



# Optimized publishing of map and dataservices with GeoServer, GeoStyler and MapProxy

Till Adams, Marc Jansen, terrestris GmbH & Co. KG

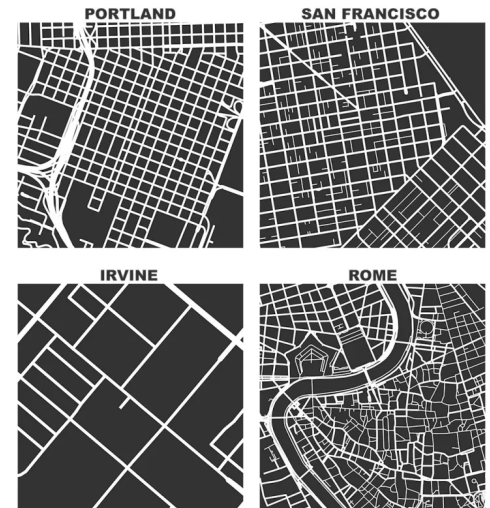


FOSS4G 2021, Buenos Aires 2021-09-30, 08:30–09:00, Buenos Aires



# Agenda – Which road do we take?

- About ...
  - ... the authors and presenters
  - ... this talk
- Components
- Optimization
  - Style
  - Performance
- Summary & Example



About ... the authors  
and presenters

# Till Adams

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- Chair of global FOSS4G 2016 in Bonn
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# Marc Jansen



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- General Manager terrestris & mundialis
- OSGeo charter member
- PSC / Core developer of
  - OpenLayers & GeoExt
  - Contributor to GeoStyler, react-geo & other
- ...Developer / technical background

# terrestris



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- [www.terrestris.de](http://www.terrestris.de)
- OpenSource GIS service provider, located in Bonn, Germany
- Planning, Development & Projects
- Consulting, Support & Trainees
- providing popular free **OSM-WMS** (worldwide)



... about this  
talk

Why this talk?

# Why this talk?

- This talk is for users, not so much for developers
- Thank god: Creation of a simple WMS with Open Source tools is easy today, but ... 🙏
  - Styling is *still* a Topic
  - Performance is *always* a Topic
- Setting up and well designed and fast WMS services are still a Topic

# Is this the one and only solution?

**No! Of course not!**

- There are many FOSS ways of achieving similar results
- This talk wants to share our experience and provide an insight into how we often solve problems



<http://densiaamelia.blogspot.com/2014/01/there-are-many-ways-to-go-to-rome-there.html>

# Scan the title for buzzw ... components

Optimized publishing of map and dataservices with



# GeoServer

- Java-based, OGC compliant Server for Geodata
- Well documented and powerful API
- Widely used in GIS world
- Integrated in many WebGIS frameworks (e.g. SHOGun)

[geoserver.org](https://geoserver.org)

 [geoserver](https://github.com/geoserver)

# GeoServer

## Input Files

- Vector files (e.g. Shape)
- RasterData (e.g. GeoTIFF)
- DataBase (e.g. PostGIS)
- Other Servers (e.g. WMS, WFS)

# GeoServer

## Output Services

- WebMapService (WMS)
  - Styling: StyledLayerDescriptor (SLD) and others
- WebFeature Service (WFS)
- WebCoverageService (WCS)
- WebProcessingService (WPS)

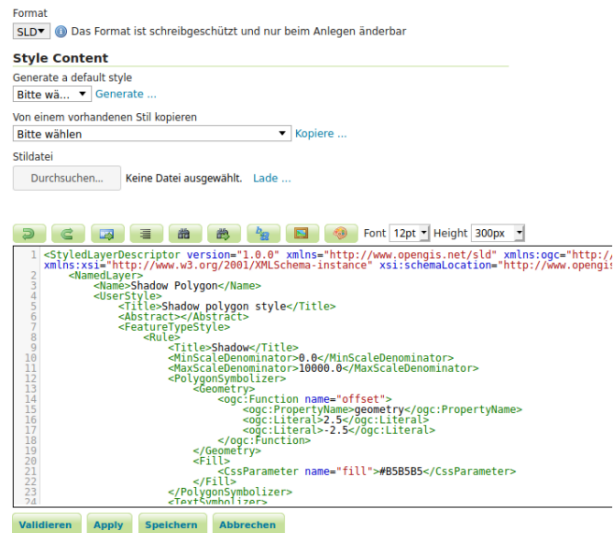


~~Optimized~~ publishing of map and data services :

Okay, you're done

# GeoServer – Styling Maps

- WebMapService (WMS)
  - Styling: StyledLayerDescriptor (SLD) et al.



# GeoStyler

- Ready-to-use map styling library
- Read & write of various style formats
- Read of various data formats
- Development & integration of own parsers
- Support for raster data
- => Later today dedicated talk by J. Suleiman

[geostyler.org](https://geostyler.org)

 [geostyler](https://github.com/geostyler)

# GeoStyler

## Input Features

- Filters & Classifications
- Scale Ranges
- Calculation of overlaps
- StandAlone (UI) / Integrated

# GeoStyler

## Read/Write formats

- Styled Layer Descriptor (SLD)
- QGIS Style
- OpenLayers Style
- MapBox Style
- Mapserver Mapfiles (=> talk by J. Teuscher)
- ... others planned

# GeoStyler

## User Interface Elements (UI)

Symbolizer Editor

0 Add

Kind: Mark

Symbol: Circle

Radius: 5

Fill-Color: Change

Fill-Opacity: 1.00

Stroke-Color: Change

Stroke-Width: 2

Stroke-Opacity: 1.00

Rotation: 0

Symbol: Triangle

Filter Editor

AND

GEN (string) != Hamburg

pop (number) < 10000000

OR

dense (number) > 10

dense (number) < 10000

Code Editor


Format: SLD Style Parser


```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <StyledLayerDescriptor version="1.0.0"
  xsi:schemaLocation="http://www.opengis.net/sld
  StyledLayerDescriptor.xsd" xmlns="http://www.opengis.net/sld"
  xmlns:ogc="http://www.opengis.net/ogc"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
3   <NamedLayer>
4     <Name>Demo Style</Name>
5     <UserStyle>
6       <Name>Demo Style</Name>
7       <Title>Demo Style</Title>
8       <FeatureTypeStyle>
9         <Rule>
10          <Name>Rule 1</Name>
11          <PointSymbolizer>
12            <Graphic>
13              <Mark>
14                <WellKnownName>circle</WellKnownName>
15                <Fill>
16                  <CssParameter name="fill">#1b0978</CssParameter>
17                </Fill>
18                <Stroke>
19                  <CssParameter name="stroke">#03010e</CssParameter>
20                  <CssParameter name="stroke-width">2</CssParameter>
21                  <CssParameter name="stroke-opacity">1</CssParameter>
22                </Stroke>
23              </Mark>
```

Copy to Clipboard Save as File

# GeoStyler

## Standalone

Docs 









Language: EN DE ES Compact: ☒ Symbolizer Renderer: OpenLayers SLD Load Style:


Load Data: WFS Data Parser Examples


Name: Population Quantiles


Classification

<input checked="" type="checkbox"/>		Name	Filter	Min. Scale	Max. Scale	$\Sigma$	
<input checked="" type="checkbox"/>	<div><div>^</div><div>v</div></div>	 679000 - 2071000	pop >= '679000' AND			4	0
<input checked="" type="checkbox"/>	<div><div>^</div><div>v</div></div>	 2071000 - 3228500	pop >= '2071000' AND			4	0
<input checked="" type="checkbox"/>	<div><div>^</div><div>v</div></div>	 3228500 - 6646250	pop >= '3228500' AND			4	0
<input checked="" type="checkbox"/>	<div><div>^</div><div>v</div></div>	 6646250 - 17890000	pop >= '6646250' AND			4	0

+ Add Rule


 Clone Rules

 Remove Rules

 Multi edit

> Code Editor

Preview Map



# GeoStyler

## GeoServer Plug In



GeoServer 2.16.x User Manual » Community modules » GeoStyler Extension

### GeoStyler Extension

This plugin gives an extra tab in the style editor with a graphical style editor.

The [GeoStyler](#) is a set of JavaScript packages that can be used to edit styles.

When editing a style in the GeoStyler the SLD code editor is automatically disabled. You can edit the style and then apply/save it as usual.

If you run into trouble using the GeoStyler module or have some suggestions, please contact the [GeoStyler repository](#).

- [Installing the GeoStyler extension](#)

Previous: [MapML](#)

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### Style Editor - tiger\_roads

Edit the current style. The editor can provide syntax highlighting and automatic formatting. Click on the "validate" button to verify the style is a valid SLD document.

Data Publishing Layer Preview Layer Attributes **GeoStyler**

Preview on layer: tiger\_roads

Name: area landmarks

<input type="checkbox"/>		Name	Filter	Min. Scale	Max. Scale
<input type="checkbox"/>				1:32000	
<input type="checkbox"/>					1:32000
<input type="checkbox"/>					1:32000
<input type="checkbox"/>		style Fea			1:32000

+ Add Rule Clone Rules Remove Rules Multi edit

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <StyledLayerDescriptor version="1.0.0"
3   xsi:schemaLocation="http://www.opengis.net/sld StyledLayerDescriptor.xsd"
4   xmlns="http://www.opengis.net/sld" xmlns:ogc="http://www.opengis.net/ogc"
5   xmlns:xlink="http://www.w3.org/1999/xlink"
6   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
7   <Name>area landmarks</Name>
8   <UserStyle>
9     <FeatureTypeStyle>
10       <FeatureTypeName>Feature</FeatureTypeName>
11       <Rule>
12         <MinScaleDenominator>32000</MinScaleDenominator>
13         <LineSymbolizer>
14           <Stroke>
15             <CssParameter name="stroke">
16               <ogc:Literal>#666666</ogc:Literal>
17             </ogc:Literal>
18             <CssParameter name="stroke-width">
19               <ogc:Literal>2</ogc:Literal>
20             </ogc:Literal>
21           </Stroke>
22         </LineSymbolizer>
23       </Rule>
24     </FeatureTypeStyle>
25   </UserStyle>
26   <Rule> <!-- this line drawn first -->
```

Validate Apply Submit Cancel



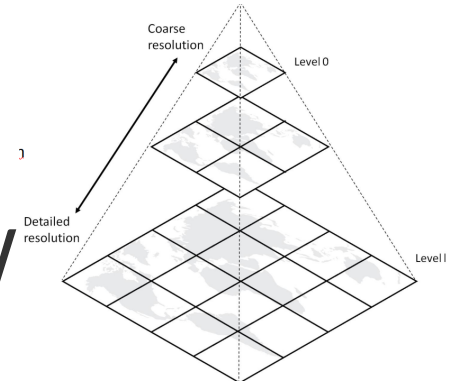
~~Optimized~~ publishing of map and data services :

But now, you're done

# Caching Maps

Clever if ...

- Data doesn't change too often
- Many requests expected
- Many layers (e.g. grouped layers)
- Performance problems
- Restricted hardware capabilities of (W



# GeoWebCache

it's integrated in GeoServer

- Java-based tiling server (caching application)
  - Sources: WMS
  - Interfaces: WMS-C, WMTS, TMS, Google Maps KML, Virtual Earth
- Well documented and powerful API
- Integrated in GeoServer

[geowebcache.org](http://geowebcache.org)

 [geowebache](#)

# MapProxy

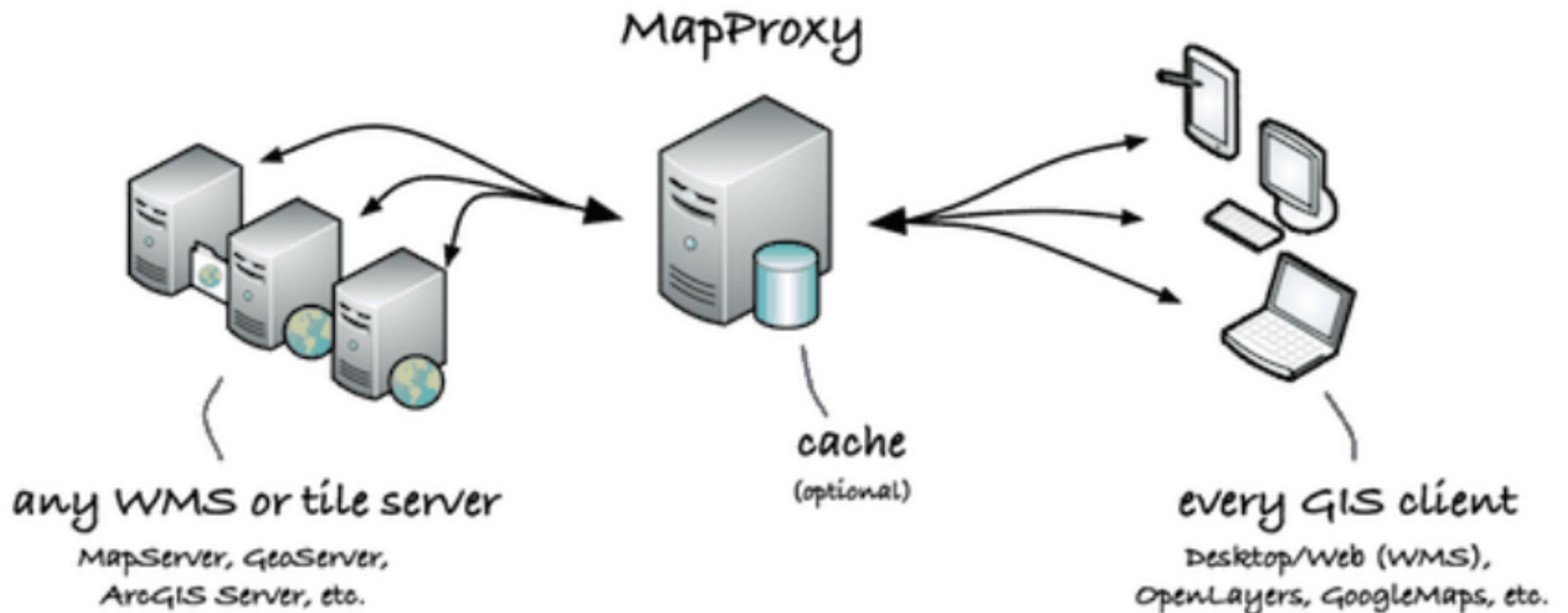
## Standalone

- Proxy for geospatial data (Caching engine)
  - Sources: WMS, WMTS, Mapserver, Mapnik, Tilecache GoogleMaps, BingMaps, ArcGIS REST
  - Interfaces: WMS-C, TMS, WMTS, KML SuperOverlays
- Well documented and powerful API

[mapproxy.org](http://mapproxy.org)

 [mapproxy](https://github.com/mapproxy)

# MapProxy



# MapProxy

## cool functions of MapProxy

- MapProxy is capable to
  - Auto-generate grey version of cache
  - Re-project tiles (= one cache for several EPSG's)
  - Interpolate tiles between cached zoom levels
  - Read a lot of input data
  - Optimized storage
  - Security for layers or regions

# GeoWebCache – Mapproxy

the attempt of a comparison I

- GeoWebCache is built-in GeoServer & Standalone
- GeoWebCache: one cache per EPSG-code –  
MapProxy: same cache for all, if wanted

# GeoWebCache – Mapproxy

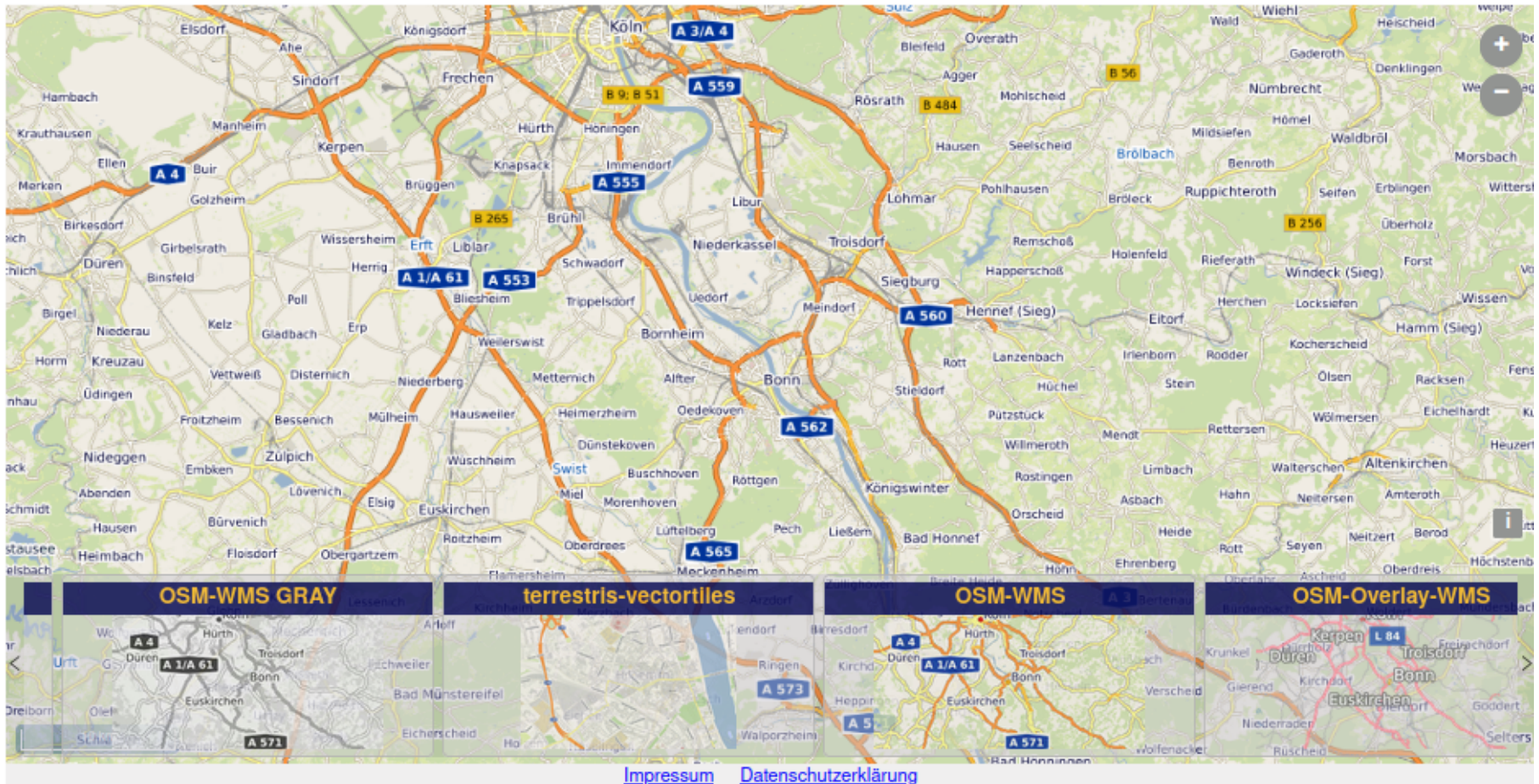
**the attempt of a comparison II**

- MapProxy is able to replace the service behind by cache-interpolation
  - MapProxy interpolates tiles if request is between zoom levels
  - GeoWebCache sends request to GeoServer
- GeoWebCache WMS needs parameter “tilled=true” on WMS-request



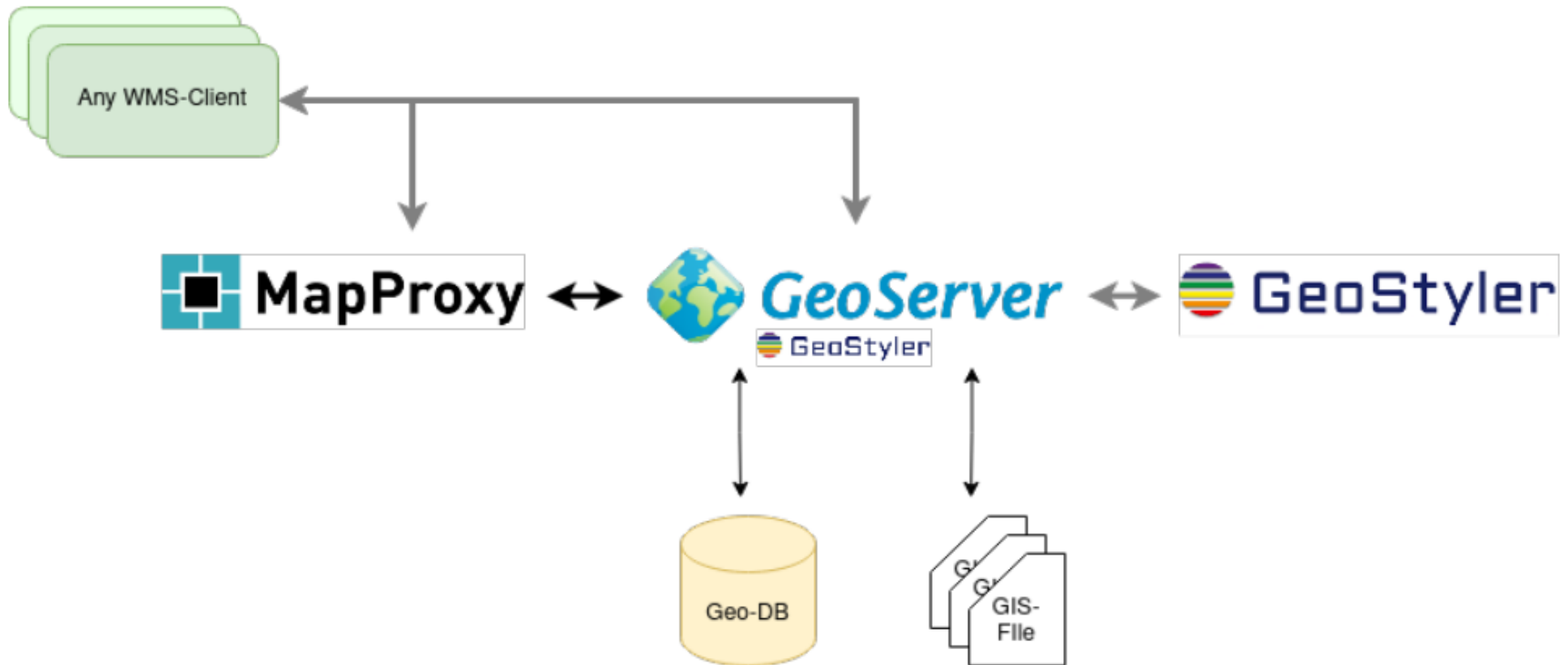
# One example

Free to use world-wide OSM WMS: [ows.terrestris.de](https://ows.terrestris.de)



# Architecture

Optimized publishing of map and dataservices



Optimized publishing of map and dataservices :

**And now, you're done!**

# Summary

**It's cool, it's open!**

- Open Source is combinable!
- There is often more than one component to reach your goal
- The presented architecture has already proven its suitability for setting up good-looking, fast and robust MapServices, as the example OpenStreetMap WMS shows

# Imprint

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[terrestris.github.io/foss4g2021/geostyler](https://terrestris.github.io/foss4g2021/geostyler)

PDF-Version, git repository