Implementing the Open Mobile GeoWeb - Some Exercises

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Outline

- Background
- Purpose
- Open Mobile GeoWeb
- Project OneMap
- Mobile Devices
- Projects and implementation
- Lessons Learned
- Conclusions
- Final Remarks

Background

- Projects have been carried out at Østfold University College, Faculty of Computer Sciences in Halden, Norway
- These projects originates from our Digital Maps course
- All participants are students, except for Gunnar

Purpose

- A feasibility study
  - Hypothesis:
    - Handheld units, mobile phones and other technologies are converging. Working with and developing for mobile devices is not very different from working with regular desktop computers
  - In addition:
    - The result should be based on open standards and specifications
      - In particular: OGC

Open Mobile GeoWeb (?)

- Open
  - Open Content
  - Open Source
  - Open Management
  - Open Services
- Mobile
  - Ubiquitous units
    - “Always on” and “always present”
- GeoWeb
  - The fusion of standard web technologies and geographic content
  - A collection of digital services, both concerning content and processing

Why open?

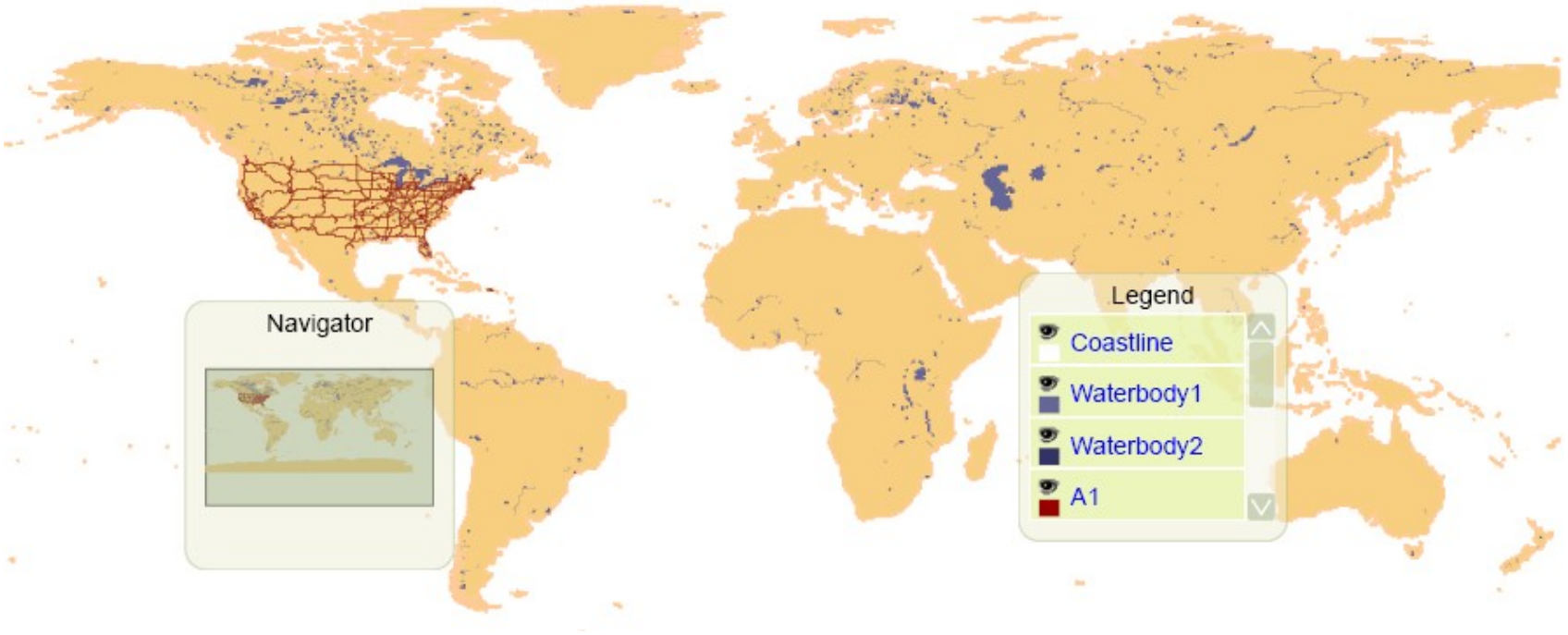
- An analogy from the Open Source movement
  - "more eyes on the source means less bugs"
    - This also applies to geodata
- The quality of both application and content is subject to peer review, which will enhance the quality of both
- Interoperability is preserved
  - WMS is a very good example of this (which we will also show in the demonstration)
  - One does not have to rely on one single proprietary provider
- Benefits in particular
  - Organizations and countries with limited resources
  - Non-profit organizations and community initiatives

OneMap

- Implementation
  - Using Open Content, Open Source and Open Tools
- Open for public use since two years ago
  - Serves both vector data (WFS) and raster data (WMS)
- Used as a testbed for the realization of different services
  - Project based (by students)

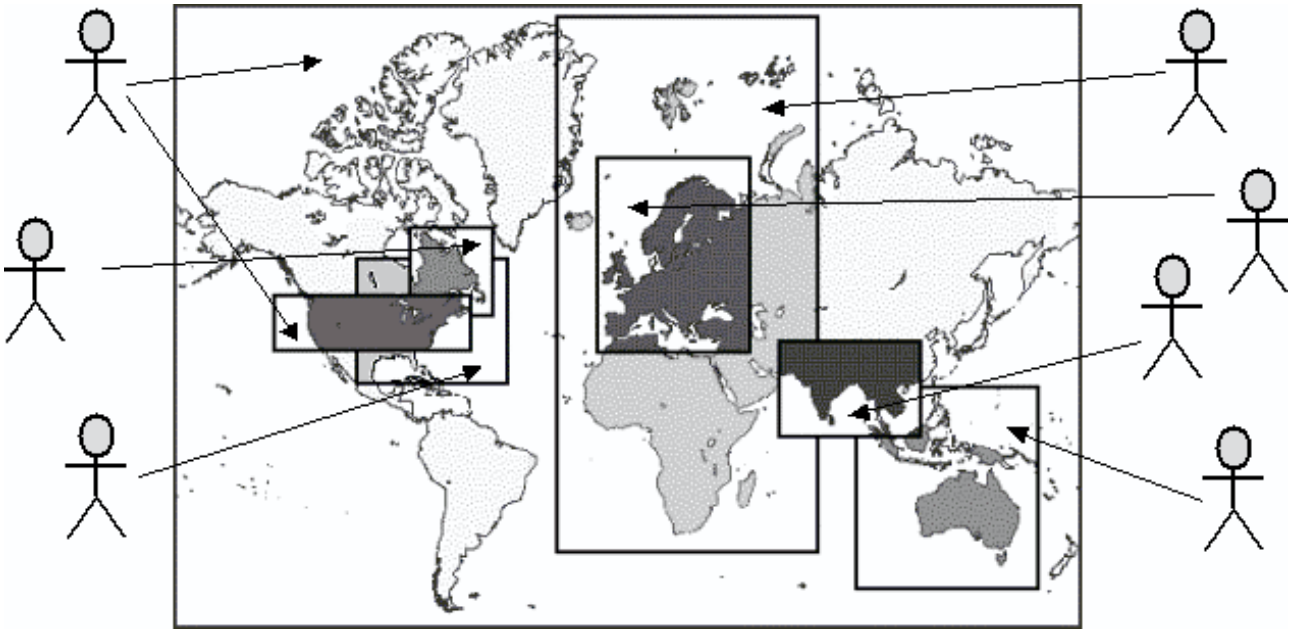
Demo – The OneMap Gateway

- Built solely by using SVG and JavaScript
- GML is transformed into SVG on the Server Side and loaded directly into the SVG plugin



Incremental Map Construction

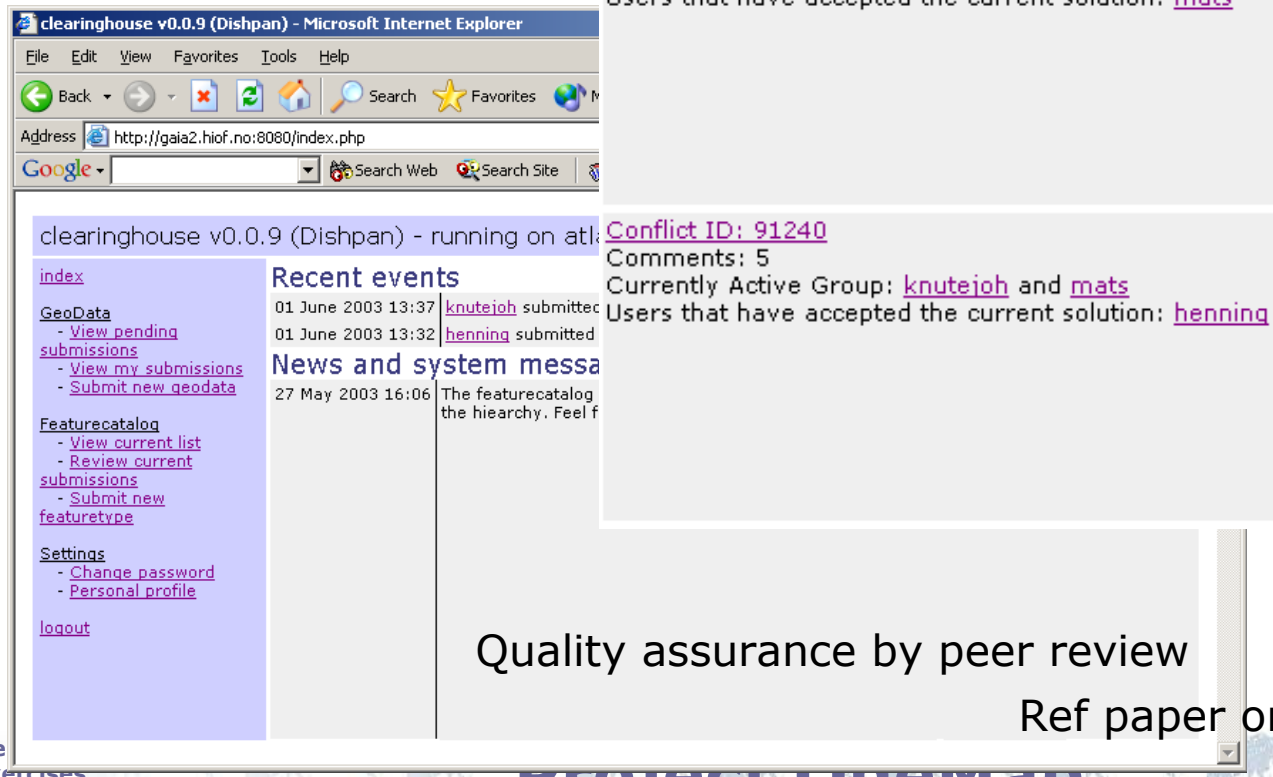
Submissions will be harmonized and accepted/rejected in peer review processes.



The Feature Catalog will be dynamically constructed and maintained...also by peer review processes.

OneMap Clearinghouse

Any party or person may submit their geodata
(or modifications of existing geodata)



Quality assurance by peer review

Ref paper on SVG Open 2003

Mobile Devices vs. Desktop Computers

- Converging
  - Processing power, memory, connectivity
- Differences
  - User Interaction
    - Limitations
      - Display size
    - State of mind of user
    - Physical conditions (rain, sun, windy, etc)
- Main challenges
  - New models of user interaction
  - Keeping the applications simple to use

The two device classes

- A location enabled PDA
  - Stylus operated small device
    - palmOne Tungsten E / T3 / C (not location enabled)
    - Sharp Zaurus (not location enabled)
    - HP iPAQ / Other Pocket PC units
    - Garmin iQue (location enabled out of the box)
- A Smartphone
  - A phone with some PDA-abilities
    - Sony Ericsson P800 / P900
    - Nokia 9210 Communicator
    - palmOne Treo 270 / 300 / 600
  - Needs an additional GPS

Location Enabled PDA

- PDA with a GPS module or built-in GPS
- To our knowledge, all map (+ gps) applications for PDAs rely on properiatary formats and is definitely not open or free
- Is it possible to implement the same functionality by using open and free content and tools?

Implementation

- Map-data is downloaded from the internet in real time, not preloaded from a CD
- Location optimized (only a subset of the complete map needs to be transferred)
- This is not raster images, this is live, open vector data in GML which is converted to the native format for the device
  - Enables route calculation and navigational queries directly on the unit (if needed)
  - Enables application developers to build on a common base for their mapping applications
- The conversion tool is coupled to a WFS-server, so we are data source independant

Screenshot


Palm OS Emulator
Download (Step 1)
Here you must specify the center of the data you would like to download. You can do this by entering the coordinates manually, or you can query a GPS if your device has one.
X:
Y:
Query GPS
<< Back
Next >>

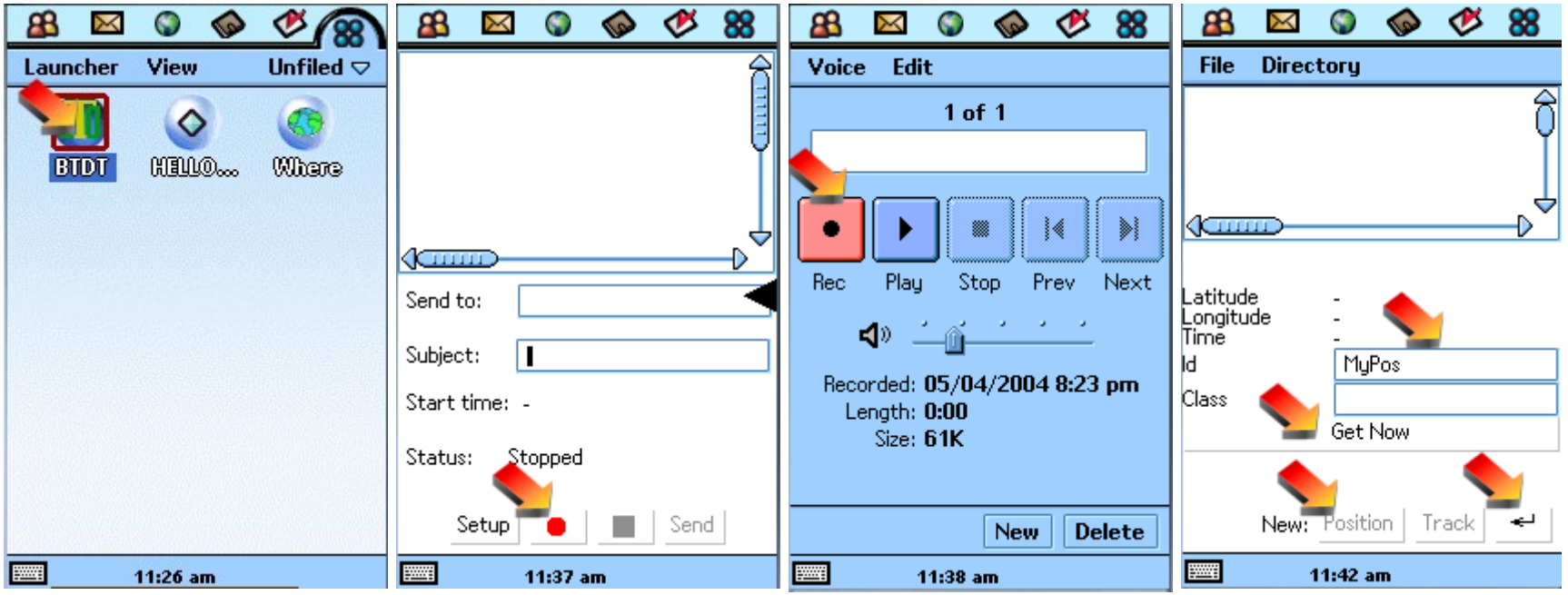
Smartphone

- Communicates with a GPS preferably by bluetooth
- Makes it possible to:
  - Take pictures
  - Record video
  - Record audio
- Is it possible to combine these two elements and store pictures, video and audio that are geopositioned?
  - Positional Message Service - PMS

Implementation

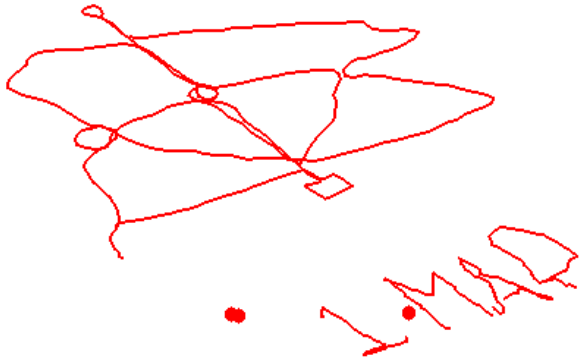
- Based on open standards
  - MMS, SMIL, GPSml (internal XML-based format)
- Pictures, Audio and Video can be associated with a point or a track (collection of points)
- The data and their position is packed into a MMS-message and then sent to a receiving server
- The server parses the MMS-package and register the uploaded files and their position with a web server
- The user can then access their data, illustrated by their relative position on a map
- The background image is provided by a WMS-server and can be changed on request

Screenshots

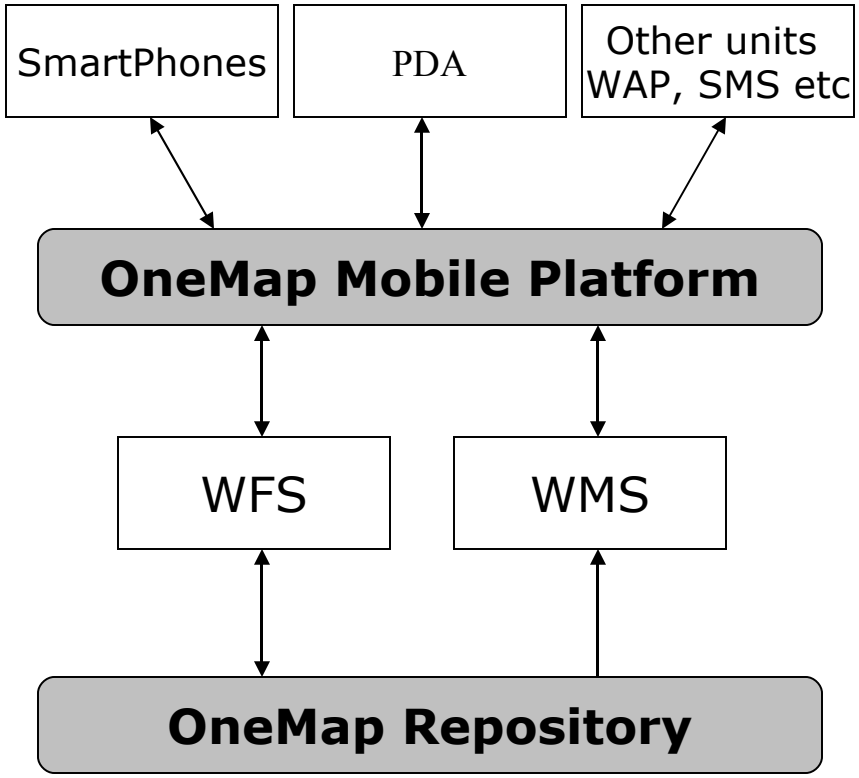


Live Demo

- Browse-application made in PHP with a few snippets of JavaScript
- Data is stored in separate directories with a XML-file with coordinates



OneMap Mobile Platform



Lessons Learned

- Development
  - Sony Ericsson P900
    - Supports java and abstraction from the unit itself
    - Well documented
    - Easy to support different version of phones and different phones based on the same platform (Symbian)
  - Garmin iQue
    - Documentation and support from Garmin is poor at best
    - palmOne / Palm is a bit better, but the documentation is rudimentary in many areas

Lessons Learned

- Usage of the units
  - P900
    - Our application is not a “One button”-application yet
      - Prone to errors
      - GPRS can become unavailable in foreign countries (depending on your provider)
    - Symbian crashed on a few occations
    - The default font is quite small and can be hard to read for many people (can be changed)
  - Garmin iQue
    - The GPS is very easy to use
    - The application itself is simple and features few steps
    - Performance leaves a lot to be desired, but it works. :-)

Conclusions

- Tecnologies converge and the open standards are available for implementation
- The devices require special handling of user interfaces
- The P900-based application about geopositioning of data is very interesting and opens up quite a few areas of potential usage

Final Remarks

- Building applications like this can be done in almost no time with the current standards
  - Students where introduced to the general concepts of mapping and the standards, and still mananged to builde these applications during a short time span
  - It does however place a lot of constraints on the User Interface

Final Remarks

- Digital Service Grid
  - A grid where "terminals" (units of all sorts) provides services to each other and communicate directly
    - Peer to Peer
      - A structure that has proven to be very flexible and quite scalable
- Terminals
  - Are entrypoints for analouge interaction with the digital services
  - The services can be distributed in the net without any traditional client/server relations
- Realizing an infrastructure like this is possible with the standards and technologies available today!

Thank you!

For more information:
http://www.onemap.org/