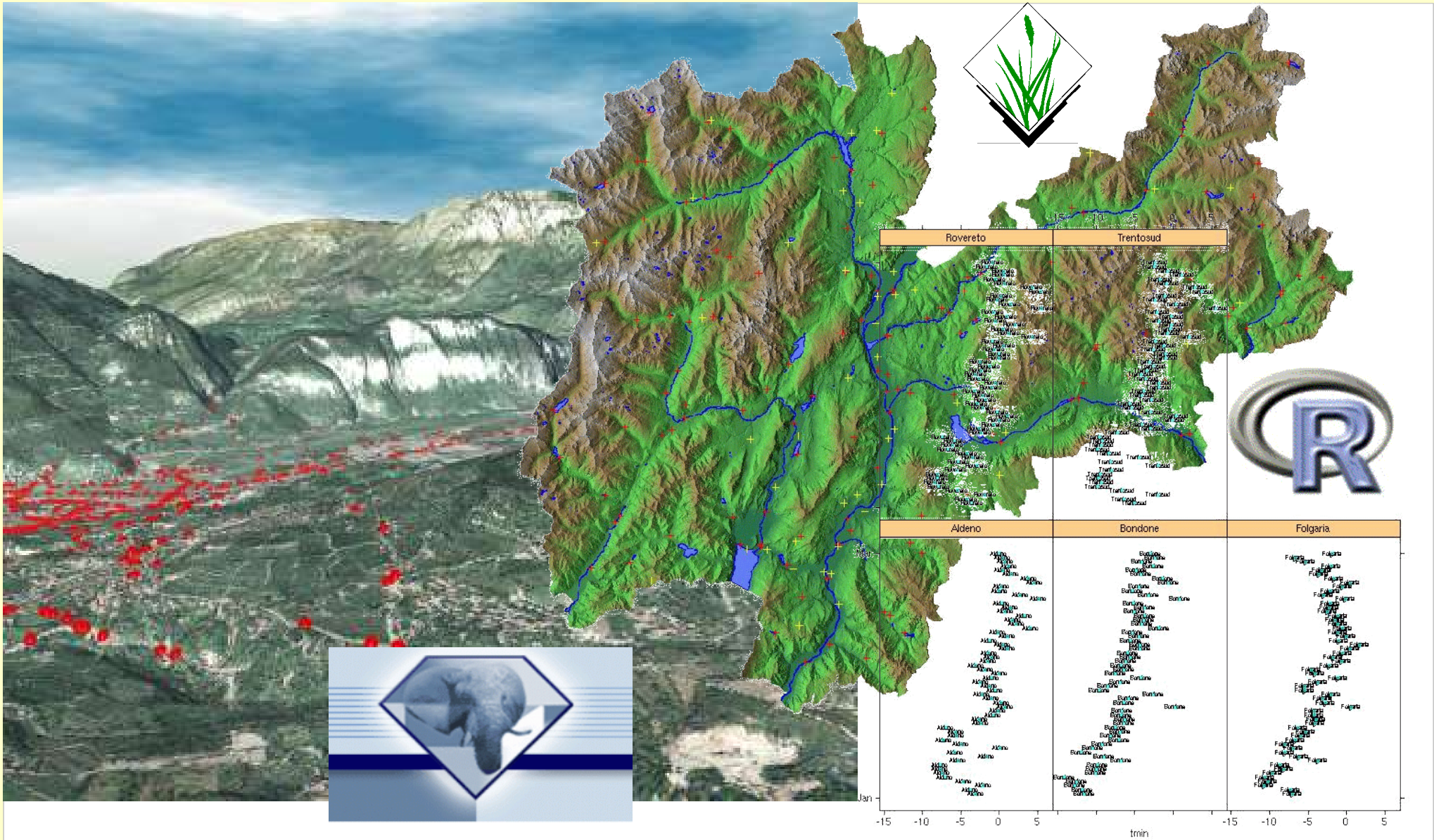
Advanced Databases
Part 1: Introduction to GRASS

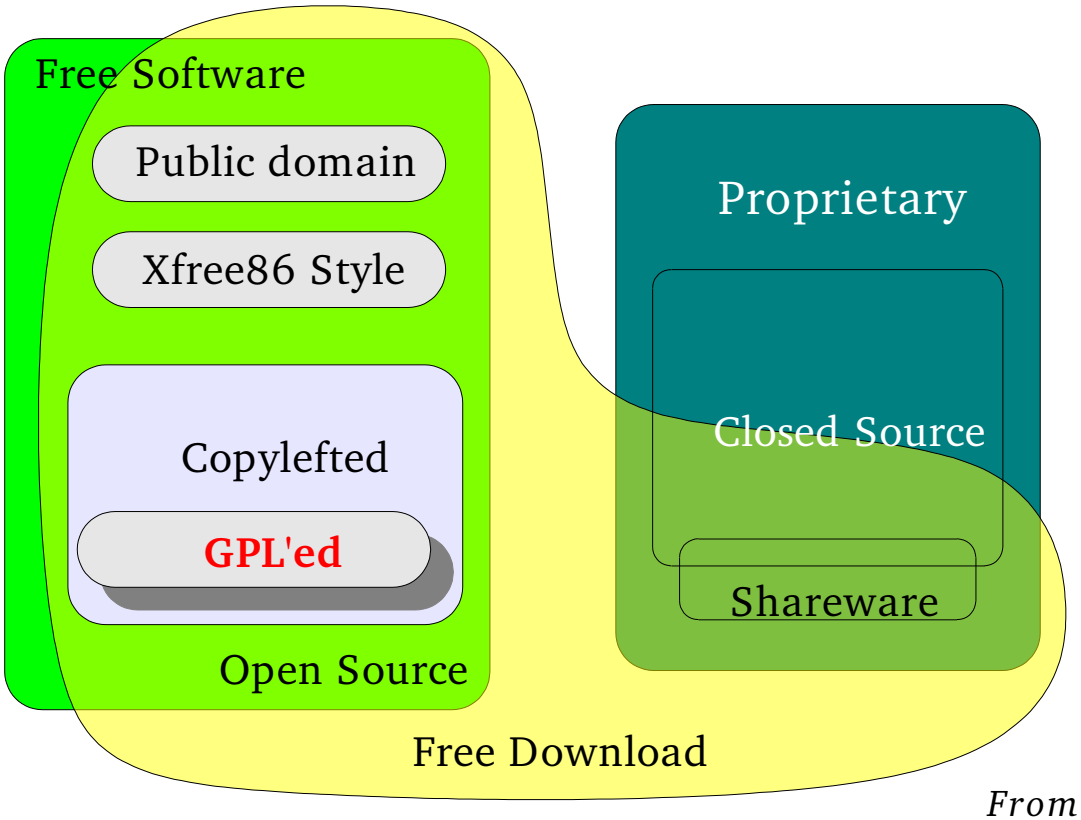
Markus Neteler, ITC-irst, 2004



Outline

- Software Licenses, GRASS History
- GRASS Database structure
- Linux file system structure
- Launching GRASS
- Sample session with 'Spearfish' dataset

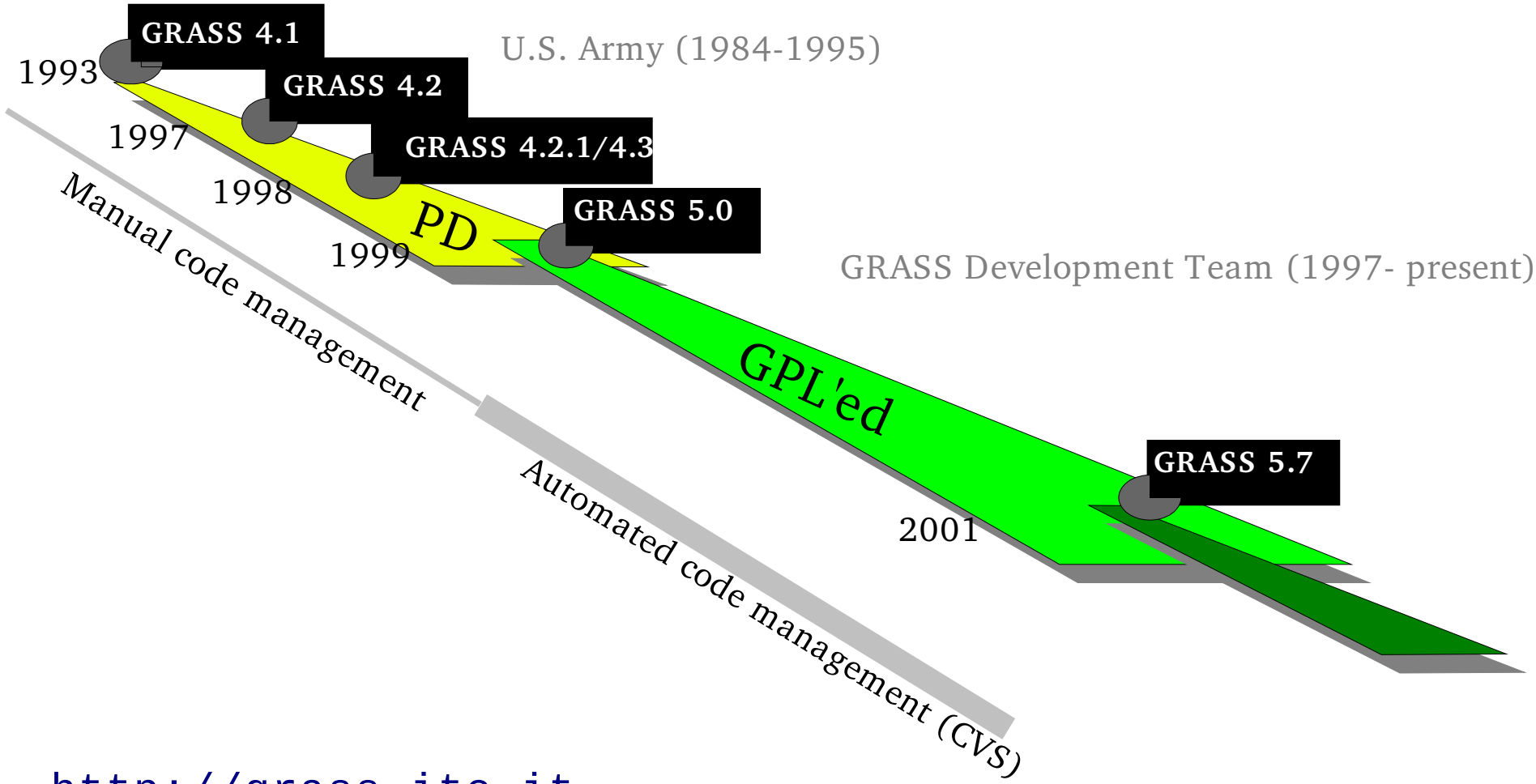
Software Licenses: Free Software vs. non-free



From GNU web site

GRASS: General Public License GPL

GRASS History



http://grass.itc.it

GRASS Web site

- GRASS main web site

  http://grass.itc.it

- Download: Current versions 5.0.x, 5.3.x, **5.7.x**

- Documentation: “GRASS Documentation Project” (GDP)

- Sample data: “Spearfish location” - South Dakota, USA

Setup in DIT computer lab

- The installation of the software is done in /usr/local/grass57 which is a **network** directory (single installation for all users)
- The 'Spearfish' data set is installed in another network directory (/utenti/grassdata/spearfish)
- The GRASS users have to store their data on a **local** disk (/scratch/ directory). This requires to create a link from the network data directory containing the common maps to the local directory:

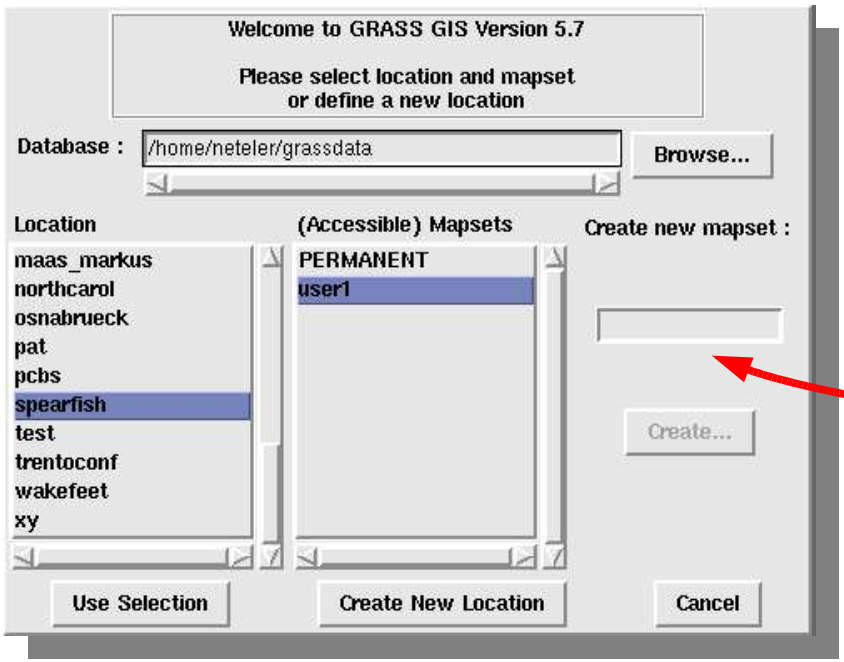
```
cd /scratch/grassdata/spearfish
ln -s /utenti/grassdata/spearfish/PERMANENT PERMANENT
```

- Then GRASS can be launched. You will work in /scratch/grassdata/spearfish in your own mapset but also see the common data from the PERMANENT mapset.

Starting with GRASS

- Start GRASS 5.7:

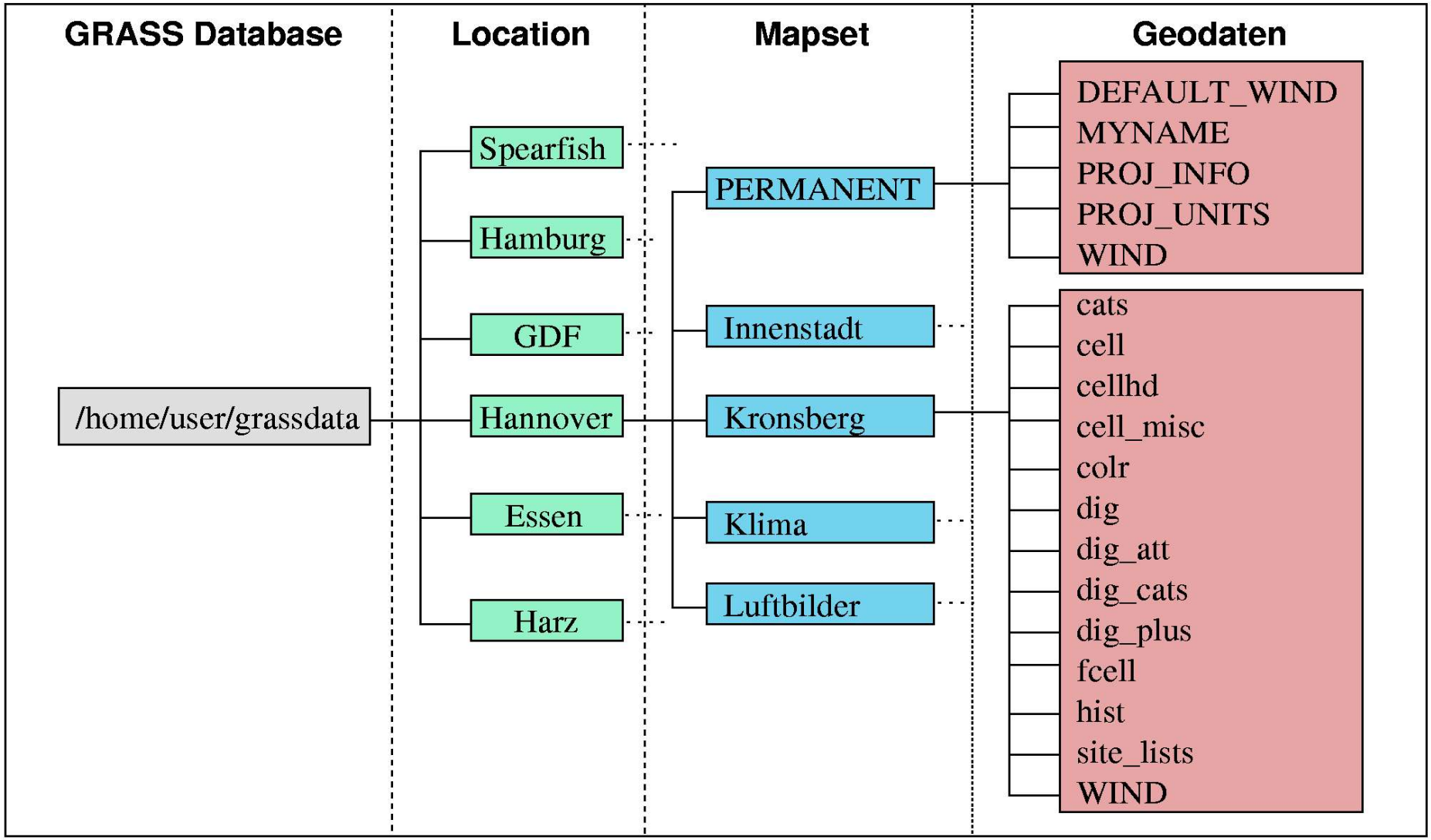
```
grass57 -gui
```



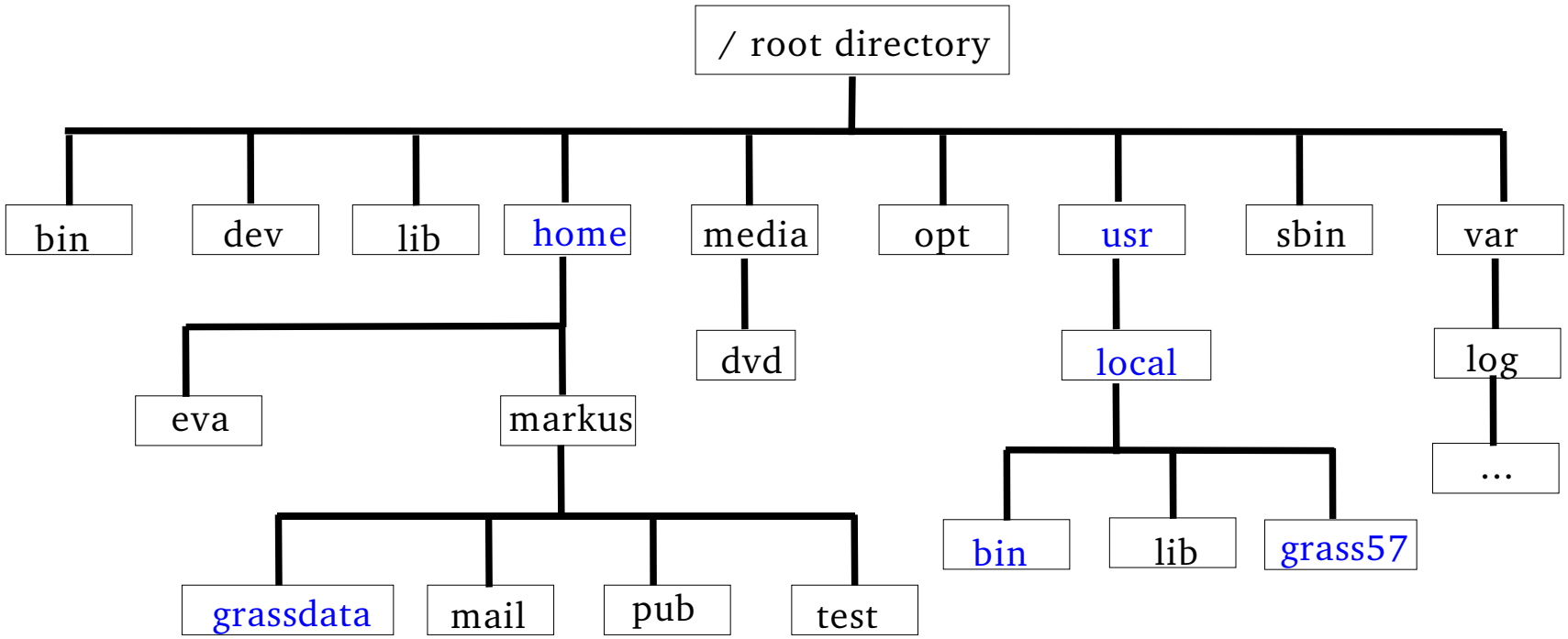
Database: **/scratch/grassdata/ <return>**
Location: **spearfish (click)**
Mapset: **if not present, generate it (right field)**

Then click
"Use selection"

GRASS Database structure: Locations and Mapsets

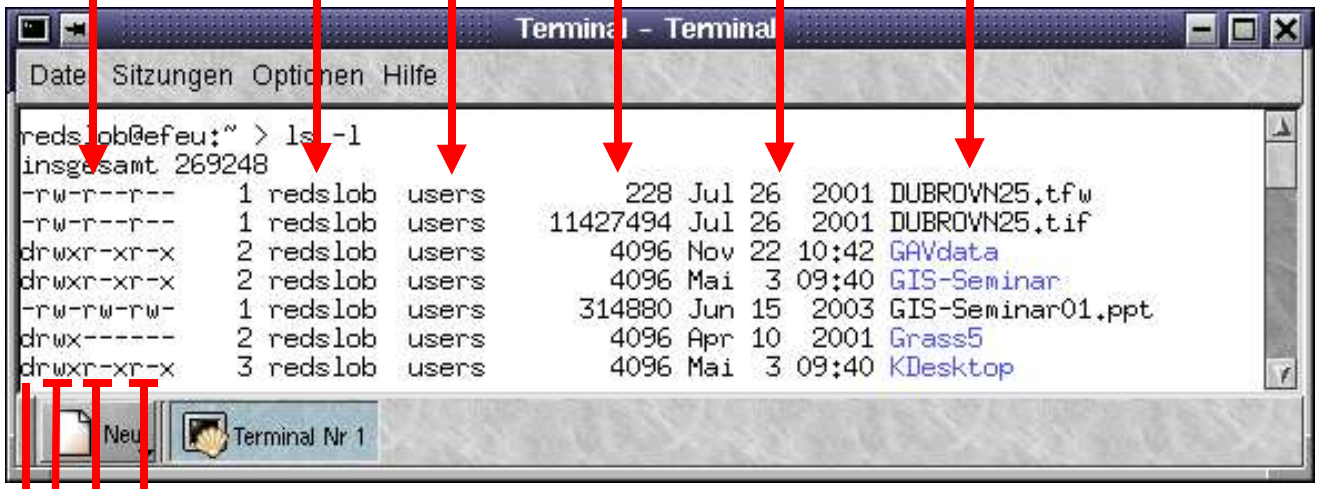


UN*X/Linux file structure



UN*X/Linux file structure

Permissions | user | group | size | date | file / directory



other
group
user

r : read
w : write
x : execute

- : file
d : directory (subdirectory)
l : link (redirection)

```
chmod -r ugo+wrx
<dateiname/ordner>
chown -R root <Dateiname/Ordner>
chgrp -R mail <Dateiname/Ordner>
```

Starting with GRASS

- Run the following commands:

```
g.list rast

g.list vect
```

- Convert vector map from old format to current format:

```
v.convert in=roads out=roads
g.list vect
```

- `d.m`

```
- add raster map 'elevation.dem'
- add vector map 'roads'
- display (world map symbol)
```

Starting with GRASS

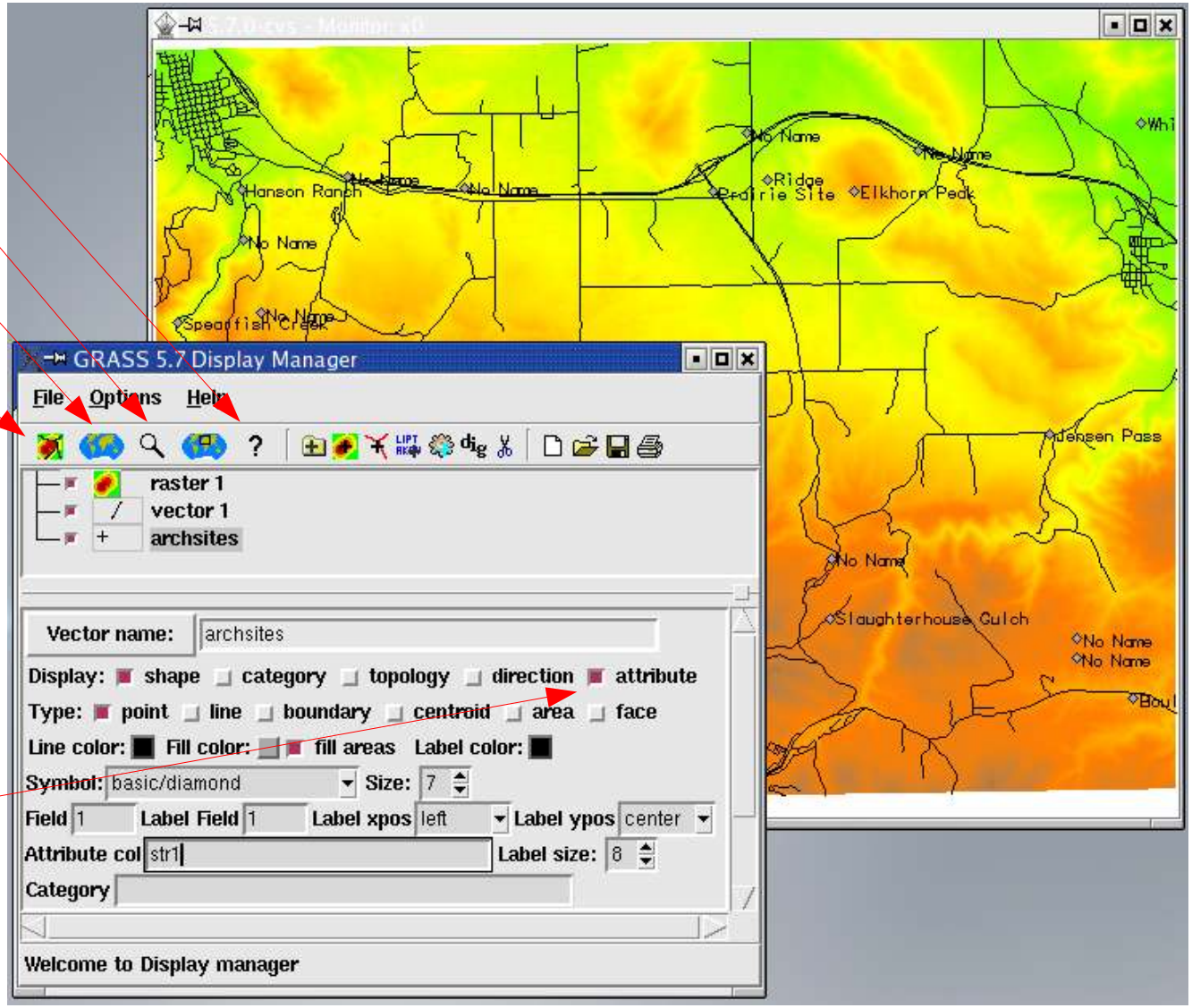
Query map (select first)

Zoom

(Re)display entire location

(Re)display current region

Attributes



Warming up with GRASS

- Continue with the following commands (conversion of old points format to current vector format):

```
v.in.sites in=archsites out=archsites
```

- `d.m`

  - add vector map 'archsites'
    - select icon symbol 'basic/diamond'
  - display (world map symbol)

  - display attributes of 'archsites' map (str1 column)
    to find column names, query the map

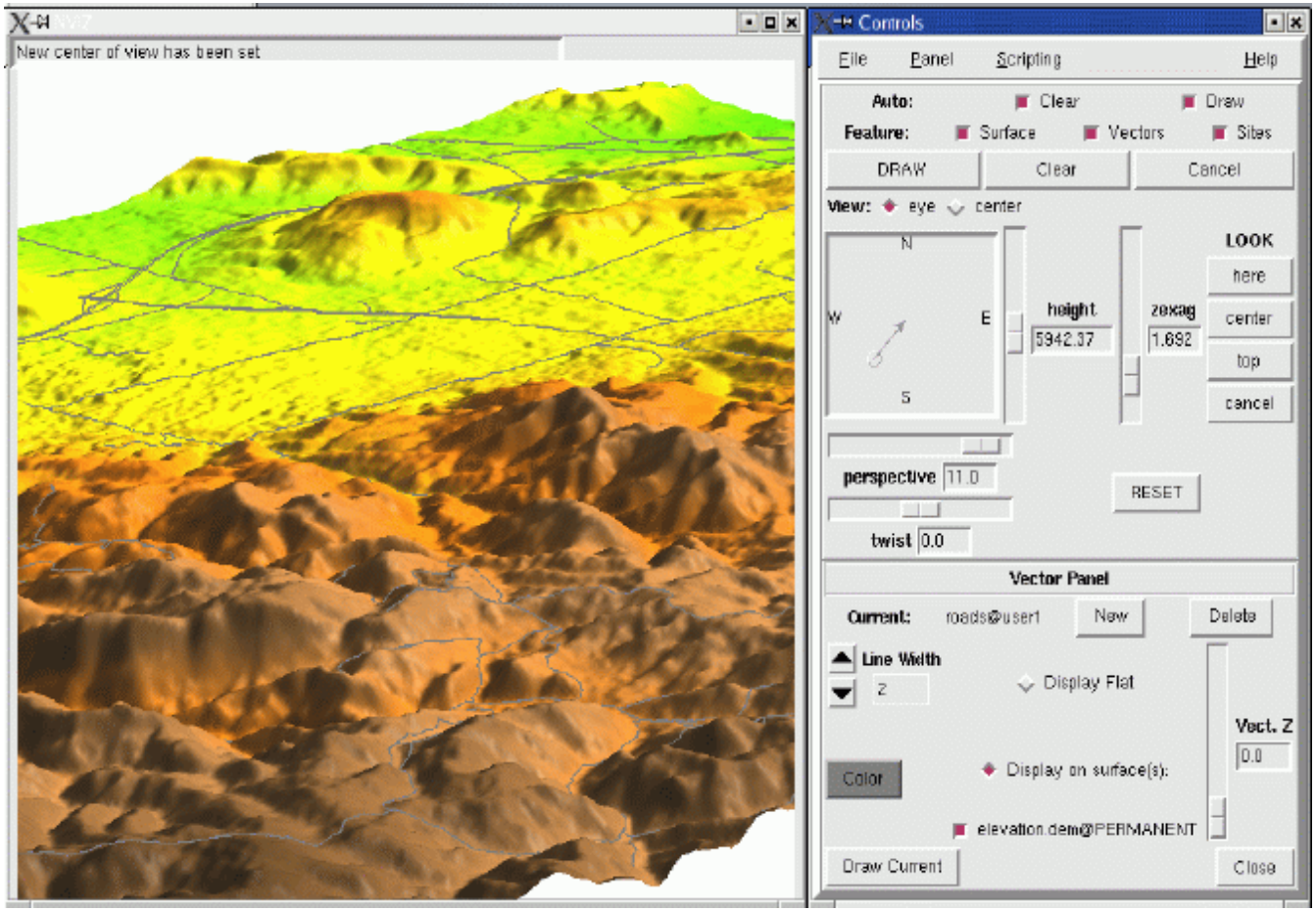
  - select only 'interstates' by SQL statement

  - save d.m settings to file

Warming up with GRASS

- Continue with the following command:

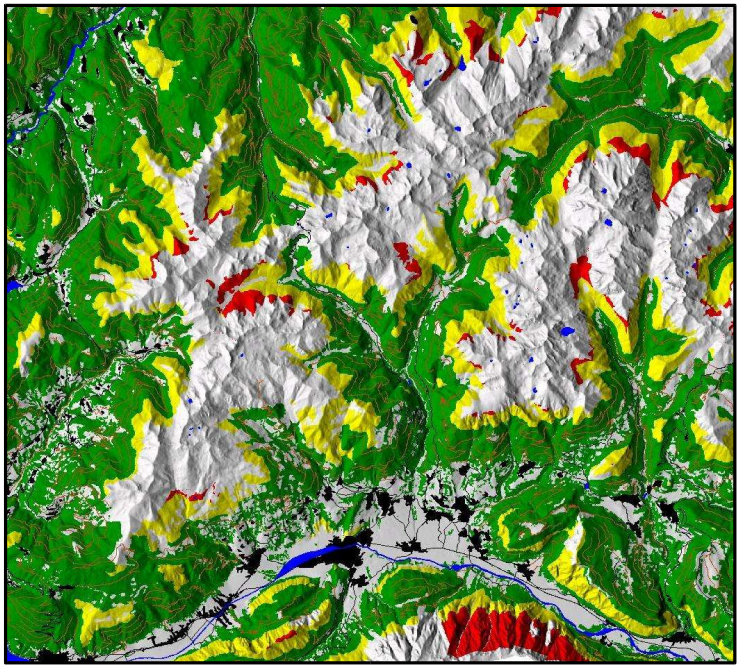
```
nviz el=elevation.dem vect=roads
```



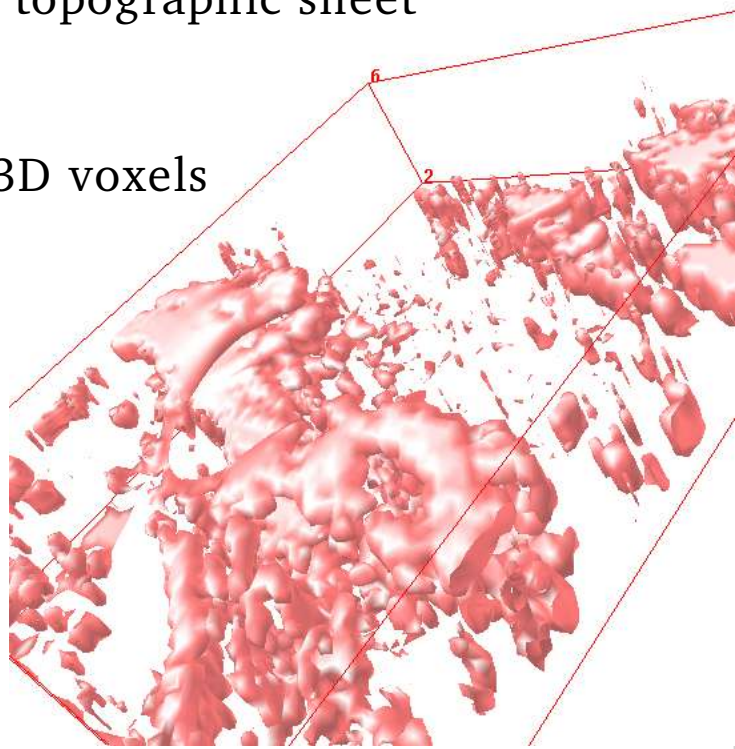
Raster data model

- 2D raster model (matrix)
  commands: `r.*`
- 3D raster model (voxels)
  commands: `r3.*`

Scanned topographic sheet



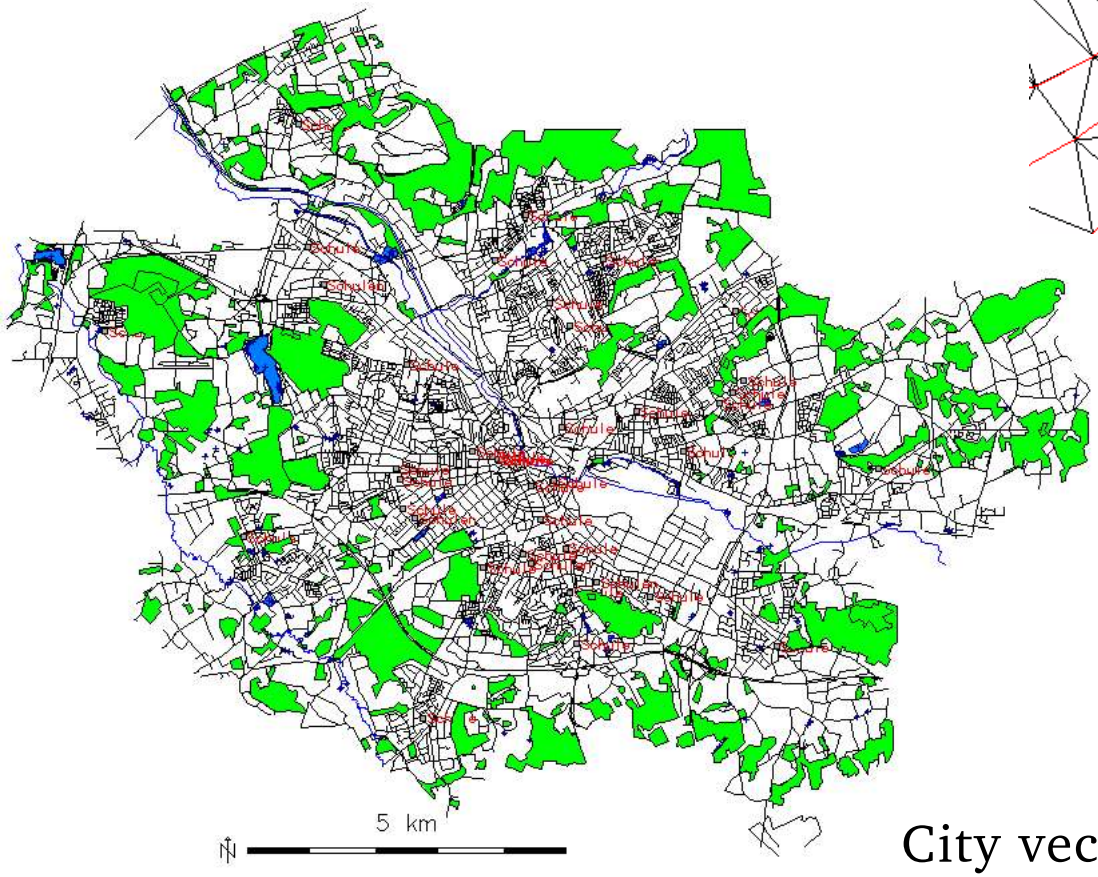
2D raster
with shading



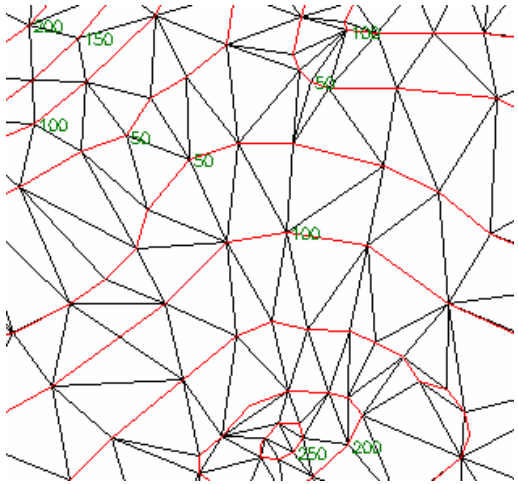
3D voxels

Vector data model

- 2D/3D vector model
  commands: `v.*`



City vector map



TIN

CAD

Using GRASS

What else for the first day?

- Restart GRASS, read the manual: `g.manual`
- `r.info elevation.dem`
- `v.info roads`
- `v.format/v.database:` define data storage settings
- `d.m:` print function

Leaving GRASS

To finish a GRASS session:

- Close all monitors by mouse click
- Save 'd.m' settings (name with extension: “.dmrc”), close 'd.m'
- To leave GRASS, enter into terminal window:

```
exit
```