CARTOGRAPHY in a Web World

SENSE Research Cluster XIII meeting: Concepts and tools for spatial data visualization

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Agenda

- Short introduction to ITC and me
- Cartography: communicating spatial data
- Changing Cartography
  - *technology*: new mapping possibilities
  - *technology*: 3 kinds of open:
    - open standards, open source & open data
  - *results in* easy access to powerful tools & data
  - *everyone's a mapmaker now...!*
- Hands-on workshop:
  - Using selected Open Source tools and Open Data to visualize your spatial data
short introduction to ITC

http://www.itc.nl/
Faculty of Geo-Information Science and Earth Observation of the University of Twente

- located in Enschede (The Netherlands)
- yearly registration: > 400 students
- average duration of stay: 14 months
- average age: 34 years
- > 14,000 students from > 160 countries
- scientific & supporting staff: ± 190 fte
Education at ITC: Target Group

- Young and mid-career professionals, and scientists from developing and emerging countries
- Increasingly professionals from industrialised countries
Education at ITC: Programmes

Graduate programme
- PhD  3½ to 4 years

Degree programme:
- Master of Science  18 months
- Master  12 months

Diploma programme:
- Postgraduate diploma  9 months
- Diploma  9 months

Language of instruction is English
Education at ITC: Specialisations

6 specialisations:

- geoinformatics
- geoinformation management
- urban planning and land administration
- natural resources management
- water resources and environmental management
- earth resources and environmental geosciences
Cartography: communicating spatial data

Why use graphics?

Graphics are holistic:

“a picture says more than a thousand words...”

“First road left, then cross the railroad and continue until you cross the river, then the first right and right again on the crossroads...”
Why use carto-graphics?
Maps give a sense of Place and Time

THE CARTOGRAPHIC COMMUNICATION PROCESS
Cartographic Grammar

Map showing the distribution of amphibious species along a river system with symbols indicating collection points and the number of species collected. The map includes symbols for forest, open water, and dike features.
Cartographic Grammar: what works best?

No. of amphibious species

no. of species found per data collection point

- 0 – 2
- 3 – 4
- 5 – 6
- 7 – 8

Forest
Open water
Dike

meters
0 500 1000
Cartographic Grammar: rules for good maps
CHANGING CARTOGRAPHY

new kinds of maps

- Combining maps with other graphics, sound and moving images: Multimedia
- Interactive maps
- Realism & false realism: Virtual worlds
- Depiction of movement & change: Animated maps
Animated maps

http://kartoweb.itc.nl/gondwana/
CHANGING CARTOGRAPHY

new (digital) data dissemination

- On CD–ROM, DVD, etcetera
- On the World Wide Web
Open Standards for Interoperability

To communicate between systems we need to standardise the messages between them.
If webservices have **spatial** functionality, for example if they use geographic data, can output maps or find routes, we call them **geowebservices**

- Google Maps, Bing maps, etc.: interfaces are publicly available, but defined, developed and owned by commercial companies
- Open Standard GeoWebServices: Open Web Services (OWS) of the Open Geospatial Consortium (OGC).
Open SOURCE software

Source code is freely accessible
- free for all to use, change and (re)distribute
- usually allowed to sell products that include source code

Development done in public:
- usually not by a company
- by a community: distributed, informal team of developers
Open source software STACK

(web)map-viewers, Graphic User Interfaces, desktop GIS, etcetera
  ■ thin clients
  ■ thick clients

middleware: geo-webservices
data-, map- and process services

Back-end: spatial databases

LIBRARIES:
software components for:
  • data access
  • conversion
  • analysis
  • projection
  • graphics
  • etc...
The OSGEO stack at ITC

Prototype
Mozilla
Qt

GeoServer

GDAL/OGR
Proj4

Geotools/
GEOS

OpenLayers

MapServer
Open Data

Open Data is maybe even more important than Open Source

- **without data, software means nothing**

- most data is still proprietary

- some movement to public access of geo-data
  - EU INSPIRE initiative
  - USA federal data
  - **OpenStreetMap**
Result: Easy access to powerful tools & data

➔ mashing up open data and animated maps

Result: Easy access to powerful tools & data

- Spatial Data Infrastructures merge with Atlasses

www.nationaleatlas.nl
Result: Easy access to powerful tools & data

➔ everyone's a mapmaker now...!

http://cartodb.com
HANDS-ON WORKSHOP

- Using selected Open Source tools and Open Data to visualize your spatial data
  - OpenStreetMap data and maps in a browser
  - The CartoDB interactive webmapping site
  - Creating your own mapping webpage
  - Creating your own KML data
  - Combine the KML with the OpenStreetMap

- materials to be found at:
  http://kartoweb.itc.nl/kobben/SENSE-PhD-day/