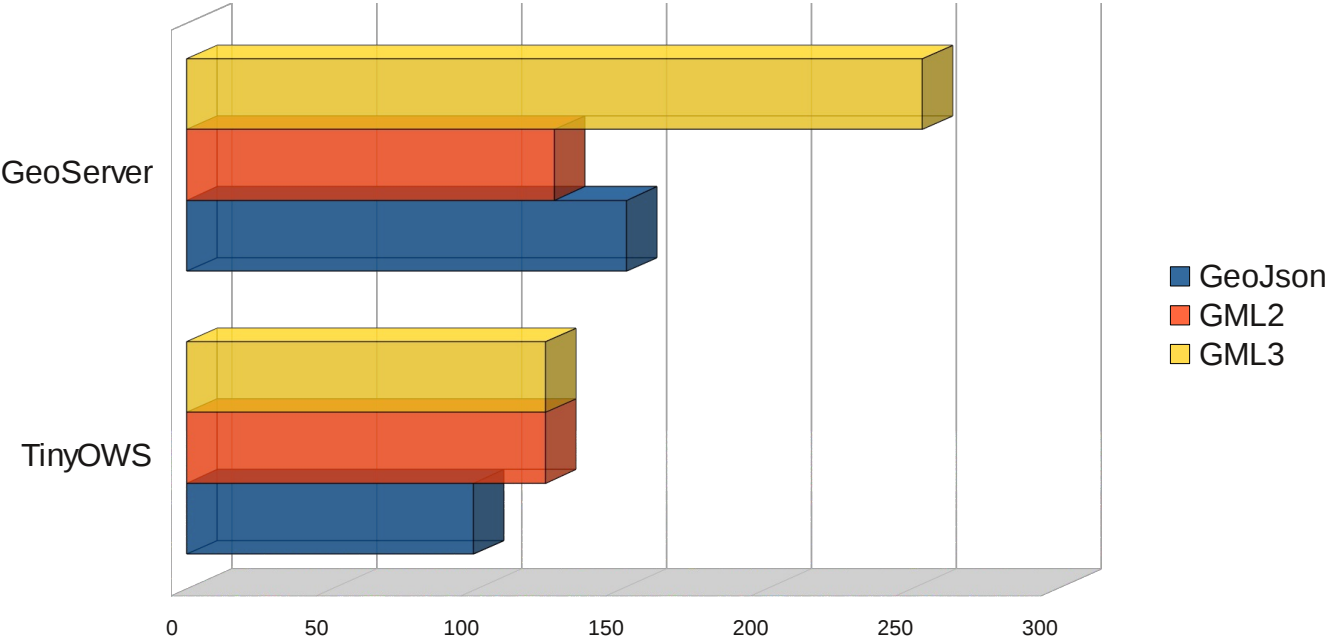
Performance Thoughts

Synthetic GetFeature Requests Bench

5000 WFS 1.1 GetFeature requests
(2500 based on different BBOX coordinates,
2500 based on a different single Id to retrieve)

Total time elapsed in seconds :

	GML 3	GML 2	GeoJson
TinyOWS	124	124	99
GeoServer	254	127	152



Full technical instructions are available here:
<http://tinyows.org/trac/wiki/ComparativeBench>

(Core 2 Duo 2.33GHz – 2Go RAM)

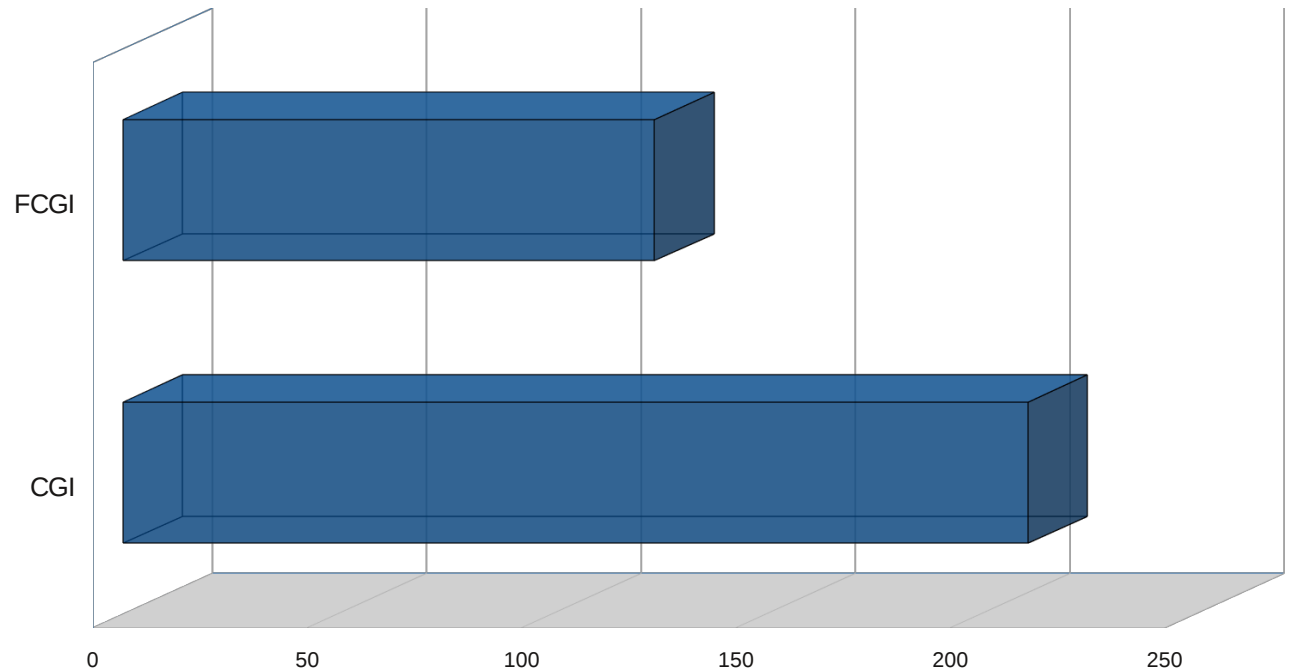
Fast CGI mode (since 0.9)

Ability to have a persistent layer:

- PostgreSQL connection
- Layers structure kept in memory

5000 GetFeature requests

TinyOWS CGI	211 s
TinyOWS FCGI	124 s



Next step, on this topic, will be Apache Module implementation (and nginx ?).

XSD Schema caching (since 1.0)

In WFS Transaction operation

XML user requests should be checked against an XSD Schema

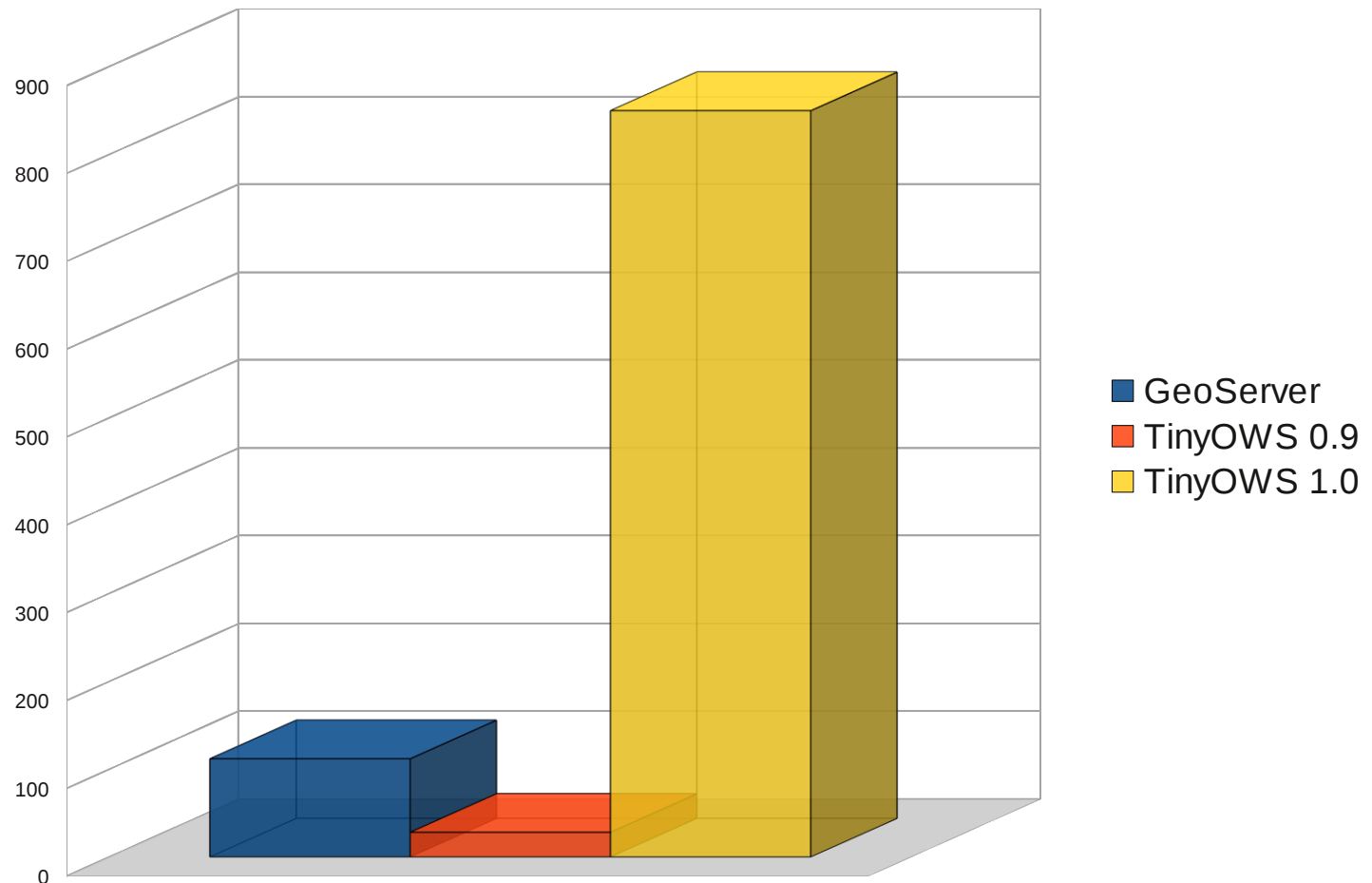
XSD Schema is now computed once
(in Fast-CGI mode)

Performances improved **40x**

Single basic feature to insert
(500 requests / concurency 20)

Requests per second:

GeoServer	125
TinyOWS 0.9	28
TinyOWS 1.0	807



Performance Thoughts

CPU is the bottleneck

=> separate Gzip compression
and WFS processing on two different CPU or box.

PostgreSQL/PostGIS is not the problem
a single instance could serve several WFS

Next step : Apache or/and Nginx Module implementation

OGC CITE Tests

OGC CITE Tests



OGC CITE provides a unit tests platform

Goal : help developpers improve real world interoperability

~1000 unit tests available for both WFS 1.1.0 and WFS 1.0.0

<http://cite.opengeospatial.org/te2/>

- ☐ ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc16.3 \(View Details\)](#): Passed
 - ☒ [Test ctl:assert-xpath \(View Details\)](#): Passed
 - ☒ [Test ctl:SchematronValidatingParser \(View Details\)](#): Passed
- ☐ ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc16.5 \(View Details\)](#): Passed
 - ☒ [Test ctl:SchematronValidatingParser \(View Details\)](#): Passed
- ☐ ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc17.1 \(View Details\)](#): Passed
 - ☒ [Test ctl:assert-xpath \(View Details\)](#): Passed
- ☐ ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc18.1 \(View Details\)](#): Failed (Inherited Failure)
 - ☒ [Test ctl:SchematronValidatingParser \(View Details\)](#): Failed
- ☐ ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc16.4 \(View Details\)](#): Passed
 - ☒ [Test ctl:assert-xpath \(View Details\)](#): Passed
 - ☒ [Test ctl:SchematronValidatingParser \(View Details\)](#): Passed
- ☐ ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc19.1 \(View Details\)](#): Passed
 - ☒ [Test ctl:SchematronValidatingParser \(View Details\)](#): Passed
- ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc19.2 \(View Details\)](#): Passed
- ☒ [Test wfs:wfs-1.1.0-Basic-GetCapabilities-tc22.1 \(View Details\)](#): Passed
- ☐ ☒ [Test wfs:run-DescribeFeatureType-POST \(View Details\)](#): Passed
- ☐ ☒ [Test wfs:wfs-1.1.0-Basic-DescribeFeatureType-tc3.1 \(View Details\)](#): Passed

OGC CITE Tests

WFS 1.0.0 – Transaction – SF-0 Tests: r3

✓ Pass: 398 ⚠ Warning: 0 ✖ Fail: 0

WFS 1.1.0 – Transaction – SF-0 Tests: r9

✓ Pass: 549 ⚠ Warning: 0 ✖ Fail: 0

Nota: All CITE unit tests are also 'Valgrinded' to prevent memory leak

**Full OGC CITE compliancy:
a real achievement of 1.0 release !**

New features

MapFile parser (since 1.0)

Single MapFile to configure MapServer and TinyOWS

TinyOWS configure options mapped to MapFile syntax :

```
NAME 'France'
CONNECTIONTYPE postgis
CONNECTION "host=127.0.0.1 user=postgres password=postgres dbname=tinyows_demo
METADATA
    'wfs_title' 'France'
    'wfs_namespace_prefix' 'tows'
    'wfs_namespace_uri' 'www.tows.com'
    'wfs_srs' 'EPSG:27582'
    'tinyows_table' 'france'
    'tinyows_writable' '1'
    'tinyows_retrievable' '1'
END
DUMP TRUE
```

Known limitations:

- Only PostGIS CONNECTIONTYPE are handled
- Each CONNECTION string value in LAYER elements must be the same.
- MapFile PROJECTION content is not parsed, so use explicit wfs_srs
- MapFile FILTER is not parsed.

Several other (little) things

- GeoJson output format (since 0.9)
- Security Bug Fixes (since 1.0.0rc3)
- PostgreSQL VIEW storage support
- Encoding support
- Log Handling
- Handle PostGIS Geography
- Improve GetCapabilities performance

...

And a lot of bugfixes !

Future and Conclusions

Who contributes to TinyOWS 1.x releases?

Jukka Rahkonen	Interoperability and lat/lon issues
Boris Leukert	Performance issues
Even Rouault	SQL Injection vulnerability issues
Carlos Ruiz	Encoding support patch
Nicklas Aven	Performance issues
Assefa Yewondwossen	MS4W packaging
Pirmin Kalberer	OSGEO Live DVD integration
Serge Dikiy	PostgreSQL integration patches
Olivier Courtin	Main developer

And, for next release,
g what about you ?

MapServer TinyOWS Roadmap

- Enhance coverage of units tests (not only CITE ones)
- WFS 2.0.0 and INSPIRE compliancy (including versioning, paging...)
- Add new export formats: Shapefile, KML, GeoRSS...
- Apache and/or Nginx module support
- OGC Application Schema support
- OGC REST implementation
- Oracle Spatial and SpatiaLite support (and multi-db)
- OGC SOS-T support

Conclusions

TinyOWS was already a really good WFS technical choice

Even better with 1.0 release.

Next step : (really) enlarge the community

- Open to new contributors and patches
- Looking for funding

Questions

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