



- eine Einführung -

Hinweis

Diese Folien basieren auf den Folien auf dem Vortrag

'GeoServer – an introduction for beginners'

von Andrea Aime & Simone Gianetti, gehalten auf der
INSPIRE-Konferenz 2016

<https://de.slideshare.net/geosolutions/geoserver-an-introduction-for-beginner>

Agenda

- Was ist 'GeoServer'
- Basiskonzepte, Administrations-GUI und REST-Schnittstelle
- WMS / WFS / WCS / WPS
- GeoWebCache
- Security

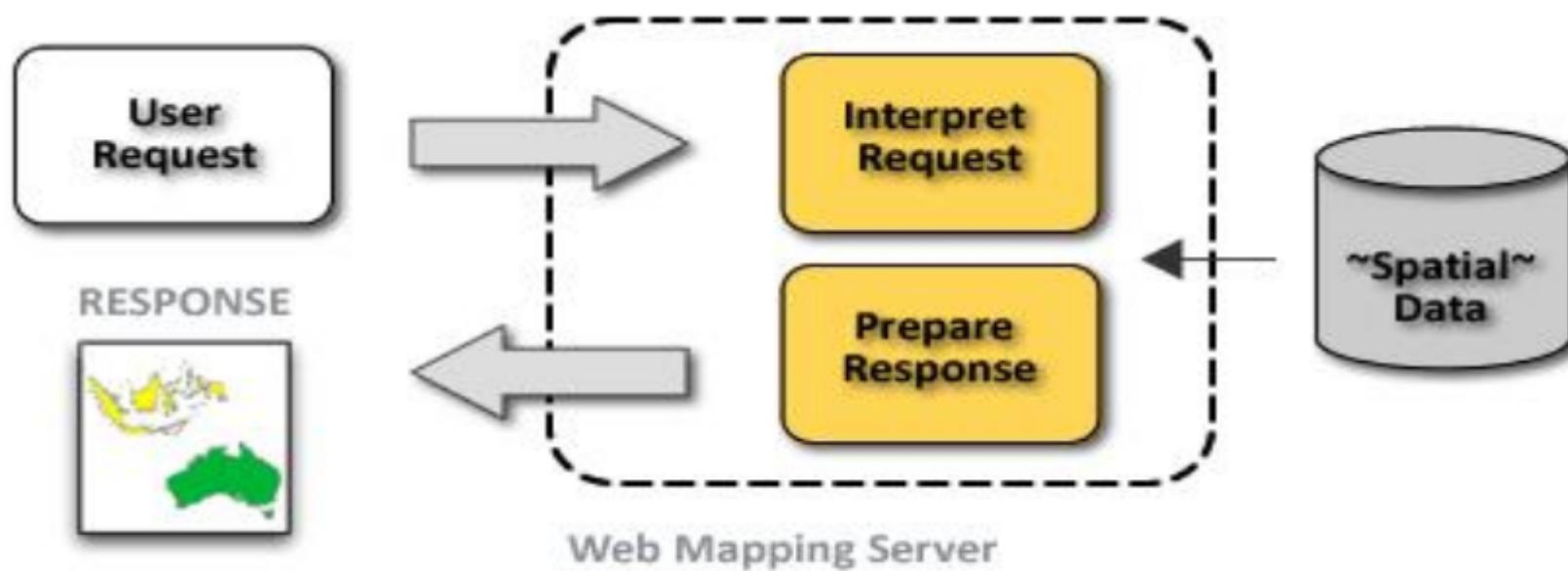
GeoServer

- **GeoServer = Kartenserver**
- **Open Source Alternativen:**
UMN MapServer, deegree, Mapnik, QGIS Server...
- **Proprietäre Alternativen:**
ArcServer, Geomedia Webmap, MapXtreme, ...

GeoServer

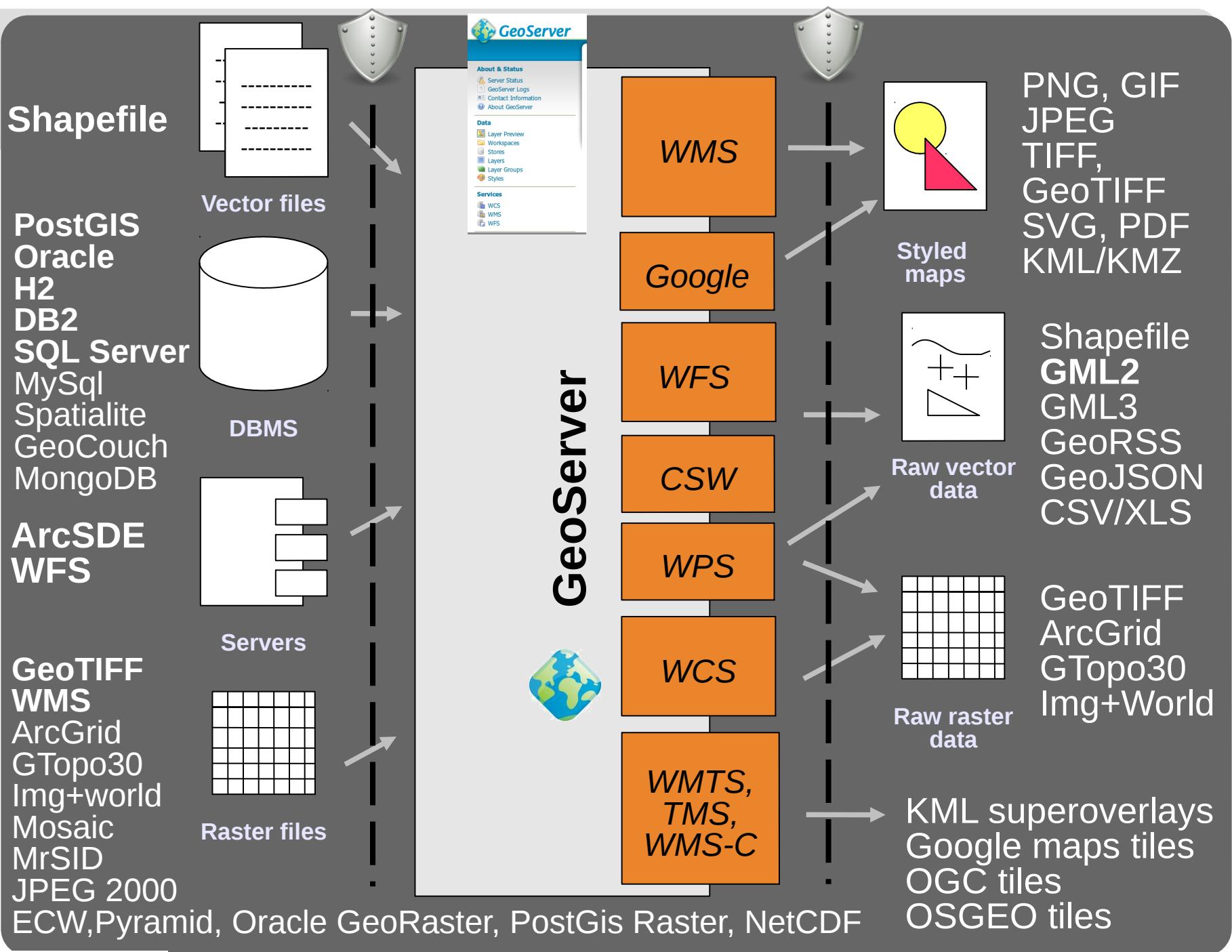
- **GeoServer**
 - Management und Verbreitung von Raster & Vektordaten
- **OGC-Standard konform**
 - OGC WMS 1.1.1, 1.3.0
 - OGC WFS 1.0, 1.1 (RI), 2.0
 - OGC WCS 1.0, 1.1.1 (RI), 2.0
 - OGC WPS 1.0.0
 - ...
- **GeoServer-Plugins**
 - Plugins erweitern Standardfunktionalität
 - werden als Add-ons installiert
- **Google Earth/Maps Unterstützung**
 - KML, GeoSearch, etc..

GeoServer als WMS-Server



Graphik aus <https://de.slideshare.net/BalajiPuthiran/geoserver-69186047>

Formate und Protokolle



GeoServer Administration

GeoServer

About & Status

- Server Status
- GeoServer Logs
- Contact Information
- About GeoServer

Data

- Layer Preview
- Workspaces
- Stores
- Layers
- Layer Groups
- Styles

Services

- WCS
- WMS
- WFS

Settings

- Global
- JAI
- Coverage Access

Tile Caching

- Tile Layers
- Caching Defaults
- Gridsets
- Disk Quota

Security

- Settings
- Authentication
- Passwords
- Users, Groups, Roles
- Data
- Services

Demos

Tools

New Vector Data Source

Add a new vector data source

Directory of spatial files (shapefiles)
Takes a directory of shapefiles and exposes it as a data store

Basic Store Info

Workspace *

topp

Data Source Name *

Description

Enabled

Connection Parameters

Directory of shapefiles *

file:data/example.extension

DBF files charset

ISO-8859-1

Create spatial index if missing

Use memory mapped buffers

Cache and reuse memory map

Directory of shapefiles

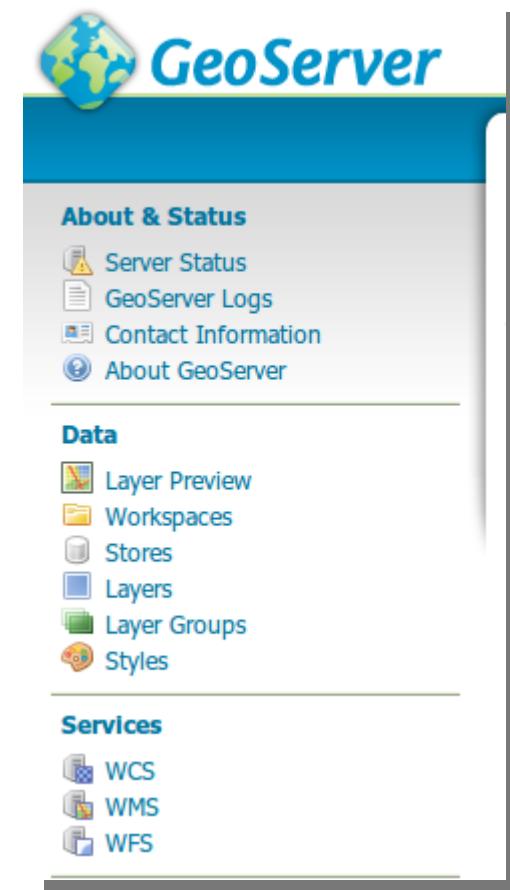
Data directory

Name	Last modified	Size
tasmania_cities.shp	23-agosto-2010 10.21	164
tasmania_roads.shp	23-agosto-2010 10.21	8,3K
tasmania_state_boundaries.shp	23-agosto-2010 10.21	6,6K
tasmania_water_bodies.shp	23-agosto-2010 10.21	9K

OK **Cancel**

GeoServer Administration - Konzept

- **Workspaces:** organisatorische Struktur (Ordner, virtuelle Dienste)
- **Speicher (Stores):** Verbindung zu Datenquelle
- **Layer:** Inhalte und deren Konfiguration
- **Stile (Styles):** Zeichenvorschriften
- **LayerGroups:** „ready to use“ Karten
- **Tiling-Engine:** GeoWebCache
- **Services:** Konfiguration pro Service
- **Security**



GeoServer Administration

Microsoft SQL Server
Microsoft SQL Server

Basic Store Info

Workspace *

topp ▾

Data Source Name *

sqlserver

Description

Enabled

Connection Parameters

host *
192.168.2.9

port *
1433

database
geodb

schema

user *
geoserver

passwd

Coordinate Reference Systems

Native SRS

UNKNOWN GCS_WGS_1984...

Declared SRS

EPSG:4326 Find... EPSG:WGS 84...

SRS handling

Force declared ▾

Bounding Boxes

Native Bounding Box

Min X	Min Y	Max X	Max Y
145,19754	-43,423512	148,27298000000	-40,852802

[Compute from data](#)

Lat/Lon Bounding Box

Min X	Min Y	Max X	Max Y
145,19754	-43,423512	148,27298000000	-40,852802

[Compute from native bounds](#)

Feature Type Details

Property	Type	Nillable
the_geom	MultiPoint	true
CITY_NAME	String	true
ADMIN_NAME	String	true
CNTRY_NAME	String	true
STATUS	String	true
POP_CLASS	String	true

GeoServer Administration

Copy from existing style

Sceglierne uno

12pt

```

1 <?xml version="1.0" encoding="ISO-8859-1"?>
2 <StyledLayerDescriptor version="1.0.0" xmlns="http://www.
3   xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="
4   xsi:schemaLocation="http://www.opengis.net/sld http://
5 <NamedLayer>
6   <Name>redflag</Name>
7   <UserStyle>
8     <Name>burg</Name>
9     <Title>A small red flag</Title>
10    <Abstract>A sample of how to use an SVG based symb
11
12    <FeatureTypeStyle>
13      <Rule>
14        <Title>Red flag</Title>
15        <PointSymbolizer>
16          <Graphic>
17            <ExternalGraphic>
18              <OnlineResource xlink:type="simple" xlink:
19                <Format>image/svg+xml</Format>
20            </ExternalGraphic>
21            <Size>
22              <ogc:Literal>20</ogc:Literal>
23            </Size>
24          </Graphic>
25        </PointSymbolizer>
26      </Rule>
27
28    </FeatureTypeStyle>
29  </UserStyle>
30

```

CSS Styles

Create and modify CSS styles. This is an alternative to editing SLD styles.

Currently editing style **css_pop** and previewing with data from **states**. Edit the style here, or:

- [Edit a different style](#).
- [Choose a different layer](#) to preview this style.
- [Create a new style](#) and preview with this layer.
- [Change layer associations](#) for this style.

The stylesheet for this map

```

/* @title: less than 2M */
[PERSONS <= 2000000] {
  fill: #4DFF4D;
}

/* @title: between 2M and 4M */
[PERSONS > 2000000] [PERSONS <= 4000000] {
  fill: #FF4D4D;
}

/* @title: more than 4M */
[PERSONS > 4000000] {
  fill: #4D4DFF;
}

*

```

[Generated SLD](#) [Map](#) [Data](#) [CSS Reference](#)

SLD file

RESTful Konfiguration

- **Programmatische Konfiguration via REST**
 - Workspaces, Datastores
 - Layer und Stile, Dienste Konfiguration
- **Freigabe interner Konfiguration an Remote Client**
 - Ajax - JavaScript ‘friendly’
- **diverse Client Bibliotheken verfügbar (Java, Python, Ruby, ...).**
- **Beispiel geoserver-manager von Geosolutions:**
<https://github.com/geosolutions-it/geoserver-manager>

RESTful Konfiguration

- Beispiel: SHOGun Layer anlegen:

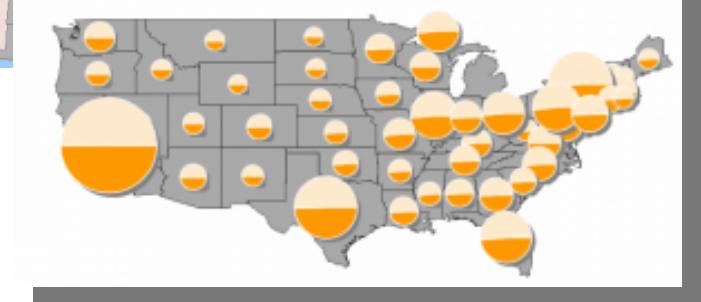
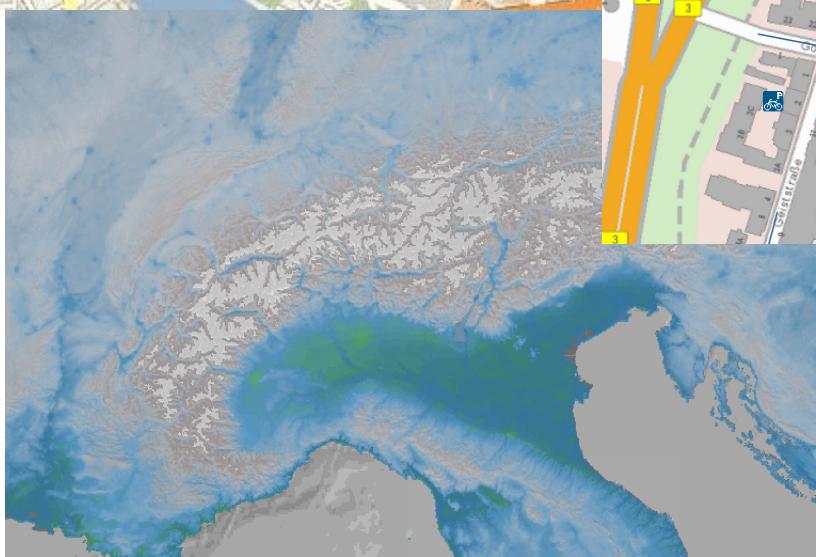
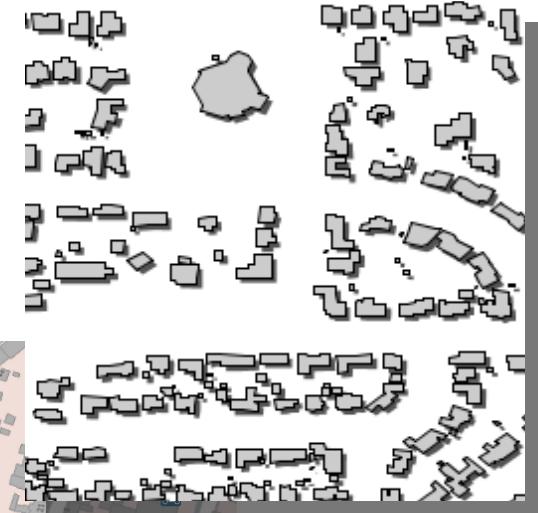
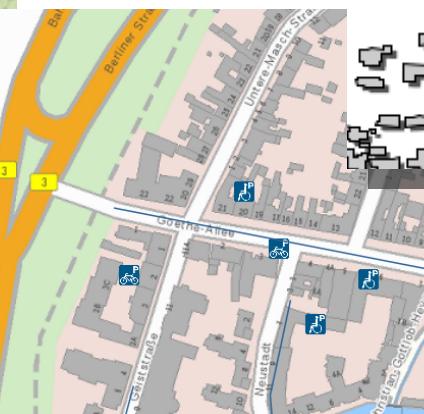
<https://github.com/terrestris/shogun2>

- Hochladen Geo-Datei (z.B. Shape)
 - Übergabe an GeoServer-Rest-API
 - GeoServer lädt Daten in Datenbank, legt Layer an, meldet Layername zurück
 - in SHOGun Admin-GUI anlegen eines Stils, Bekanntgabe des Stils an GeoServer-API
 - GeoServer speichert Stil
 -

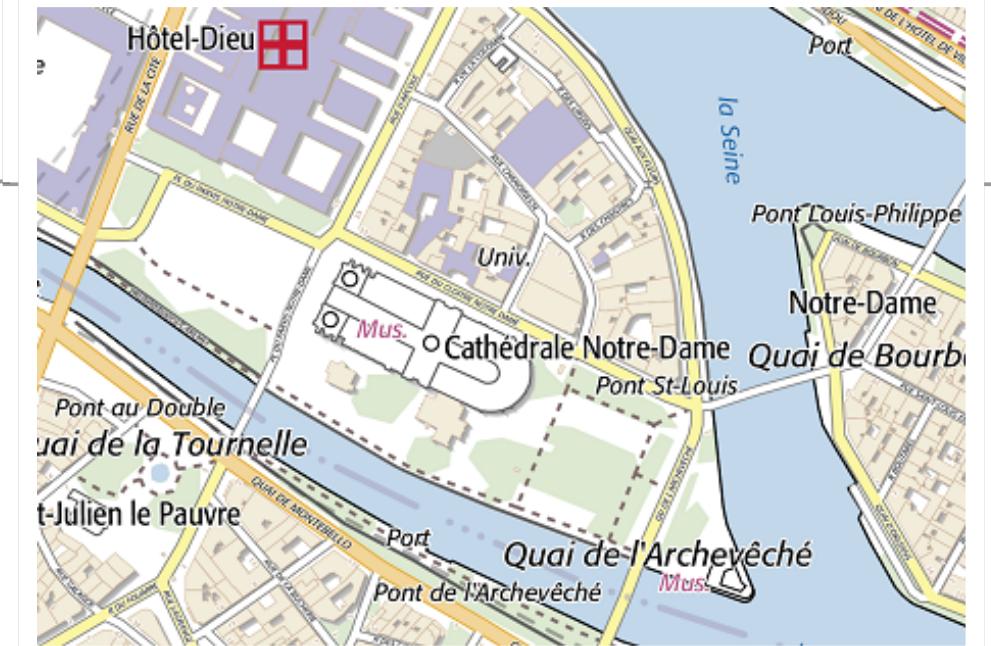
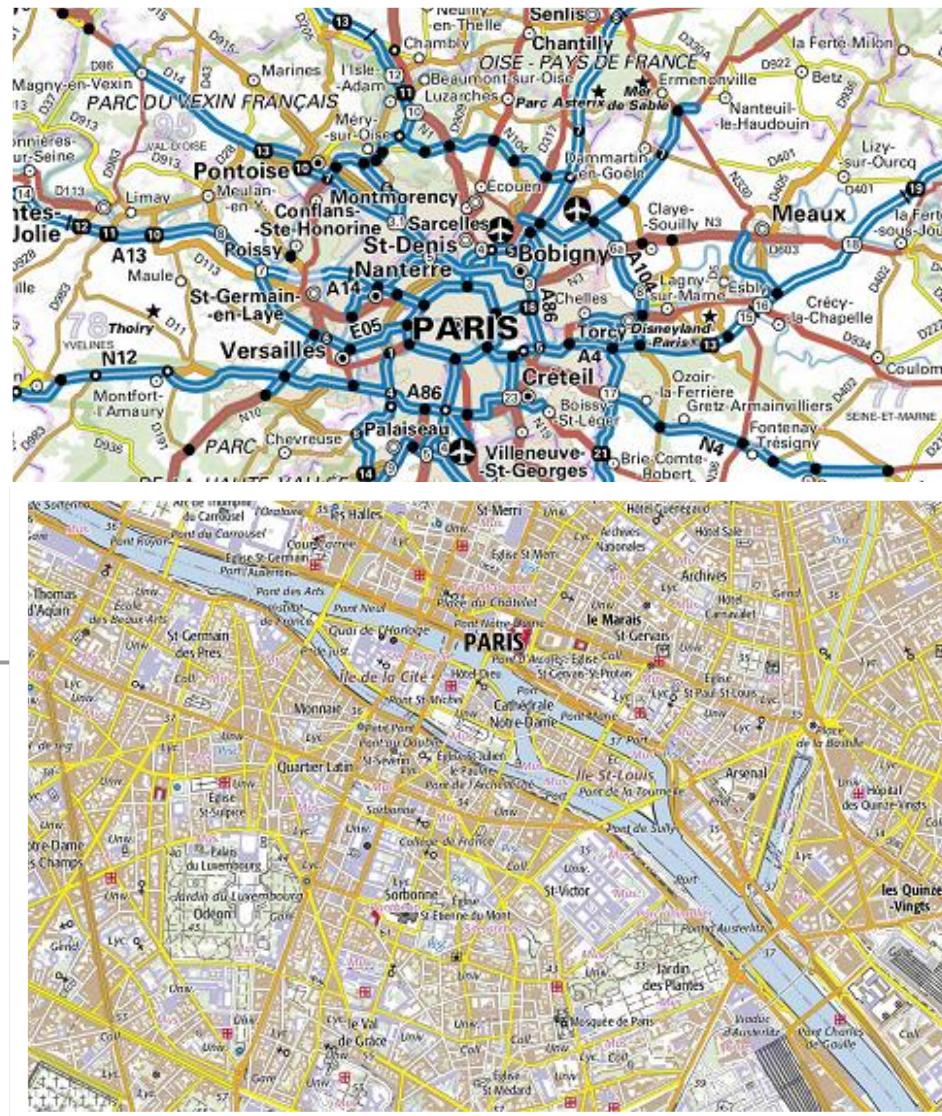
WMS

- **Veröffentlichung von Geodaten**
 - Sinnvolle Kombination von Raster und Vektordaten
 - Regel-/Maßstabsgesteuertes Rendering
- **WMS 1.1.1 und 1.3 support**
- **SLD**
 - Basis Support für SLD 1.1 und SE 1.1
 - voller Support für SLD 1.0
 - CSS Extension für kompakte Stile
- **Dazu: viele Rendering-Extensions verfügbar**

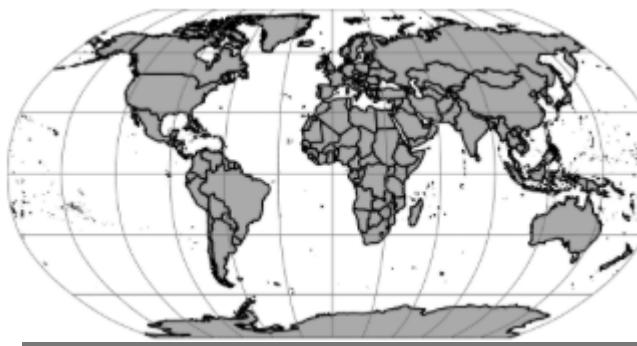
WMS – Rendering Beispiele



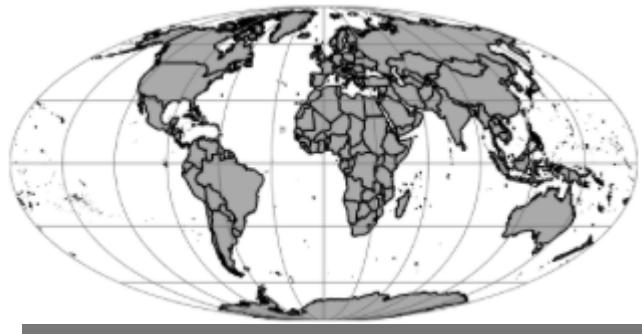
WMS – Beispiele IGN France



WMS - viele unterstützte Projektionen

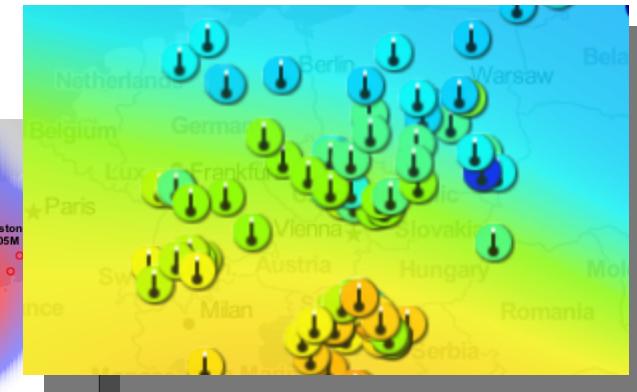
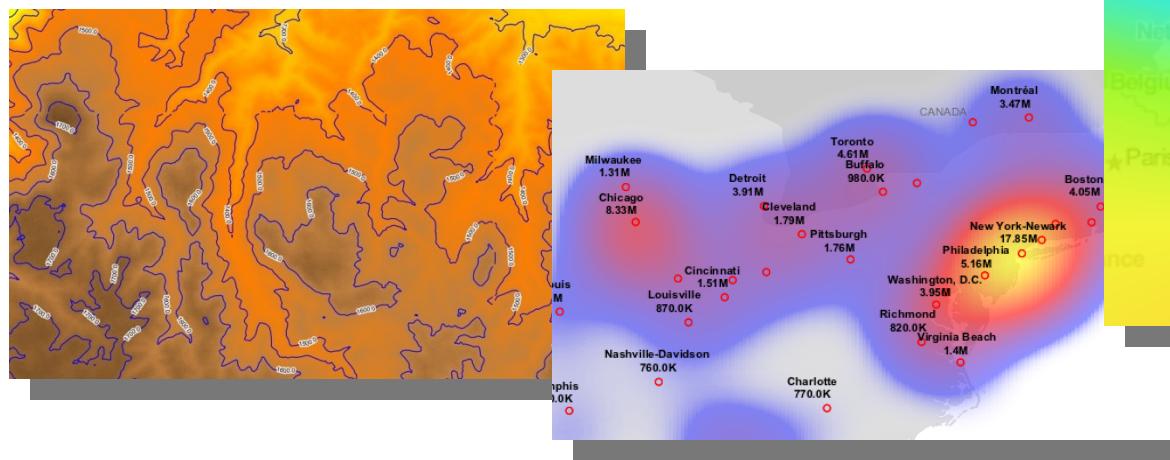


Dateline
crossing
management



WMS - Rendering von Transformationen

- On-the-fly Daten Transformation
- Aufruf räumlicher Analyse Prozesse in SLD's
- Performance-optimiert
- Beispiele: on the fly Isolinien, Heatmaps, Punkte-Clustering, Interpolation, u.v.m.



WFS

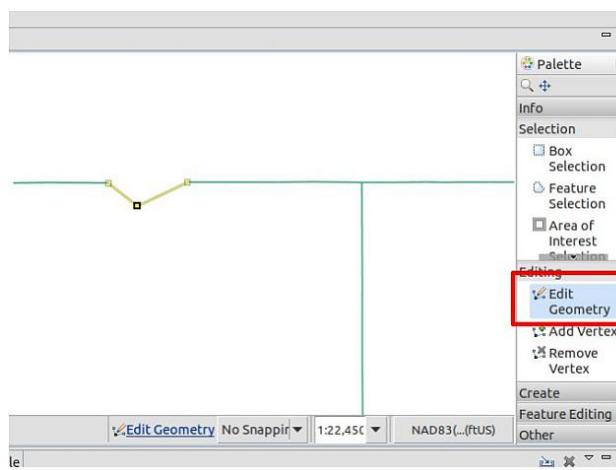
- **Veröffentlichung von Vektordaten**
- **WFS 1.0, 1.1 und 2.0 (seit v2.2.0)**
- **Transaktion und Paging verfügbar**
- **einfaches Filtern mit CQL**
- **Formate:**
 - **GML 2, 3.1 und 3.2**
 - **CSV, Excel Spreadsheet, GeoRSS, GeoJSON**
 - **Shapefile (*.zip)**
 - **alle Formate die ogr2ogr unterstützt (konfigurierbar)**

WFS - Support von Filtern

- **Support von Standard Filtern**
 - skalar (<, <=, >, >=, =, !=, like)
 - zeitlich
 - räumlich (intersections, touch, dwithin, dbeyond, ...)
- Filter werden direkt in native Filter auf der Datenquelle übersetzt (z.B., SQL bei räuml. Datenbanken, OGC Filter für kaskadierende WFS, SDE Filter,)
- Set von Filterfunktionen für advanced Filtering (do math and string manipulation in your filters):
http://docs.geoserver.org/stable/en/user/filter/function_reference.html

WFS -Transactional

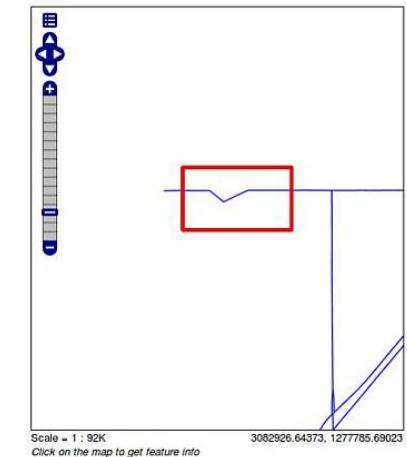
- **WFS-T: Dateneditierung über Client (Desktop, Web oder Mobil)**



WFS-T



WMS



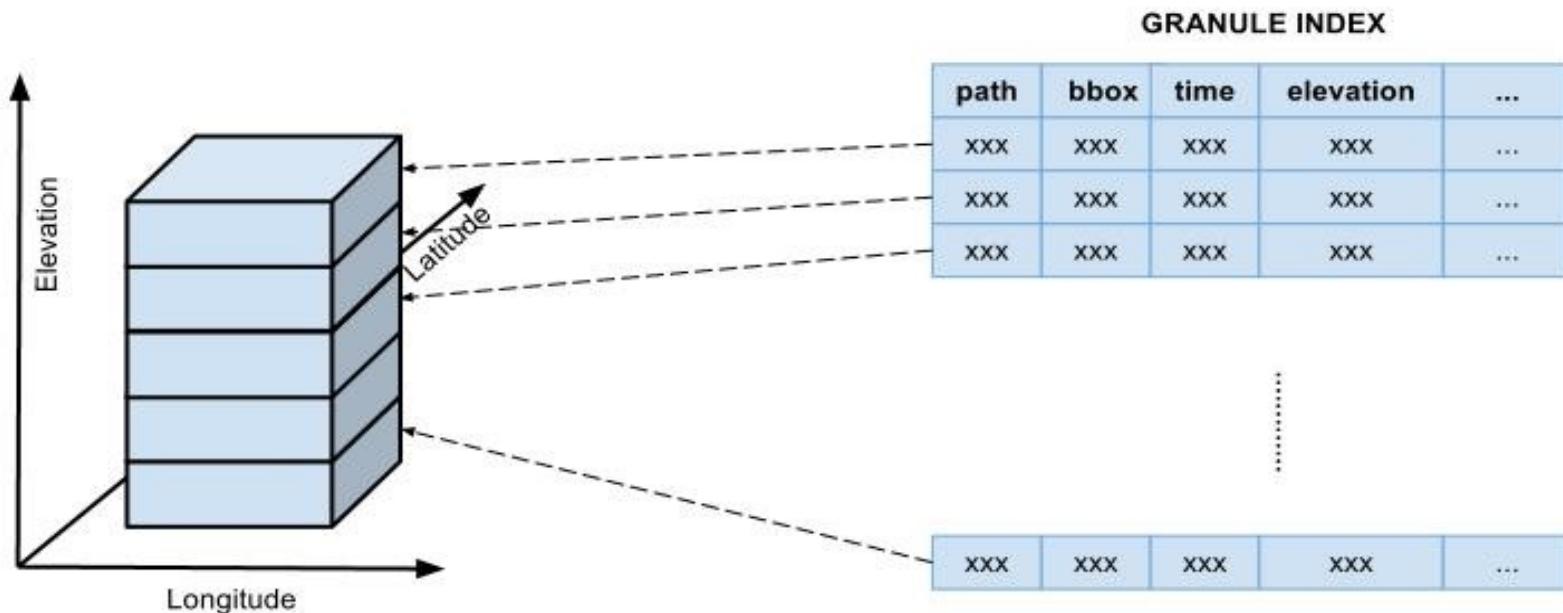
Editierung und Speicherung
Von Änderungen

Alle Protokolle sehen
Änderungen sofort

WCS

- **Veröffentlichung von Raster Daten**
 - Rasterdaten werden ausgeliefert (keine Karten)
 - Support für TIME und ELEVATION (über ImageMosaic plugin)
- **WCS 1.0, 1.1.1 und 2.0**
- **Ausgabeformate**
 - GeoTiff, ArcGrid
 - NetCDF
- **Extensions verfügbar**

WCS - n-Dimensionale Mosaike



Input multidimensional NetCDF file that contains multiple forecasts at multiple elevations (optionals) for various geophysical parameters.

For each single 2D slice contained int he multidimensional NetCDF file we have an entry to index it for successive stitching.

WPS

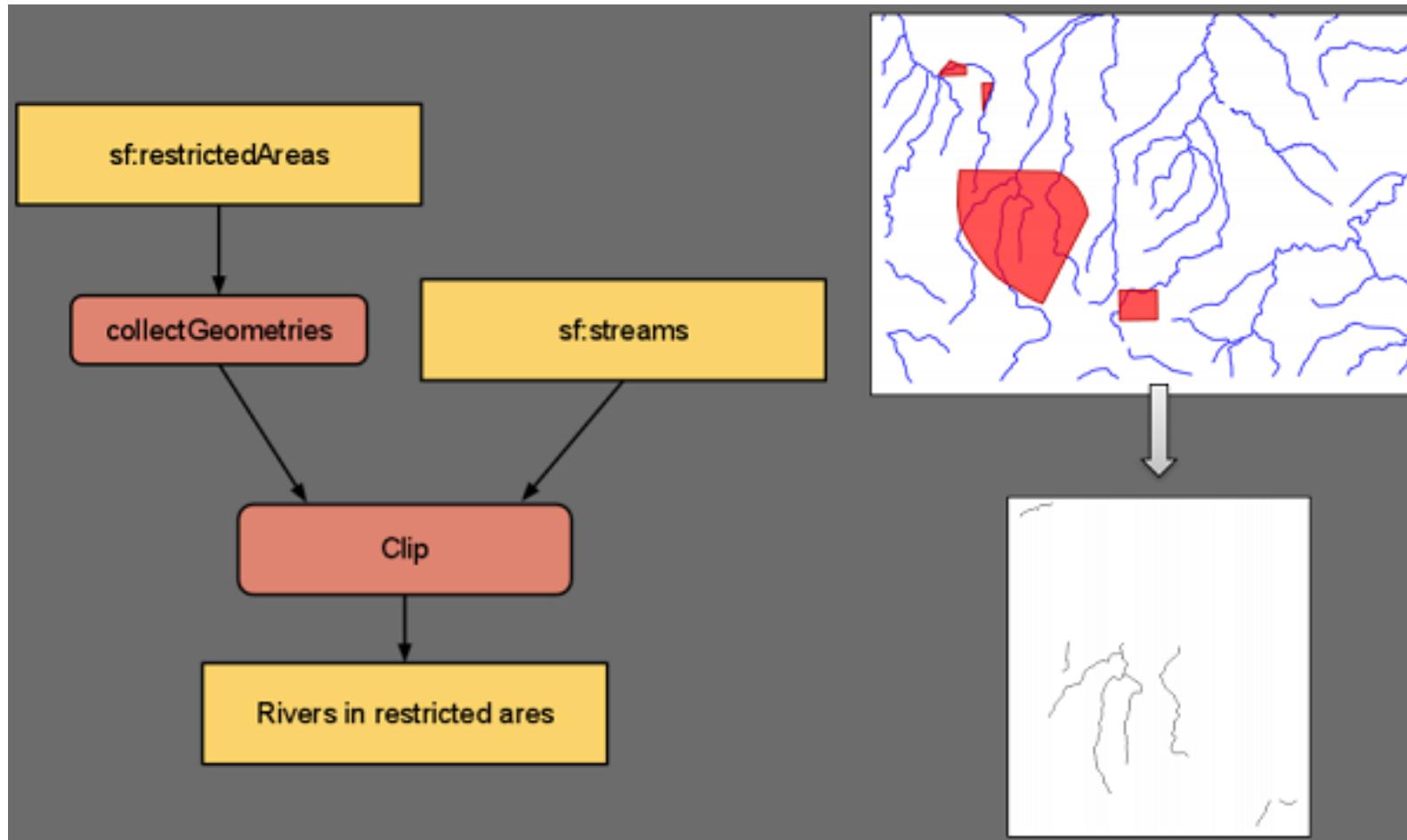
- **WPS 1.0 als offizielle Erweiterung**
- **Unterstützt Raster und Vektordaten**
- **Viele bereits existente Prozesse (~100):**
 - **Vektor- und Rasteranalyse**
 - **Umwandlungen (z.B. Raster2Vektor)**
- **Offen für Implementierung eigener WPS**
- **Zugriff auf GeoServer-Datenquellen**
 - es müssen keine Daten übermittelt werden, die schon im GeoServer als Datenquelle bekannt sind

WPS – ein Beispiel

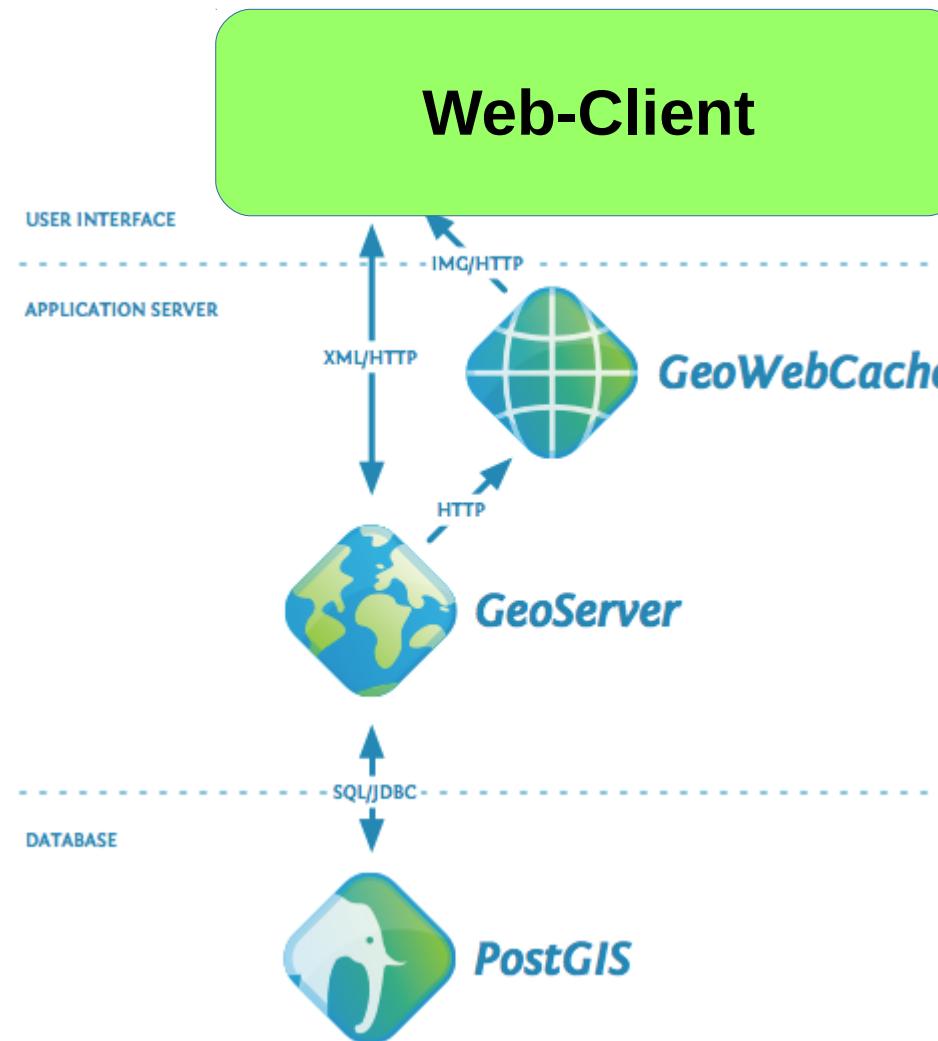
```
<wps:Execute version="1.0.0" service="WPS" ...>
  <ows:Identifier>JTS:buffer</ows:Identifier>
  <wps:DataInputs>
    <wps:Input>
      <ows:Identifier>geom</ows:Identifier>
      <wps>Data>
        <wps:ComplexData mimeType="text/xml; subtype=gml/3.1.1">
          <gml:LineString>
            <gml:posList>0.0 0.0 10.0 0.0 10.0 10.0</gml:posList>
          </gml:LineString>
        </wps:ComplexData>
      </wps>Data>
    </wps:Input>
    <wps:Input>
      <ows:Identifier>distance</ows:Identifier>
      <wps>Data>
        <wps:LiteralData>2</wps:LiteralData>
      </wps>Data>
    </wps:Input>
  </wps:DataInputs>
  <wps:ResponseForm>
    <wps:RawDataOutput mimeType="text/xml; subtype=gml/3.1.1">
      <ows:Identifier>result</ows:Identifier>
    </wps:RawDataOutput>
  </wps:ResponseForm>
</wps:Execute>
```

- **Buffern einer „L“ förmigen Geometrie mit “distance 2”**
- **Resultat wird als GML zurück gegeben**

WPS – Beispiel für Verkettung



WMS - GeoWebCache Integration



**Direkte Aufrufe an GeoServer
Rendering-Engine**

**Administration über GeoServer
Administration**

Support für Editierung (WFS-T)

**Support verschiedener Tile
Protokolle**

- GMap, Gearth**

- OpenLayers, VEarth,
Bing**

Speed-up Faktor 10/100

<https://gis.stackexchange.com/questions/21452/how-do-gis-web-apps-work>

Security: Authentifizierung

- **Hinzuladbare Authentifizierungs-Mechanismen**

J2EE - Delegates to servlet container for authentication

Anonymous - Authenticates anonymously performing no actual authentication

Remember Me - Authenticates by recognizing authentication from a previous request

Form - Authenticates by processing username/password from a form submission

X.509 - Authenticates by verifying the signature of a X.509 certificate

HTTP Header - Authenticates by checking existence of an HTTP request header

Basic - Authenticates using HTTP basic authentication

Digest - Authenticates using HTTP digest authentication

Username Password - Default username password authentication that works against a user group service

JDBC - Authentication via a database connection

LDAP - Authentication via Lightweight Directory Access Protocol server

Security: Geofence

The screenshot shows the GeoServer Rules interface. The main table lists security rules across various dimensions:

User	Group	Instance	Service	Request	Workspace	Layer	Grant					
0 admin	*	*	*	*	*	*	LIMIT	Edit rule	Details	Remove	Up	Down
1 tiger	*	default-gs	*	*	tiger	*	ALLOW	Edit rule	Details	Remove	Up	Down
3 tiger	*	default-gs	*	*	*	*	DENY	Edit rule	Details	Remove	Up	Down
6 *	*	default-gs	*	*	topp	gboundaries	ALLOW	Edit rule	Details	Remove	Up	Down
7 *	*	default-gs	*	*	topp	*	DENY	Edit rule	Details	Remove	Up	Down

On the left, there is a sidebar with "Layer Details" settings:

- Default Style: line
- CQL Read: **Forcing the default style from the ones available on GeoServer**
- CQL Write:
- Allowed Area: SRID=2077;MULTIPOLYGON (((674511.2514 4680906.0013, 674648.2514 4680521.0013, 674692.0014 4680397.5013,

Below the table, a message says "Forcing geometry limits".

A modal window titled "Editing Details for Rule #3" shows layer attributes:

Name	Data Type	Access Type
cod_reg	java.lang.Integer	NONE
nome_reg	java.lang.String	READONLY
the_geom	com.vividsolutions.jts.geom.Mul	READONLY

A message below the modal says "Deny access to some layer attributes".

am Ende ...

- **Fragen & Anregungen**
→ **adams@terrestris.de**
- **Hilfe**
→ **<http://www.geoserver.org>**
→ **<http://geoserver.org/comm/>**