Open Source GIS

LOTS Bern 18.2.05

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Agenda

- Typische GIS Anwendungen
- Datenformate und GIS-Datenbanken
- Standards & Protokolle
- Bibliotheken & Applikationen
- Fragen & Live-Demo

Open Source

- GPL (GNU General Public License)
  - Freedom to use/distribute/improve/study
  - Linux Kernel, GNU-Tools, KDE, GRASS
- Andere OSS Lizenzen
  - BSD (UMN MapServer)
  - Apache
  - Mozilla Public License (MPL)
  - www.opensource.org

Typische GIS Funktionen

- GIS: Geographische Informationssysteme
- Funktionen
  - Karten-Anzeige / Visualisierung
  - Informationen, Suchfunktionen
  - Analyse
  - Datenerfassung (Digitalisierung), Bearbeitung

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Datenformate und Datenbanken

- Rasterdaten
  - Pixel-basiert, z.B. Satellitenbilder
  - Formate: TIFF, jpeg
- Vektordaten
  - Formate: Shape-Files und viele mehr
- GIS-Datenbanken
  - Speicherung und Indizierung von Vektordaten

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Geo-Datenbanken

- PostgreSQL/PostGIS
- MySQL
- Kommerziell: Oracle Spatial, ArcSDE

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Geo-Datenbanken / PostGIS

- Erweiterung PostgreSQL
- OpenGIS „Simple Features“
- ```
  create table baum (gid int4,baum_typ varchar);
  select AddGeometryColumn ('geodaten1','baum',
  'the_geom','31493','POINT',2);
  insert into baum values ('1','Erle',GeometryFromText
  ('POINT(3564780.70 5631558.75)',31493));
  insert into baum values ('2','Linde', GeometryFromText
  ('POINT(3564850.72 5631672.23)', 31493));
  ```


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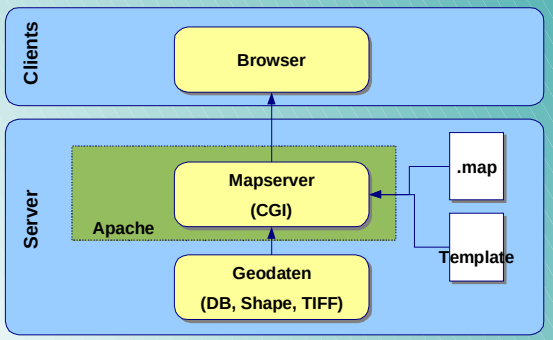
Von den Daten zur Karte im Browser


  ```

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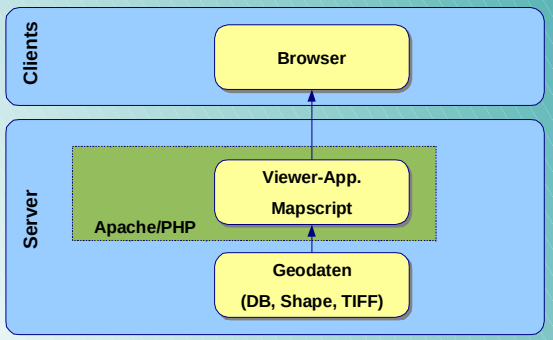
Von den Daten zur Karte im Browser



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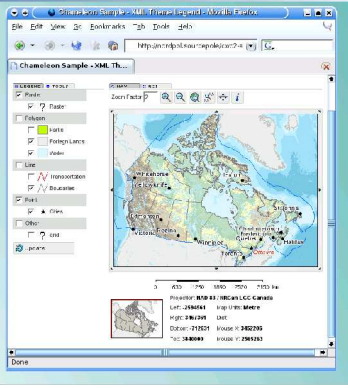
Chameleon



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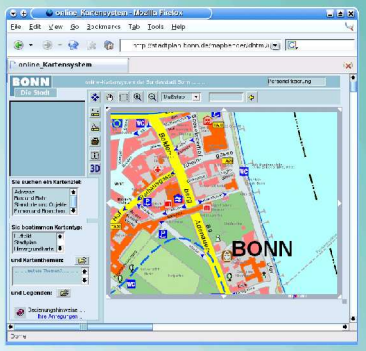
MapBender



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Datenquellen

- Frei erhältliche Daten
  - vmap0
  - GEOnet Names Server (GNS)
- Kostenpflichtige Daten
  - CH Landeskarten (Vektor, Raster)
  - Luftbilder
  - ...

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GIS-Standards

- Datenformate
  - GML
  - Interlis 1 und 2
- Protokolle
  - WMS (Web Mapping Service)
  - WFS & weitere OGC Standards

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GIS-Standards - GML

- Geography Markup Language
- http://www.opengis.org/specs/
- Datenspezifikation:
  - XML Schema
- Daten:
  - XML

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Interlis

- www.interlis.ch
- Amtliche Vermessung CH: Interlis 1
- Aktuell: Interlis 2
- Datenspezifikation:
  - Interlis (Pascal-ähnliche Syntax)
- Daten (Transferformat):
  - XML

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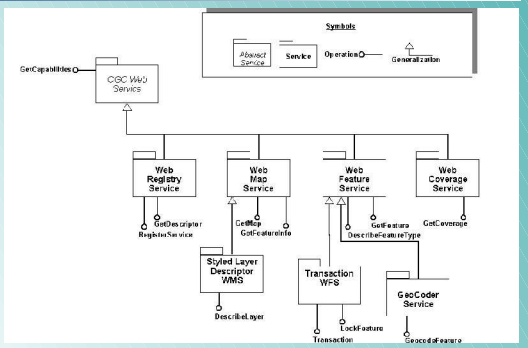
OGC Web Services

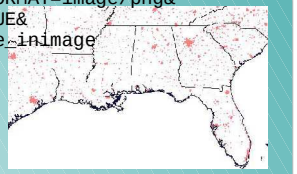


Web Map Service (WMS)

- HTTP-based communication
  - HTTP GET or POST mechanism
- Operations
  - GetCapabilities
  - GetMap
  - GetFeatureInfo (optional)

Web Map Service (WMS)

- http://www.opengis.org/specs/
- `http://b-maps.com/map.cgi?VERSION=1.1.0&`
  `REQUEST=GetMap&SRS=EPSG:4326&`
  `BBOX=-97.105,24.913,78.794,36.358&`
  `WIDTH=560&HEIGHT=350&`
  `LAYERS=BUILTUPA_1M,COASTL_1M,POLBNDL_1M&`
  `STYLES=0XFF8080,0X101040,BLACK&FORMAT=image/png&`
  `BGCOLOR=0xFFFFFF& TRANSPARENT=TRUE&`
  `EXCEPTIONS=application/vnd.ogc.se_inimage`



Web Feature Service (WFS)

- Feature level access to spatial data
  - Finer grained access and query
- Spatial and non-spatial query capability
  - Attribute and / or geometry
- Returns GML
  - Further transform with XSLT to SVG, style with SLD, etc.
- Transactional capability
  - INSERT, UPDATE, DELETE, LOCK, …
- Security considerations

Styled Layer Descriptors (SLD)

- Symbolization to map data
- Styling
- Addresses lack of symbolization within current and past OGC services
- Cartographic design of GeoData
- Augments OpenGIS specifications
  - Can custom style WMS content
  - Can custom style WFS content

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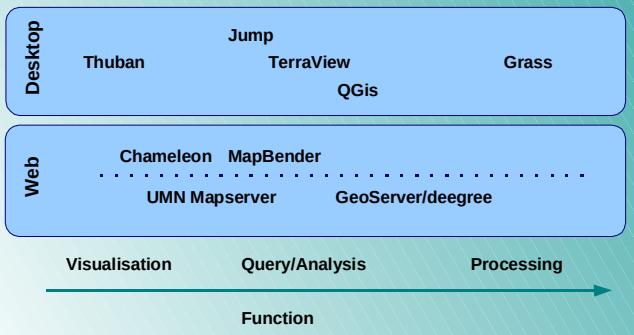
Applikations-Landschaft



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Applikationen OGC

Product	URL	OGC Specification(s)
UMN MapServer	http://mapserver.gis.umn.edu/	WMS,WFS,Context,SLD Filter,GML
PostGIS	http://postgis.refractions.net/	Simple Features for SQL
MapBuilder	http://mapbuilder.sourceforge.net/	WMS,Context
deegree	http://deegree.sourceforge.net/	WMS,WFS,WCS,WCAS WFS-G,WTS,WCTS
GeoServer	http://geoserver.sourceforge.net/	WFS-T
maplab	http://www.maptools.org/maplab/index.phtml	WMS
Chameleon	http://www.maptools.org/chameleon/index.phtml	WMS,Context,WFS
inlineWMS	http://sourceforge.net/projects/inlinewms	WMS
JUMP	http://www.vividsolutions.com/jump/	GML
GEOS	http://geos.refractions.net/	Simple Features for SQL
gml4j	http://gml4j.sourceforge.net/	GML
MySQL Spatial	http://www.mysql.com/	OGC Geometry Model
MapSurfer	http://mapsurfer.sourceforge.net/	WMS
PyOGCLib	http://pyogclib.sourceforge.net/	WMS
QuickWMS	http://www.inovagis.org/quickwms/	WMS
Studio	http://www.maptools.org/studio/	SLD,Context,WMS
OpenMap	http://openmap.bbn.com/	
GeoTools	http://www.geotools.org/	GML,SLD,Grid Coverages,WCTS,Filter

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„Two Tribes“

- C Tribe
  - UMN Mapserver
  - GRASS
  - OpenEV
  - QGIS
  - OGR/GDAL
  - PROJ4
  - GEOS
  - PostGIS
- Java Tribe
  - GeoTools
  - GeoServer
  - DeeGree
  - OpenMap
  - JUMP
  - uDig

OpenGIS WMS/WFS

JDBC

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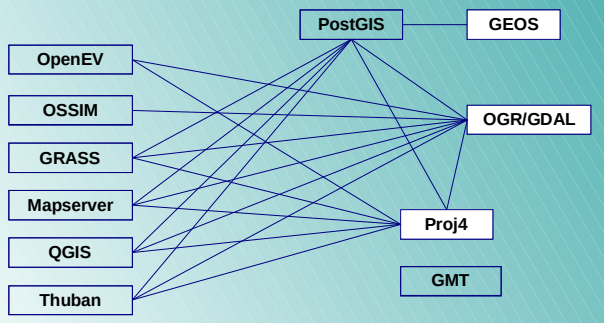
C Tribe



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C Libraries

- GDAL
  - Raster Format Reader / Writer
- OGR
  - Vector Format Reader / Writer
- PROJ4
  - Coordinate Reprojection
- GEOS
  - Geometry Objects and Functions

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C Servers

- Mapserver
  - OpenGIS Web Map Server
  - OpenGIS Web Feature Server
  - OGR / GDAL / PROJ4
  - PostGIS / ArcSDE / OracleSpatial
- PostGIS
  - OpenGIS Simple Features for SQL
  - PROJ4 / GEOS

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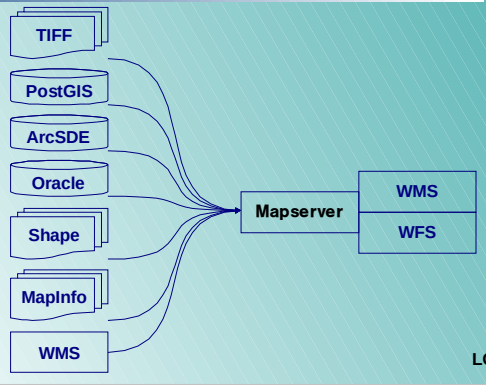
UMN Mapserver



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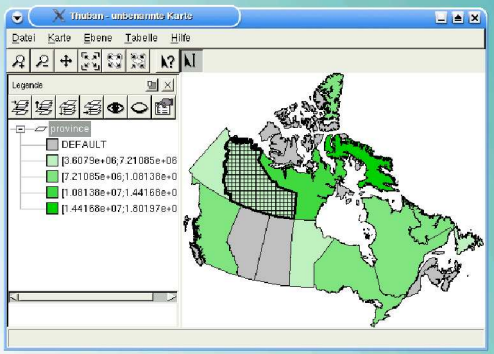
Thuban



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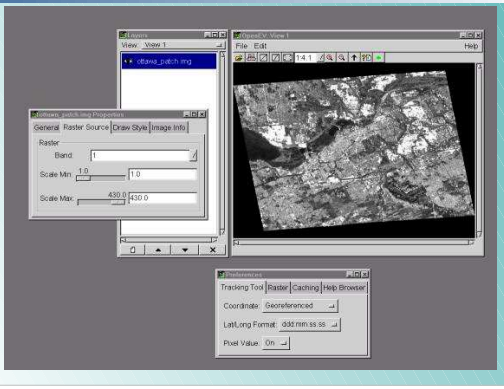
OpenEV



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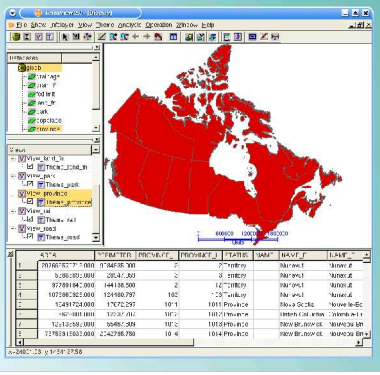
TerraView



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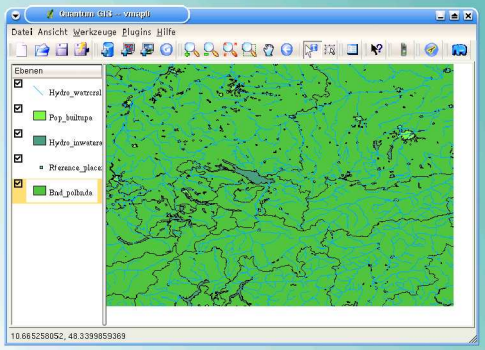
QGIS (Quantum GIS)



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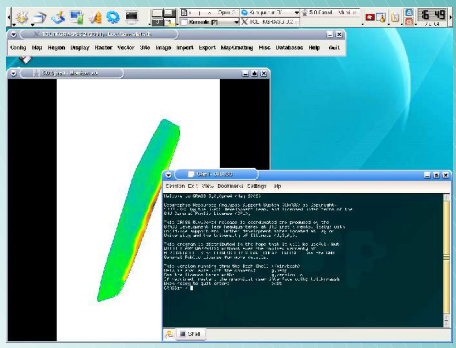
GRASS



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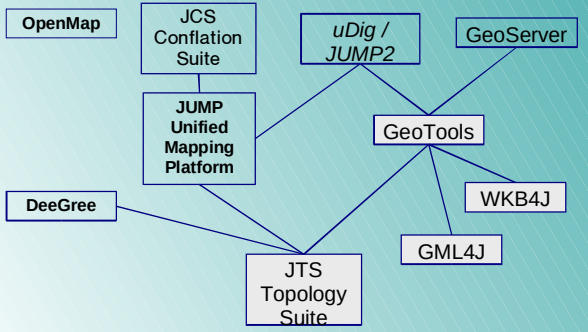
Java Tribe



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Java Libraries

- JTS Topology Suite
  - OpenGIS Geometries and Methods
- GeoTools
  - Data Formats, Java GIS Toolkit
- WKB4J
  - Java Well-Known Binary Reader / Writer
- GML4J
  - Java GML Reader / Writer

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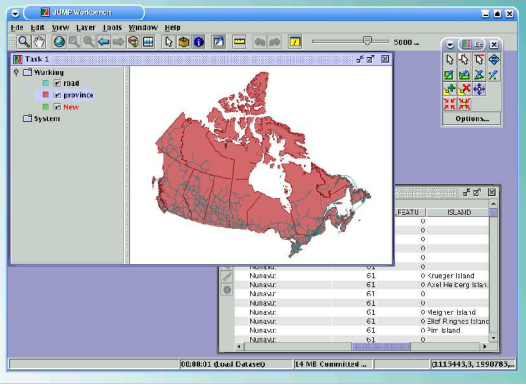
JUMP



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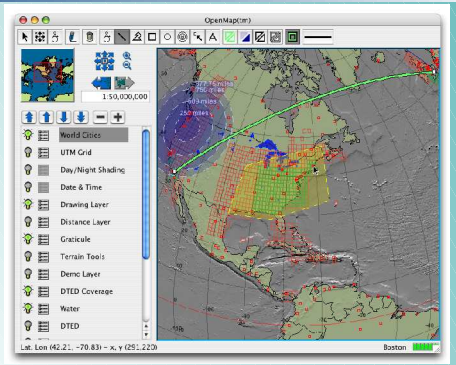
OpenMap



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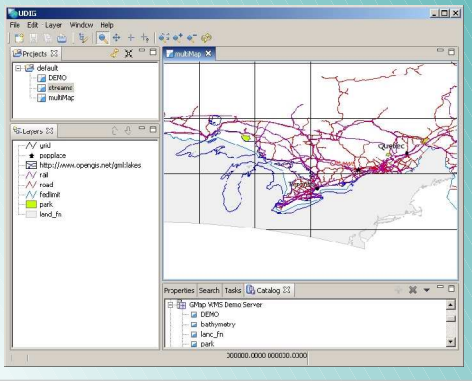
uDIG



Weitere Links

- http://www.freegis.org/
- http://www.sourcepole.ch/gis-knoppix/

Credits:

- Paul Ramsey, Refractions Research
- Tom Kralidis, Jeff McKenna, Peter Pulsifer, Bart van den Eijnden

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Fragen?
Live-Demo
Danke!

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<pka at sourcepole.ch>