

# Open GeoWeb



# Content

➔ **GeoWeb**

➔ **Open GeoWeb**

➔ **XML**

➔ **SVG**

➔ **GML**

➔ **SWF (Flash)**

➔ **Java**

➔ **WMS**

➔ **WFS**

➔ **WCS**

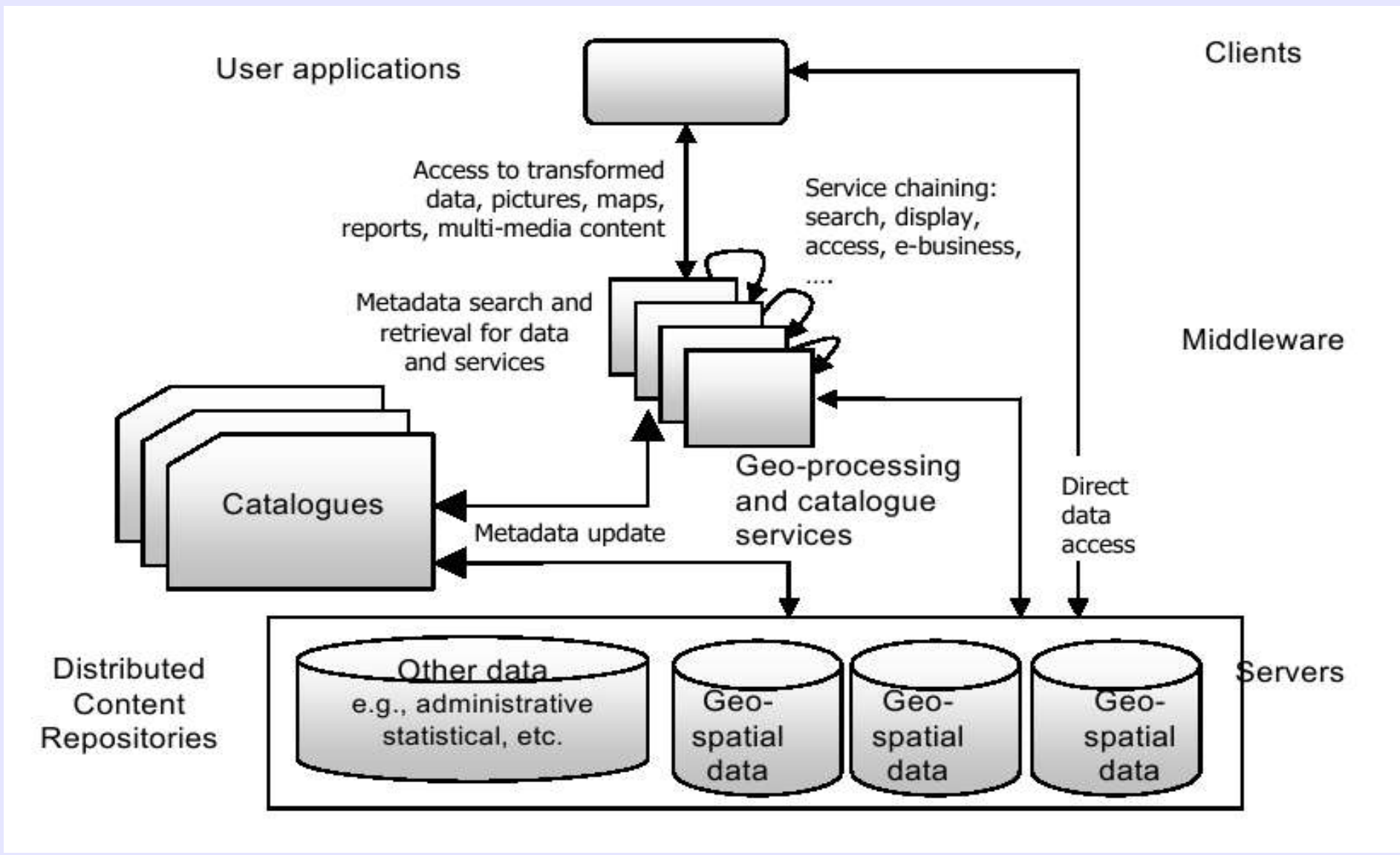
➔ **OGC CAT**

# GeoWeb

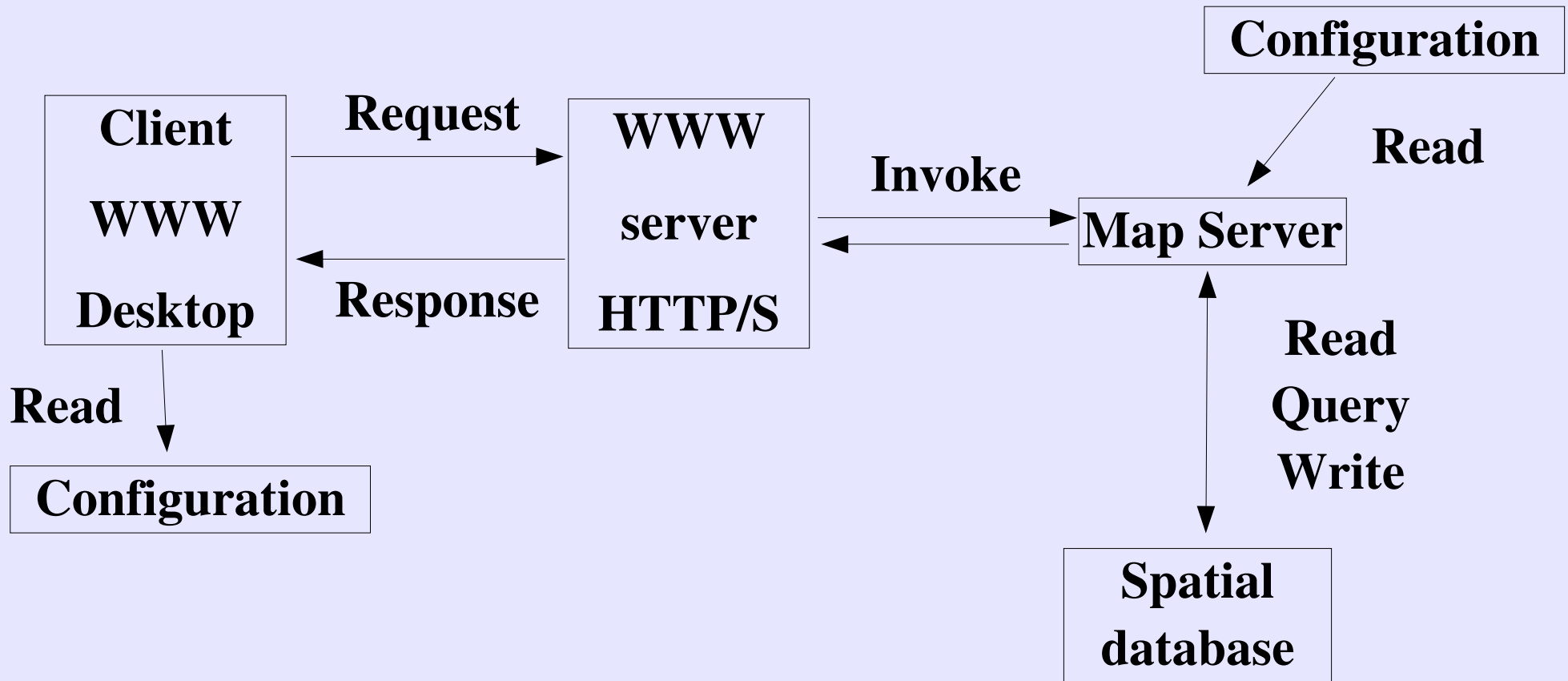
- **Web Mapping – clients and map servers**
- **Geo Web Services – set of services – mapping, data, metadata, analysis, ...**



# GeoWeb - Inspire



# Web Mapping



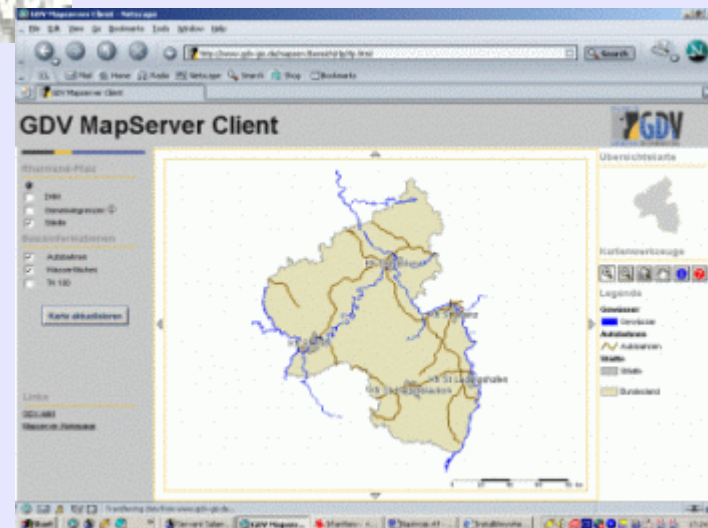
# Requests

- **GetMap**
- **GetData**
- **StoreData**



# Responses

- Bitmap (PNG, GIF)
- Vector data (GML, SVG, SWF, ...)
- Configuration
- Exceptions (errors)

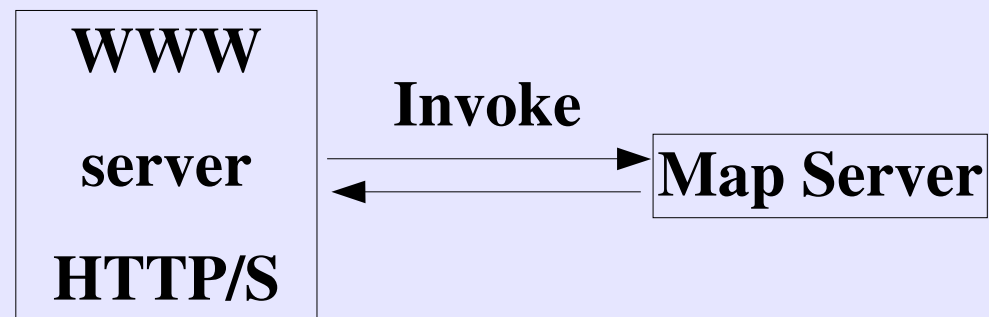


```
<?xml version="1.0" encoding="utf-8" ?>
<ogr:FeatureCollection
  xmlns:xsi="http://www.w3c.org/2001/XMLSchema-instance"
  xsi:schemaLocation=". kraje.xsd"
  xmlns:ogr="http://ogr.maptools.org/"
  xmlns:gml="http://www.opengis.net/gml">
  <gml:boundedBy>
    <gml:Box>
      <gml:coord><gml:X>-904222.837576437</gml:X><gml:Y>-1227241.528725796</gml:Y></gml:coord>
      <gml:coord><gml:X>-431433.3321681719</gml:X><gml:Y>-935237.8791404357</gml:Y></gml:coord>
    </gml:Box>
  </gml:boundedBy>
  <gml:featureMember>
    <kraje_pseudo fid="0">
      <cat>6</cat>
      <nk>US</nk>
      <kn>6</kn>
      <kodnuts>CZ042</kodnuts>
      <nazkr>Ústecký</nazkr>
      <nazkr_a>Ustecky</nazkr_a>
      <vymera> 533492.060000000055879</vymera>
      <ob91>824461</ob91>
      <ob01>820219</ob01>
      <obakt>820868</obakt>
      <nazcs>YVXFMc</nazcs>
      <zmenazaz>01012000</zmenazaz>
      <ogr:geometryProperty><gml:Polygon><gml:outerBoundaryIs><gml:LinearRing><gml:coordinates>-732885
-732885.511,-998448.558 -733385.882,-998448.558 -733385.882,-998448.558 -733886.253,-998948.858
-734386.624,-1001450.356 -734386.624,-1001450.356 -734886.996,-1001950.655 -734886.996,-1001950.
-736388.109,-1002450.955 -736888.480,-1002951.255 -736888.480,-1002951.255 -737388.852,-1003451.
```



# Invoke

- **CGI (FastCGI)**
- **Servlet**
- **HTTPD module**





# Configuration

- User environment
- Map components
- Functionality
- Data sources

Configuration

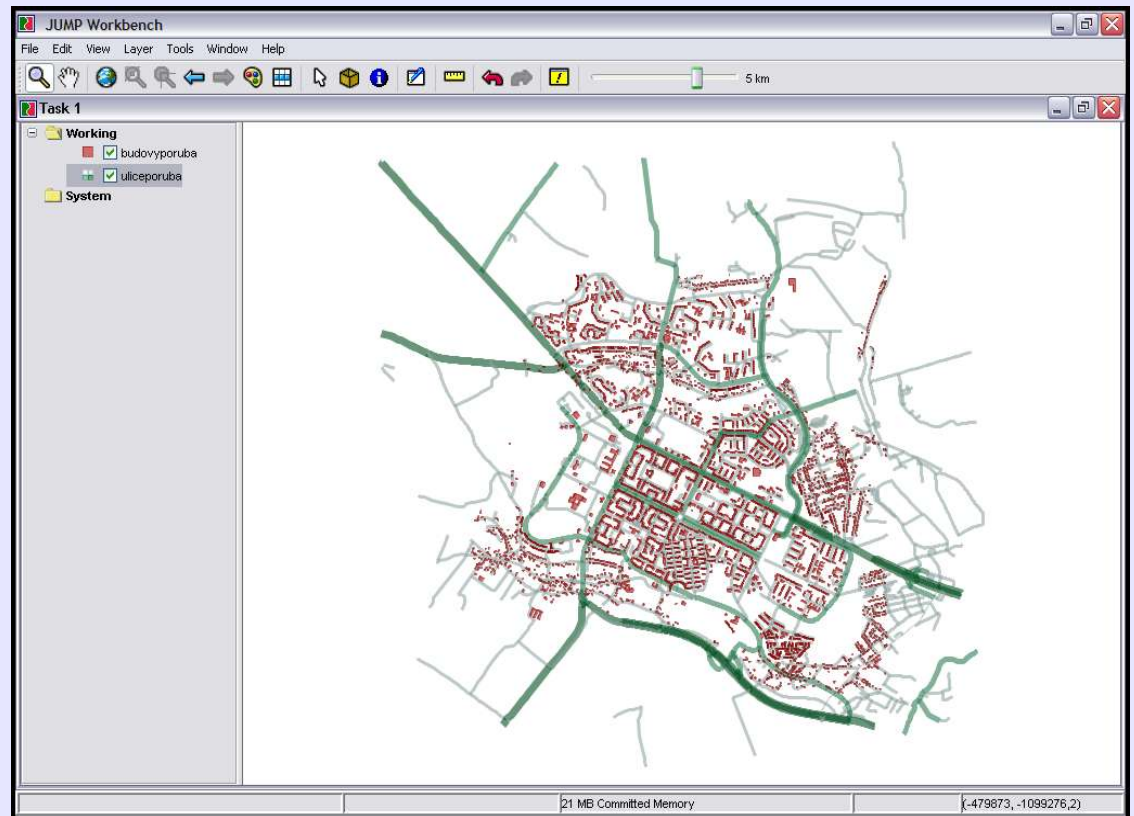
Read

Map Server

Client  
WWW  
Desktop



Configuration



# Other Geo Web Services

- Spatial Analysis
- Metadata
- Gazetteer
- ...



**WSCO Open Source**  
Web Services Catalog for Orchestration Open Source

**Příklad zjištění erozního rizika**

Název obce:

Typ služby:  Služby:  **HOTOVO**

Typ služby:  Služby:  **HOTOVO**

Typ služby:  Služby:  **HOTOVO**

**Mezivýsledek: 1**  
**Cena: 2 Euro**  
**Rychlost: maximálně 0h 12m**

[Počítej pro novou oblast](#)

**V zadané oblasti je malé erozní riziko!**

[ [úvod](#) ] - [ [vyhledávání](#) ] - [ [registrace](#) ] - [ [ukázka](#) ]  
Správce: Jan Růžička, [jan.ruzicka@vsb.cz](mailto:jan.ruzicka@vsb.cz)





# WSCO Open Source

Web Services Catalog for Orchestration Open Source

## Other Geo Web Services

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# Open GeoWeb

- **Open Specifications – Open Geospatial Consortium, ISO, W3C, ...**
- **Open Source components – clients, services, libraries**
- **Open Accessible Services**



# Open Specifications

- **Standardisation**
- **WMS, WFS, WCS, GML**
- **XML**
- **SOAP, WSDL, WS-CDL**
- **ISO 19115, OGC CAT**



# Open Source Components

- **Necessary for services migrating**
- **Necessary for further development**



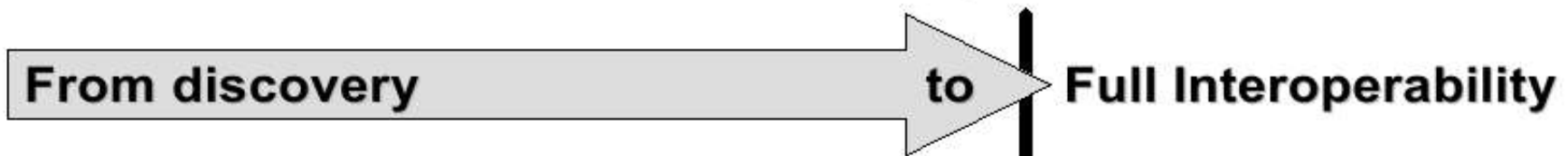
# Open Accessible Services

- **Part of NGII, EGII, GGII**
- **Free of charge**
- **Basic data sources**
- **Basic analysis, gazeteers, ...**



# Open Accessible Services

Towards an Infrastructure for Spatial Information



### Standardisation

- Metadata
- Discovery Service
- Data Policies
- Licensing Framework
- Coordinating structures
- ...

### Harmonisation

- Geodetic Framework
- Seamless data
- Quality insurance
- Certification
- Data model
- ...

### Integration

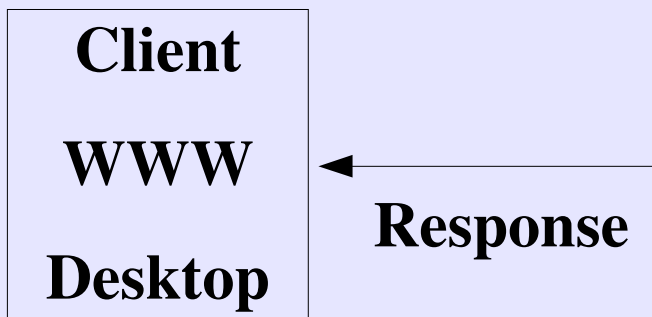
- Catalog Services
- View Service
- Query Service
- Object Access Service
- Generalisation Services
- Geo-Processing services
- ...





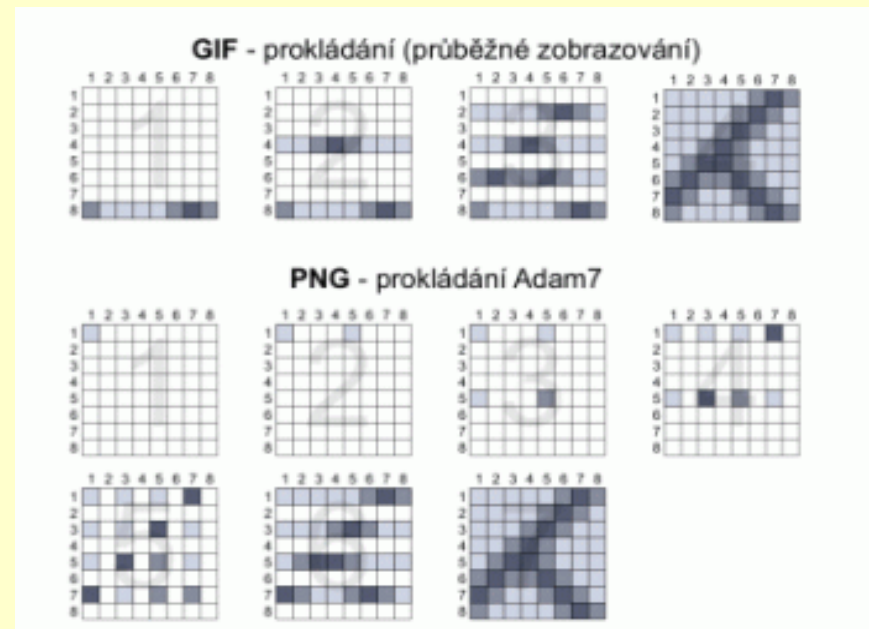
# Web Mapping - Responses

- **Bitmap (PNG, GIF)**
- **Vector data (GML, SVG, SWF, ...)**
- Configuration
- Exceptions (errors)



# Bitmaps

- Raster data
- Pixels
- PNG – 8 bits – 32 bits color depth, powerful interlacing, transparent – alpha
- GIF – 8 bits, interlacing, simple transparent
- JPEG – 24 bits, not very often used



# XML

- **eXtensible Markup Language**
- **Data exchange**
- **Base for many specifications**
- **UNICODE**



# XML Document

```
<?xml version="1.0" encoding="utf-8" ?>  
<ob91>824461</ob91>
```



# XML Document / 2

```
<?xml version="1.0" encoding="utf-8" ?>
<kraj fid="1">
  <cat>6</cat>
  <nk>US</nk>
  <kn>6</kn>
  <kodnuts>CZ042</kodnuts>
  <nazkr>Ústecký</nazkr>
  <nazkr_a>Ustecky</nazkr_a>
  <vymera> 533492.060000000055879</vymera>
  <ob91>824461</ob91>
  <ob01>820219</ob01>
  <obakt>820868</obakt>
</kraj>
```



# Who loves XML?



# XML Schema

- Defines structure for the exchanged data

```
<xs:element name="ob91" nillable="true" minOccurs="0"
  maxOccurs="1">
  <xs:simpleType>
    <xs:restriction base="xs:integer">
      <xs:totalDigits value="11"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```



# What XML brings?

- **How to specify exchange formats – XML Schema**
- **Tools for parsing XML documents**
- **Open, human readable way for data exchange**
- **Chaos???**





# SVG

- **W3C specification for 2D vector graphic based on XML**
- **Not only geometry**
- **Styles, symbols**
- **Transformation**
- **Animations (JavaScript, SMIL)**



# SVG

```
<g id="signaturen" visibility="visible">
```

```
<g>
```

```
<circle class="fil2 str7" cx="-160" cy="1078" r="39"/>
```

```
<circle class="fil3 str7" cx="-160" cy="1078" r="28"/>
```

```
</g>
```

```
</g>
```



# SVG

carto:net - Example for Canvas and Layers - Microsoft Internet Explorer

File Edit View Favorites Tools Help


Address <http://www.carto.net/papers/svg/samples/canvas.shtml>

## carto:net

HELP ● PAPERS ● PROJECTS ● AUTHORS

carto:papers:svg:examples:basic:layers

### Example for Canvas and Layers



Please try with the help of this simple SVG-example the elementary functions of the Viewer:

- **Zooming** with the help of the CTRL-Key (or Apple-Key) one can drag a rectangle above the area one wishes to zoom in. With the right mouse button (CTRL-Key + mouse click on the Mac) one gets a context menu, where you can choose step-by-step zooming and can go back to the original extent.
- **Zoom Out** like above, but with SHIFT-Key pressed.
- **Panning**: Press the ALT-Key and move the mouse cursor while a "hand-icon" appears.
- **Anti-Aliasing**: Maybe turned on and off with the help of the context menu. ("Higher Quality").
- **Layers** can be turned on and off like in traditional GIS, Graphics and DTP software.

To see the higher quality and precision of this vector graphics compared to traditional raster graphics, you can see the same example with a [larger extent](#). For returning to this page please use the "Back-Button" of your browser.

Start [Taskbar icons] Internet 17:36



# SVG Support

- <http://www.mozilla.org/projects/svg/>
- **Mozilla 1.5 - directly**
- **Mozilla Firefox 1.5 - directly**
- **IE - Adobe Plugin**



# SWF (Flash)

- **Solution form Macromedia**
- **Now documented and open**
- **Vector, raster, video, animations, sound – container for multimedia**
- **New - 3D space support**



# Java

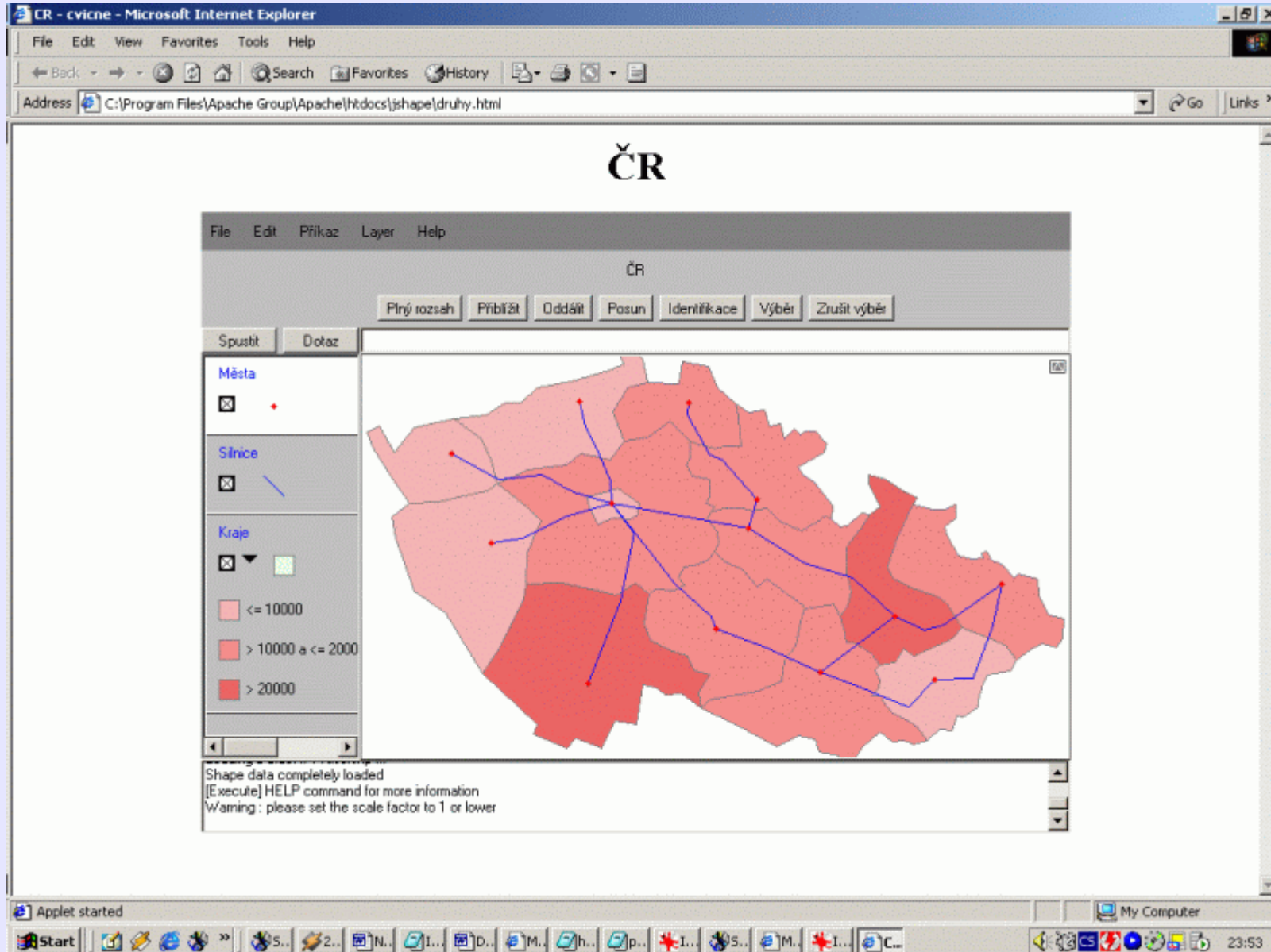
- **Programming language**
- **XML support**
- **Web services support (SOAP)**

- **Servlet** 

- **Java applet**



# Java applet



# WMS

- **Web Map Service**
- **Standardised way how to obtain map from map server**
- **Request – parameters (text)**
- **Response – map (bitmap – raster) or description (XML)**
- **HTTP, POST, GET**



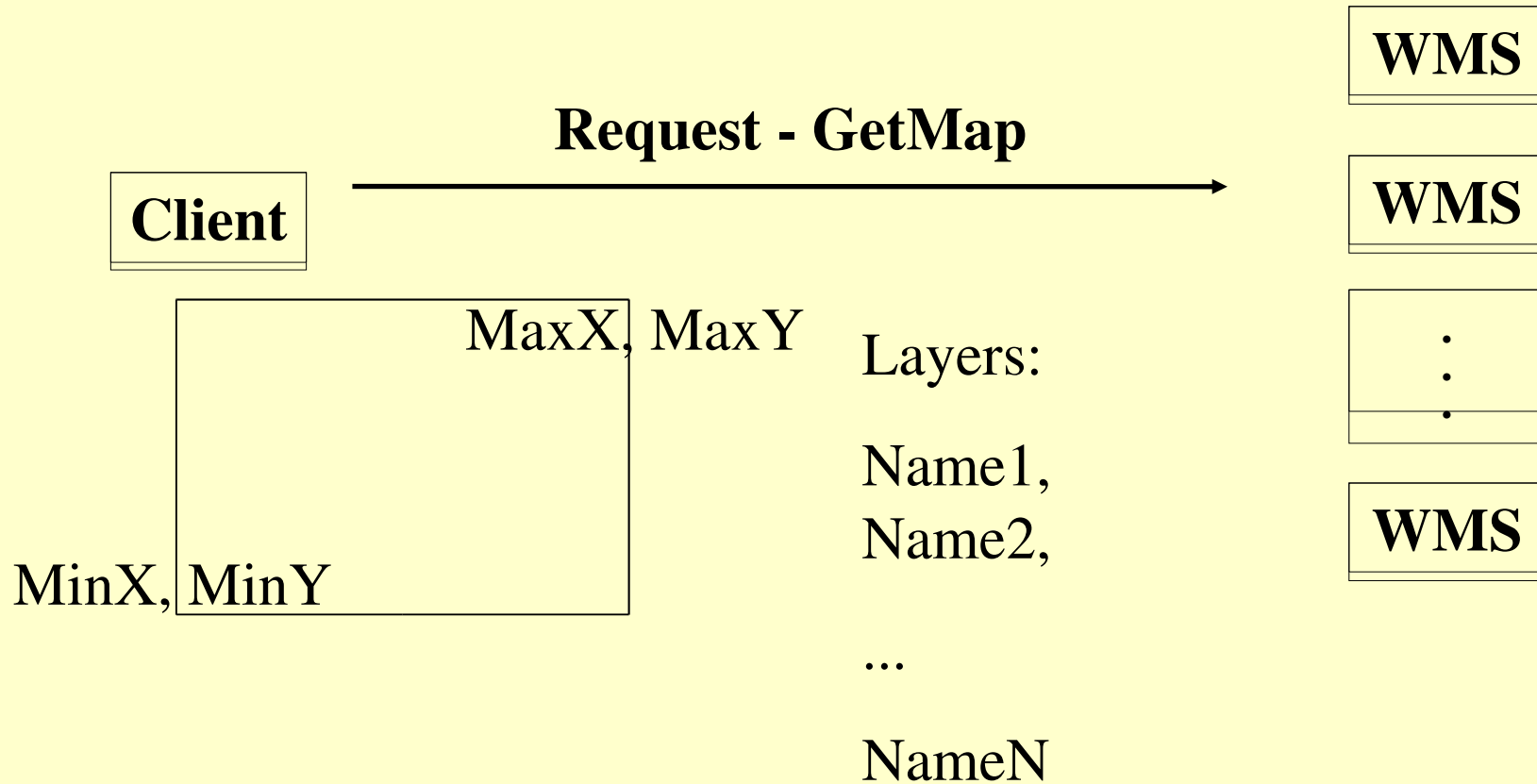


# WMS Requests

- **GetCapabilities**
- **GetMap**
- **GetFeatureInfo**



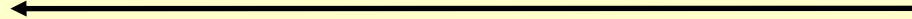
# WMS



# WMS

Client

Response - Bitmap

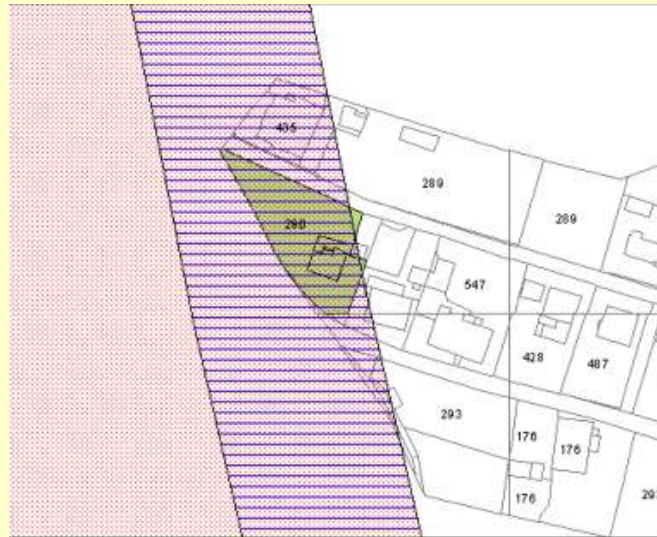


WMS

WMS

⋮

WMS



# WMS

**[http://demo.deegree.org:8080/deegree/wms  
?SERVICE=WMS&REQUEST=GetCapabilities](http://demo.deegree.org:8080/deegree/wms?SERVICE=WMS&REQUEST=GetCapabilities)**

**[http://www.airesip.org/wms/process.cgi?RE  
QUEST=GetMap&FORMAT=image/gif&WI  
DTH=640&HEIGHT=480&LAYERS=temper  
ature&SRS=EPSG:4326&BBOX=-110.,40.,-  
80.,30.&VERSION=1.1.1](http://www.airesip.org/wms/process.cgi?REQUEST=GetMap&FORMAT=image/gif&WIDTH=640&HEIGHT=480&LAYERS=temperature&SRS=EPSG:4326&BBOX=-110.,40.,-80.,30.&VERSION=1.1.1)**



# WMS Others

- **SLD (Styled Layer Descriptor)**
- **Metadata**
- **Time stamp**
- **Coordinate systems – EPSG**
- **Formats**
- **...**



# GML

- **Geography Markup Language**
- **Specification for describing vector geodata in a XML way**
- **Connected with Simple Features Specification – point, line, polygon**
- **Allows more – complex types**



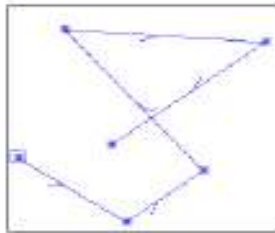
# Simple Features



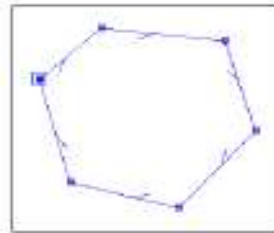
Point



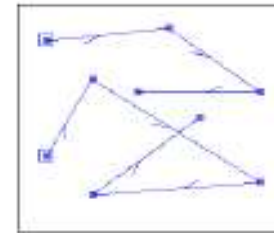
Multi-Point



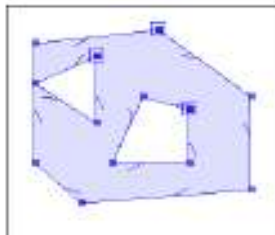
Line-String



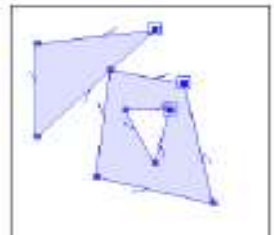
Linear-Ring



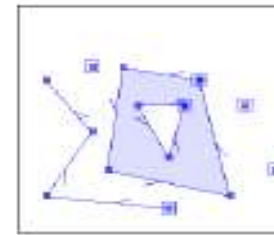
Multi-Line-String



Polygon



Multi-Polygon



Geometry-Collection

# GML – Part of the possible code

```
<gml:featureMember>  
  <kraje_pseudo fid="0">  
    <ob91>824461</ob91>  
    <ob01>820219</ob01>  
    <obakt>820868</obakt>  
    <nazcs>YVXFCMc</nazcs>  
    <zmenazaz>01012000</zmenazaz>  
<ogr:geometryProperty><gml:Polygon><gml:outerBounda  
ryls><gml:LinearRing><gml:coordinates>-732885.511,-  
998448.558 -732885.511,-998448.558 -733385.882,-  
998448.558 -733385.882,-998448.558 -733886.253,-  
998948.858 -733886.253,-1000950.056 -734386.624,-  
1001450.356 -734386.624,-1001450.356
```

....







# WFS

- **Web Feature Service**
- **Standardised way how to get (send) vector geodata from/to map server**
- **Request – parameters (XML/GML)**
- **Response – description (XML) or data (XML/GML)**
- **HTTP, POST, GET**



# WFS Requests

- **GetCapabilities**
- **DescribeFeatureType**
- **GetFeature**
- **LockFeature**
- **Transaction – Insert, Update**



# WFS Request

```
<GetCapabilities xmlns="http://www.opengis.net/wfs" service="WFS"
  version="1.0.0"/>
```

```
<DescribeFeatureType version="1.0.0" service="WFS"
  xmlns="http://www.opengis.net/wfs"
  xmlns:ns01="http://www.server01.com/ns01"
  xmlns:ns02="http://www.server02.com/ns02"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.opengis.net/wfs ../wfs/1.0.0/WFS-
  basic.xsd"> <TypeName>ns01:TREESA_1M</TypeName>
  <TypeName>ns02:ROADL_1M</TypeName>
```

```
</DescribeFeatureType>
```



# WCS

- **Web Coverage Service**
- **Standardised way how to get raw raster geodata from the server**



# OGC CAT

- **Specification for metainformation systems**
- **Standardised way how to ask for metadata, update/insert metadata**
- **ISO 19115, FGDC**
- **SOAP, CORBA, DCOM**

