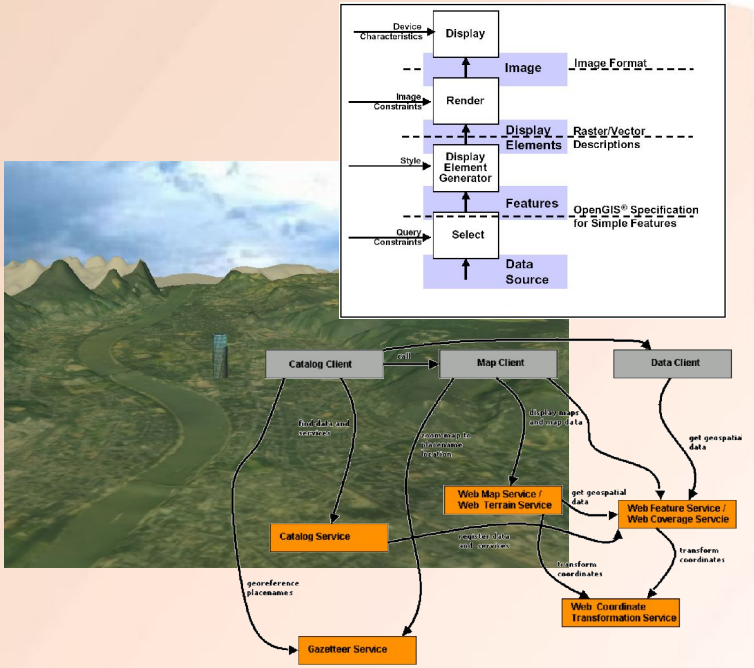
OGC WMS & WFS



lat/lon
raumbezogene informationssysteme

Dipl.-Geograph **Jens Fitzke**
fitzke@lat-lon.de
http://www.lat-lon.de/

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lat/lon?

- Bonn University --> spin-off (11/2000)
- Focus: OGC/ISO know how + Free Software
- Main project: deegree ("Framework")
- OGC WMS Reference Implementation
- OGC Draft Specs: WCTS, WFS-G
- SDI-Projects: QA of German National Metadata Portal, Impl. of Luxembourg Metadata Network, Impl. of Environmental SDI of Hamburg, Cons. in FAO-driven SDI project in Eastern Africa

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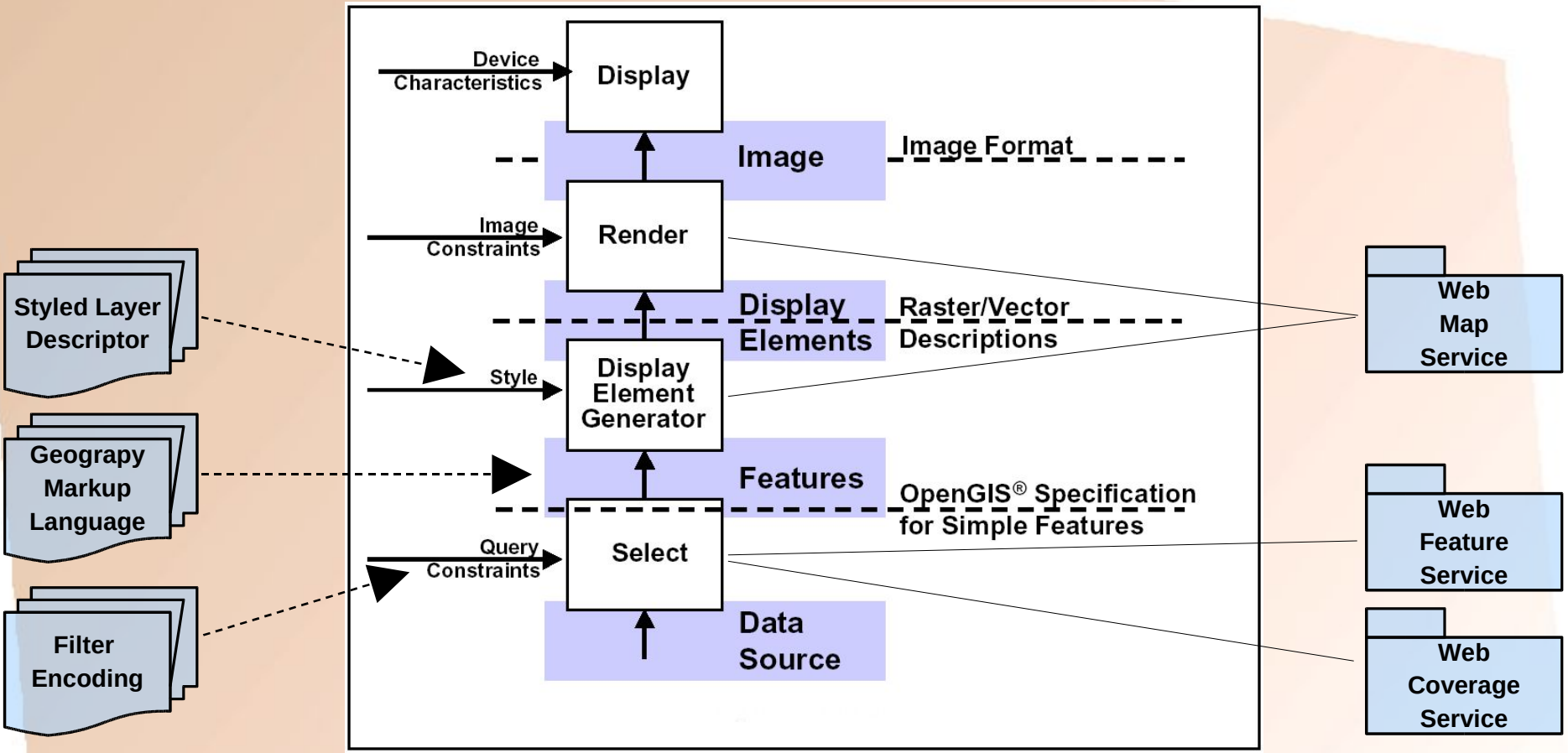
agenda

- intro
  - OGC WMS/WFS overview
  - deegree WMS/WFS overview
- hands on
  - deegree WMS/WFS configuration
  - examples: getting maps & data
- your questions

the portrayal model



Source: Cuthbert 1998, modified (OpenGIS Project Document 98-060)

Web Map Service

The WMS specification standardizes the way in which clients request maps. Clients request maps from a WMS instance in terms of named layers and provide parameters such as the size of the returned map as well as the spatial reference system to be used in drawing the map.
This specification defines three WMS operations: GetCapabilities returns service-level metadata, which is a description of the service's information content and acceptable request parameters; GetMap returns a map image whose geospatial and dimensional parameters are well-defined; GetFeatureInfo (optional) returns information about particular features shown on a map.

(from OpenGIS® Reference Model)

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Web Map Service

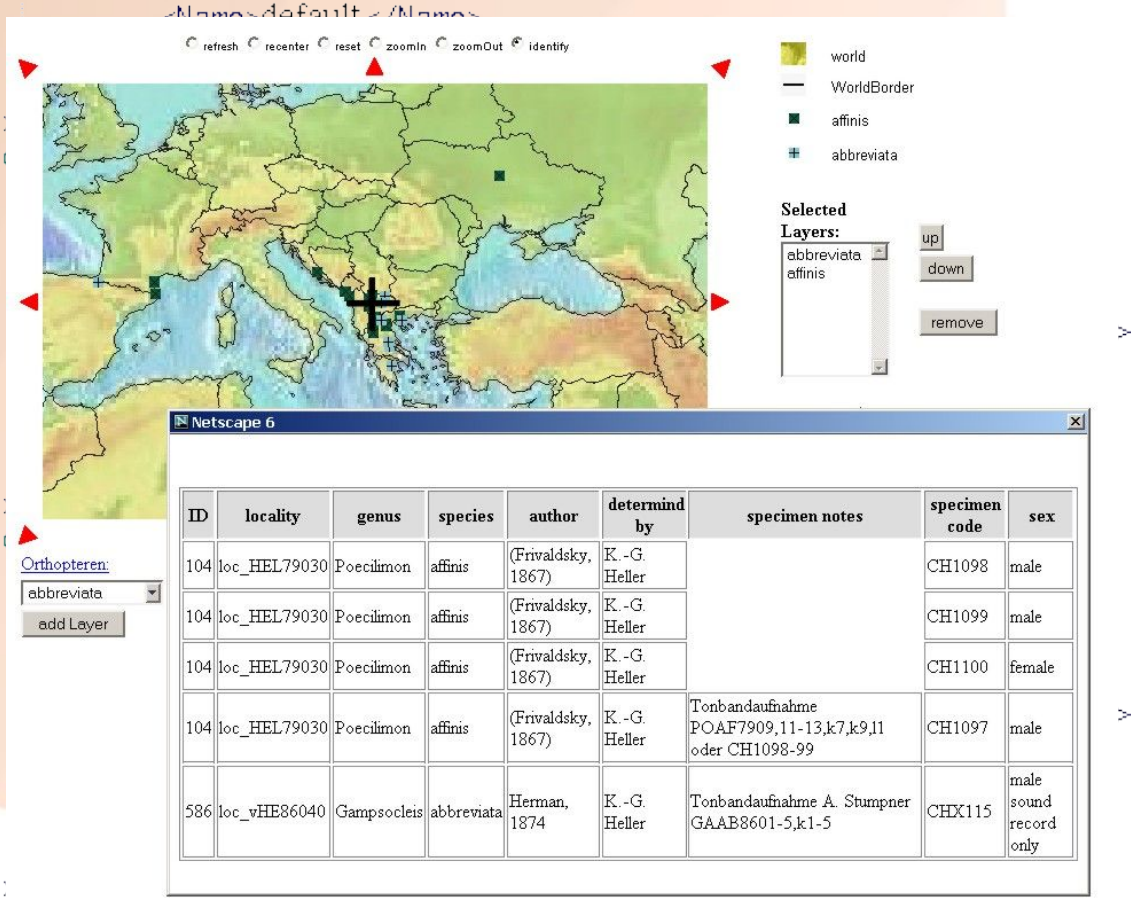
```
</Exception>
<Layer queryable="0">
        <Title>deegree Sample WMS</Title>
        <Abstract>Author: Andreas Poth -- last update: 28.06.02</Abstract>
        <SRS>EPSG:4326</SRS>
        <LatLonBoundingBox minx="-180" miny="-90" maxx="180" maxy="90"/>
        <Layer queryable="0">
                <Name>world</Name>
                <Title>World Topography</Title>
                <Abstract/>
                <SRS>EPSG:4326</SRS>
                <LatLonBoundingBox minx="-180" miny="-90" maxx="180" maxy="90"/>
                <Style>
                        <Name>default</Name>
```

Web Map Service

GetCapabilities

GetMap

GetFeatureInfo



ID	locality	genus	species	author	determind by	specimen notes	specimen code	sex
104	loc_HEL79030	Poecilimon	affinis	(Frivaldsky, 1867)	K.-G. Heller		CH1098	male
104	loc_HEL79030	Poecilimon	affinis	(Frivaldsky, 1867)	K.-G. Heller		CH1099	male
104	loc_HEL79030	Poecilimon	affinis	(Frivaldsky, 1867)	K.-G. Heller		CH1100	female
104	loc_HEL79030	Poecilimon	affinis	(Frivaldsky, 1867)	K.-G. Heller	Tonbandaufnahme POAF7909,11-13,k7,k9,l1 oder CH1098-99	CH1097	male
586	loc_vHE86040	Gampsocleis	abbreviata	Herman, 1874	K.-G. Heller	Tonbandaufnahme A. Stumpner GAAB8601-5,k1-5	CHX115	male sound record only

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WMS GetCapabilities

request

http://localhost:8080/deegreewms/wms?
SERVICE=WMS&
VERSION=1.1.1&
REQUEST=GetCapabilities

response

an XML Document of MIME type
application/vnd.ogc.wms_xml

WMS GetMap

request

http://localhost:8080/deegreewms/wms?
SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&
WIDTH=800&HEIGHT=600&
BBOX=12,30,35,45&
SRS=EPSG:4326&
FORMAT=image/jpg&TRANSPARENT=false&
BGCOLOR=0xffffff&
LAYERS=europe:physical,europe:countries&
STYLES=default,default&
EXCEPTIONS=application/vnd.ogc.se_xml

The 4 parameters printed in blue define the geometric properties of the map to allow for overlay of maps originating from different servers.

response

a map image of the requested MIME type

SLD WMS GetMap

request

http://localhost:8080/deegreewms/wms?
SERVICE=WMS&VERSION=1.1.1&REQUEST=GetMap&
WIDTH=800&HEIGHT=600&
BBOX=12,30,35,45&
SRS=EPSG:4326&
FORMAT=image/jpg&TRANSPARENT=false&
BGCOLOR=0xffffff&
SLD=http://localhost/sld_repository/mySLDfile.xml&
EXCEPTIONS=application/vnd.ogc.se_xml

alternatives:
- SLD_BODY param
- HTTP POST

response

a map image of the requested MIME type

WMS GetFeatureInfo

request

http://localhost:8080/deegreewms/wms?
SERVICE=WMS&VERSION=1.1.1&
REQUEST=GetFeatureInfo&
[copy of the map request parameters]&
QUERY_LAYERS=europe:countries
FEATURE_COUNT=999&
INFO_FORMAT=application/vnd.ogc.gml&
X=224&Y=226&
EXCEPTIONS=application/vnd.ogc.se_xml

response

according to the requested MIME type

Web Feature Service

The Web Feature Service (WFS) supports INSERT, UPDATE, DELETE, QUERY and DISCOVERY of geographic features. WFS delivers GML representations of simple geospatial features in response to queries from HTTP clients. Clients access geographic feature data through WFS by submitting a request for just those features that are needed for an application.
A WFS can either be a basic WFS (a READ-ONLY WFS), which implements the GetCapabilities, DescribeFeatureType and GetFeature interfaces, or a transaction WFS, which, in addition to supporting all the interfaces of a basic WFS, implements the Transaction interface (and optionally the LockFeature interface).

(from OpenGIS® Reference Model)

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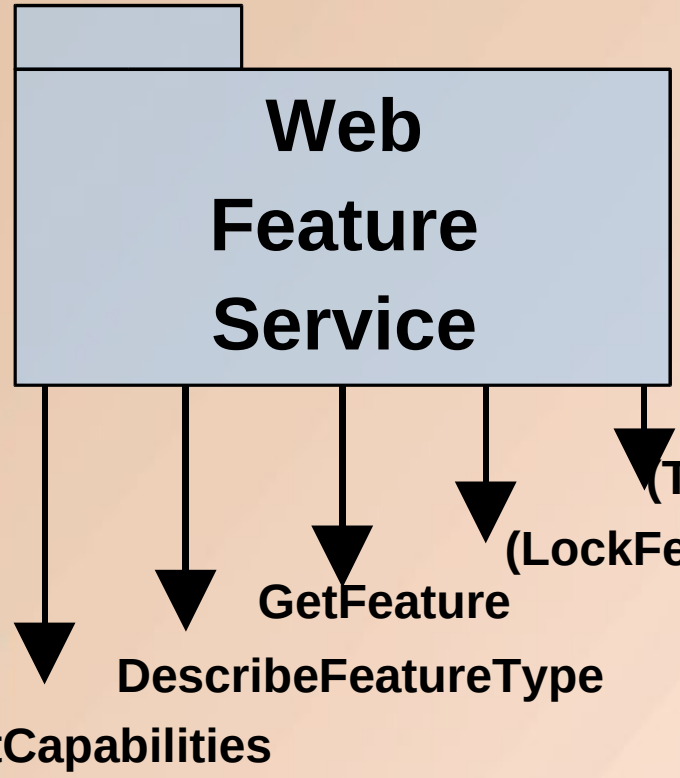
Web Feature Service



Filter Encoding

```
<wfs:Query typeName="NIMA_GNS">
    <ogc:Filter>
        <ogc:And>
            <ogc:PropertyIsLike wildCard="*" singleChar="?" escape="\">
                <ogc:PropertyName>isol9112:geographicIdentifier</ogc:PropertyName>
                <ogc:Literal>Bonn*</ogc:Literal>
            </ogc:PropertyIsLike>
            <ogc:PropertyIsEqualTo>

<ogc:PropertyName>isol9112:SI_LocationType/isol9112:identifier</ogc:PropertyName>
                <ogc:Literal>PPL</ogc:Literal>
            </ogc:PropertyIsEqualTo>
            <ogc:BBOX>
                <ogc:PropertyName>isol9112:geographicExtent</ogc:PropertyName>
                <gml:Box>
                    <gml:coordinates>6.8,50 7.5,51</gml:coordinates>
                </gml:Box>
            </ogc:BBOX>
        </ogc:And>
    </ogc:Filter>
</wfs:Query>
```

Geography Markup Language (GML)

```
    <wfs-g:queryResult>
        <wfs-g:BKG_VG250 fid="BKG_VG250.0531400000">
            <isol9112:geographicIdentifier>Bonn</isol9112:geographicIdentifier>
            <isol9112:geographicExtent>
                <isol9115:EX_BoundingPolygon>
                    <isol9115:polygon>
                        <isol9115:polygon>
                            <gml:outerBoundaryIs>
                                <gml:LinearRing>
                                    <gml:coordinates cs="," decimal="." ts="
">7.06093344,50.6327601 7.1943768,50.6424065 7.19526636,50.642616 7.21074312,50.6497487
7.20946764,50.736821 7.20407844,50.7447358 7.19984772,50.7480007 7.1351298,50.771321
7.13182104,50.7724081 7.12523412 50.7743091 7.06712112,50.7712943 7.04855088,50.76436
7.03844532,50.7592832 7.037316,50.7582187 7.02247392,50.7066729 7.02238068,50.7063067
7.02377892 50.6613098 7.02414,50.6613798 7.02602676,50.6542991 7.05698244,50.632905
7.06093344,50.6327601</gml:coordinates>
                                </gml:LinearRing>
                            </gml:outerBoundaryIs>
                        </isol9115:polygon>
                    </isol9115:polygon>
                </isol9115:EX_BoundingPolygon>
            </isol9112:geographicExtent>
            <isol9112:position>
                <gml:Point>
                    <!-- to be changed to gml:pos in GML3.0 -->
                    <gml:coordinates cs="," decimal="." ts="
">7.10993405,50.7056914</gml:coordinates>
                </gml:Point>
            </isol9112:position>
            <isol9112:administrator>
                <isol9115:CI_ResponsibleParty>
```

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WFS GetCapabilities

request

http://localhost:8080/deegreewfs/wfs?
SERVICE=WFS&
VERSION=1.0.0&
REQUEST=GetCapabilities

response

an XML Document of MIME type text/xml

alternative:
- HTTP POST

WFS DescribeFeatureType

request

http://localhost:8080/deegreewfs/wfs?
SERVICE=WfS&VERSION=1.0.0&
REQUEST=DescribeFeatureType&
TYPENAME=europe:countries&
OUTPUTFORMAT=XMLSCHEMA

alternative:
- HTTP POST

response

an XML schema document describing the structure of the requested feature types

WFS GetFeature

request

XML-Document containing Filter Encoding query like

```
<?xml version="1.0" encoding="iso-8859-1"?>
<wfs:GetFeature xmlns:wfs="http://www.opengis.net/wfs"
xmlns:ogc="http://www.opengis.net/ogc" outputFormat="GML2">
    <wfs:Query typeName="FeatureTypeToQuery">
        <wfs:PropertyName>selectedProperty1</wfs:PropertyName>
        <wfs:PropertyName>selectedProperty2</wfs:PropertyName>
        <ogc:Filter>
            <ogc:PropertyIsLike wildCard="*" singleChar="?" escape="\">
                <ogc:PropertyName>aProperty</ogc:PropertyName>
                <ogc:Literal>*someCharacters*</ogc:Literal>
            </ogc:PropertyIsLike>
        </ogc:Filter>
    </wfs:Query>
</wfs:GetFeature>
```

```
<?xml version="1.0" encoding="iso-8859-1"?>
<wfs:GetFeature xmlns:wfs="http://www.opengis.net/wfs"
xmlns:ogc="http://www.opengis.net/ogc"
xmlns:gml="http://www.opengis.net/gml" outputFormat="GML2">
    <wfs:Query typeName="FeatureTypeToQuery">
        <ogc:Filter>
            <ogc:BBOX>
                <ogc:PropertyName>ageometricProperty</ogc:PropertyName>
                <gml:Box>
                    <gml:coordinates>-8.0,40.0 12.0,56.4</gml:coordinates>
                </gml:Box>
            </ogc:BBOX>
        </ogc:Filter>
    </wfs:Query>
</wfs:GetFeature>
```

send to the WFS via HTTP POST

alternative:
- HTTP GET (limited)

response

a GML Document

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integrated/component WMS

- implementation, not compliance issue
- integrated WMS
  - tighly coupled to feature stores
  - named layers and styles
  - may support user defined styles
- component WMS
  - not (necessarily) bound to feature stores
  - supports user defined layers and styles

component WMS

preconditions for component WMS usage:

- enhancements of the capabilities document
- describeLayer request
- (limited) access to the underlying feature store
  - GetCapabilities
  - DescribeFeatureType

deegree (JaGo)

Java Framework for Geospatial Solutions

.org

- Collaboration between GIS RG, Dept. of Geogr., Bonn Univ. and lat/lon
- Free Software: LGPL

.aim

- Interoperability
- Geodata Management
- SDI building blocks

.how

- ISO Models (esp. 19107) and OGC Interfaces
- Datasource Abstraction
- XML-based Configuration

.now

- Most comprehensive OGC/ISO-related Free Software Package:
  CS-W, WMS (OGC Reference Implementation), WFS, WCS, WTS, WCTS

http://deegree.sourceforge.net/

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free software ?

GNU's Not Unix! - the GNU Project and the Free Software Foundation (FSF) - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop http://www.fsf.org/ Search Print

GNU's Not Unix!

Free software is a matter of liberty, not price. To understand the concept, you should think of „free“ as in „free speech“, not as in „free beer“.

The Free Software Foundation (FSF) is the principal organizational sponsor of the GNU Project. FSF receives very little funding from corporations or grant-making foundations. We rely on support from individuals like you who support FSF's mission to preserve, protect and promote the freedom to use, study, copy, modify, and redistribute computer software, and to defend the rights of Free Software users. Last year, over 67% of our operating funds came from individual donors. That ongoing support is the primary way we can continue our work. Please consider making a donation today.

[Albanian | Catalan | Chinese(Simplified) | Chinese(Traditional) | Croatian | Czech |

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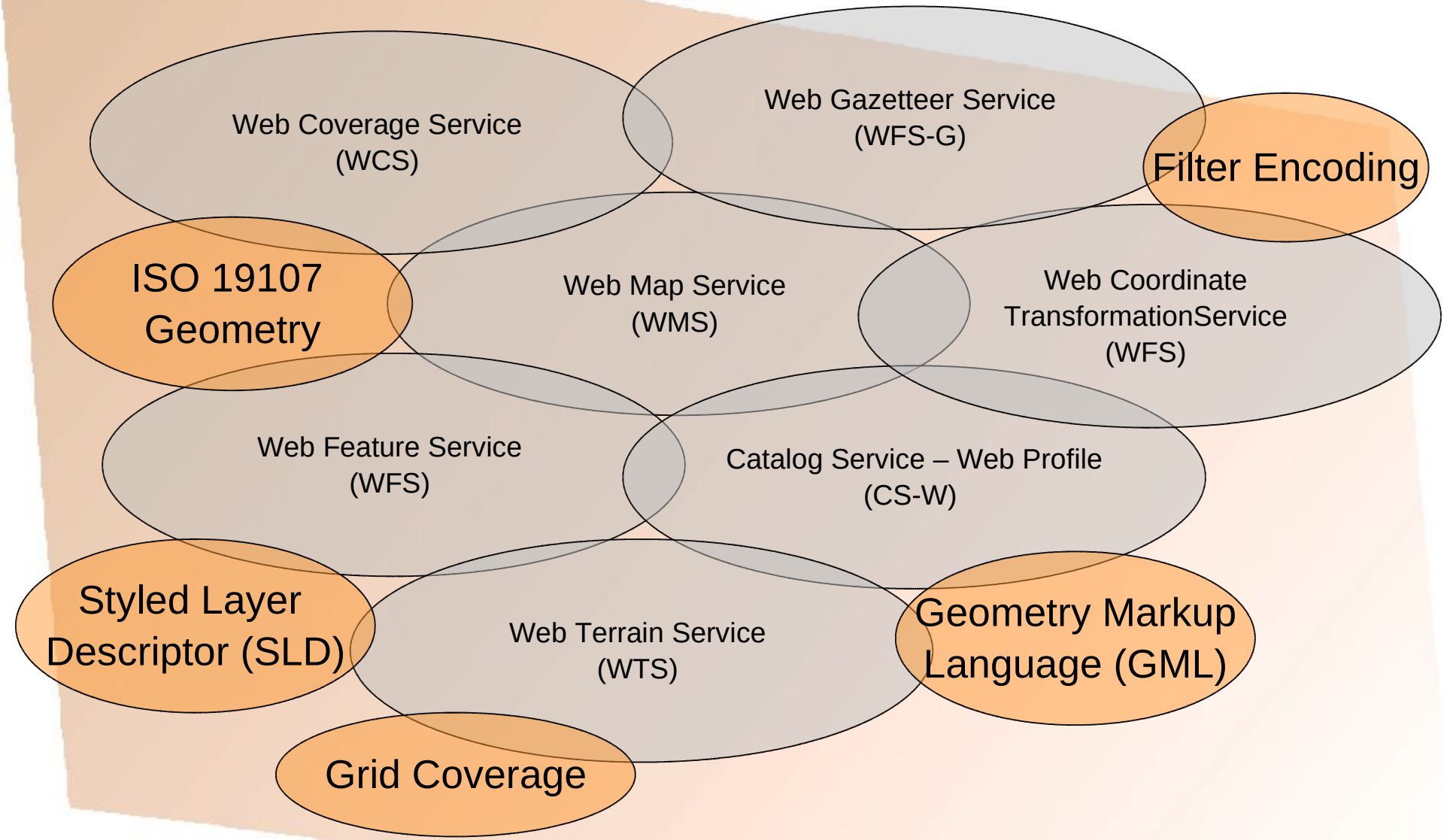
deegree modules



services implemented

Name	Functionality
Web Map Service (WMS)	Web-based creation of maps out of raster and vector datasets. The generated maps can be visualized by common web browsers.
Web Feature Service (WFS)	Web-based access to vector geo-data, that is delivered as GML 2.1.1 conformant XML-documents to clients, which can the further process this data (for example in a desktop GIS).
Web Coverage Service (WCS)	Web-based access to raster geo-data, that can be delivered in several image formats (e.g. TIFF, GIF, JPEG, BMP, PNM) and can then further be processed.
Web Catalog Service (CS-W) based on OGC Web Services Stateless Catalog Profile.	Web-based catalog service for administration and querying of metadata describing geo-data and geo-services. A catalog service allows retrieval of data and services based on spatial and textual search criteria.
Web Gazetteer Service (WFS-G)	Service allowing geo-referencing of geographic entities based on textual identifiers (e.g. place names)
Web Terrain Service (WTS)	Creation of views out of 3D-data like city models and digital elevation models. The generated views can be visualized by standard web browsers.
Web Coordinate Transformation Service (WCTS)	A WCTS allows the web-based transformation of geographic coordinates from one coordinate references system into another.

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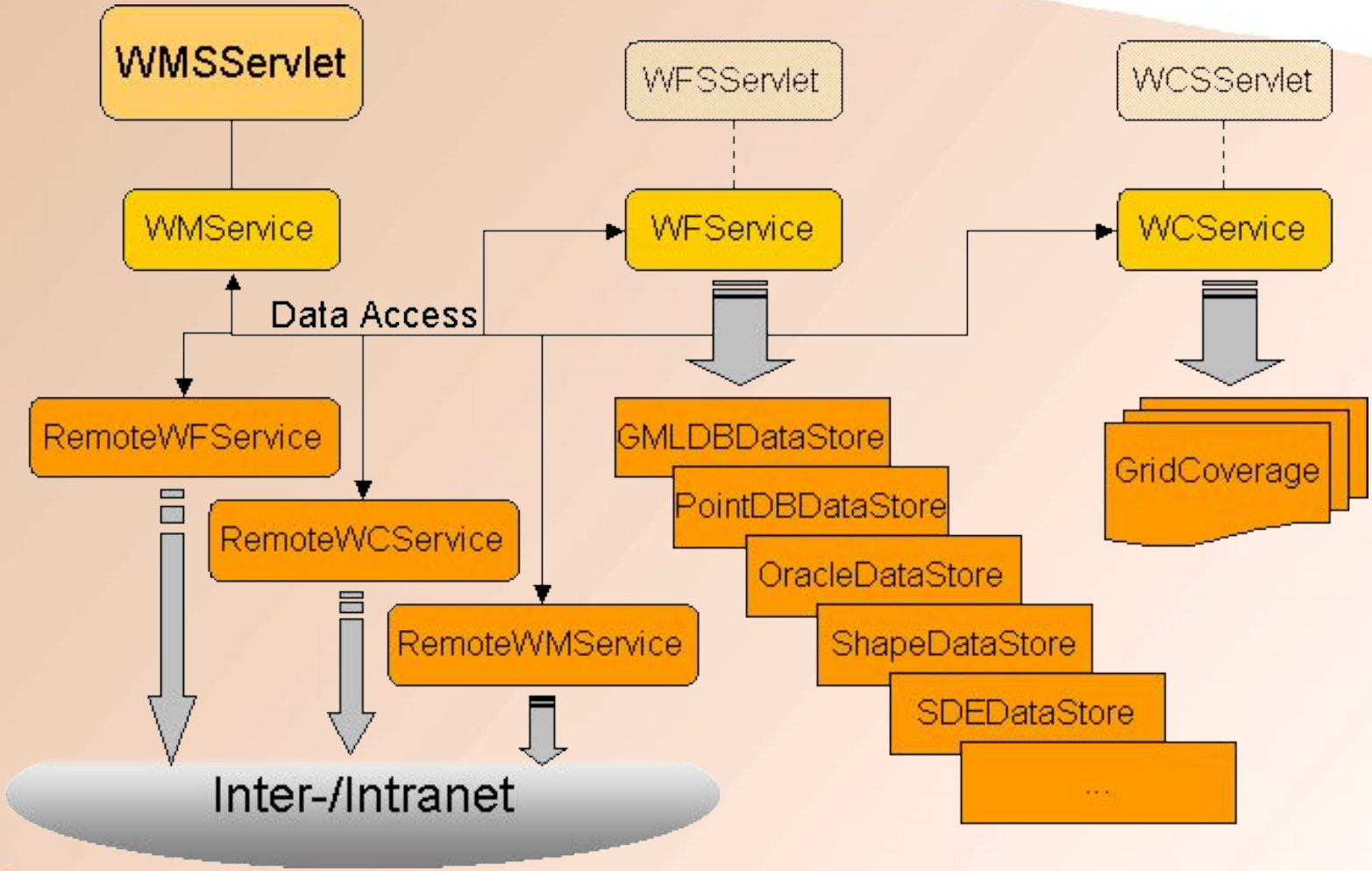
deegree data access



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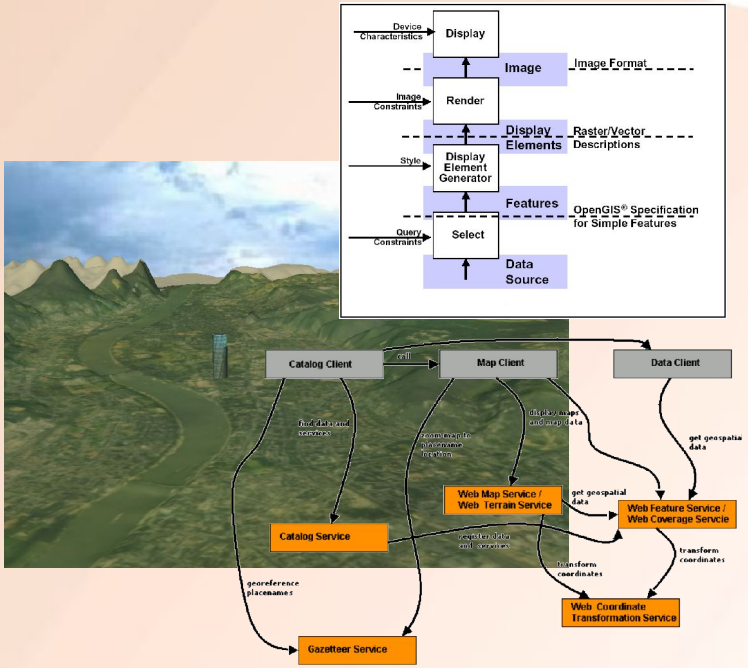
it's up to you...

- copy the DemoCD_deegree directory from the CD into the root of your c:/ drive
- start c:/DemoCD_deegree/runTomcat.bat
- open your favourite Web browser
- WMS: http://localhost:8080/deegreewms/
- WFS: http://localhost:8080/deegreewfs/wfs?
- WMS Client: http://localhost:8080/client
- simple Viewer (with basic WFS interaction facilities): start c:/DemoCD_deegree/runViewer.bat

thank you! – questions?

OGC WMS & WFS



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Dipl.-Geograph **Jens Fitzke**
fitzke@lat-lon.de
http://www.lat-lon.de/

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