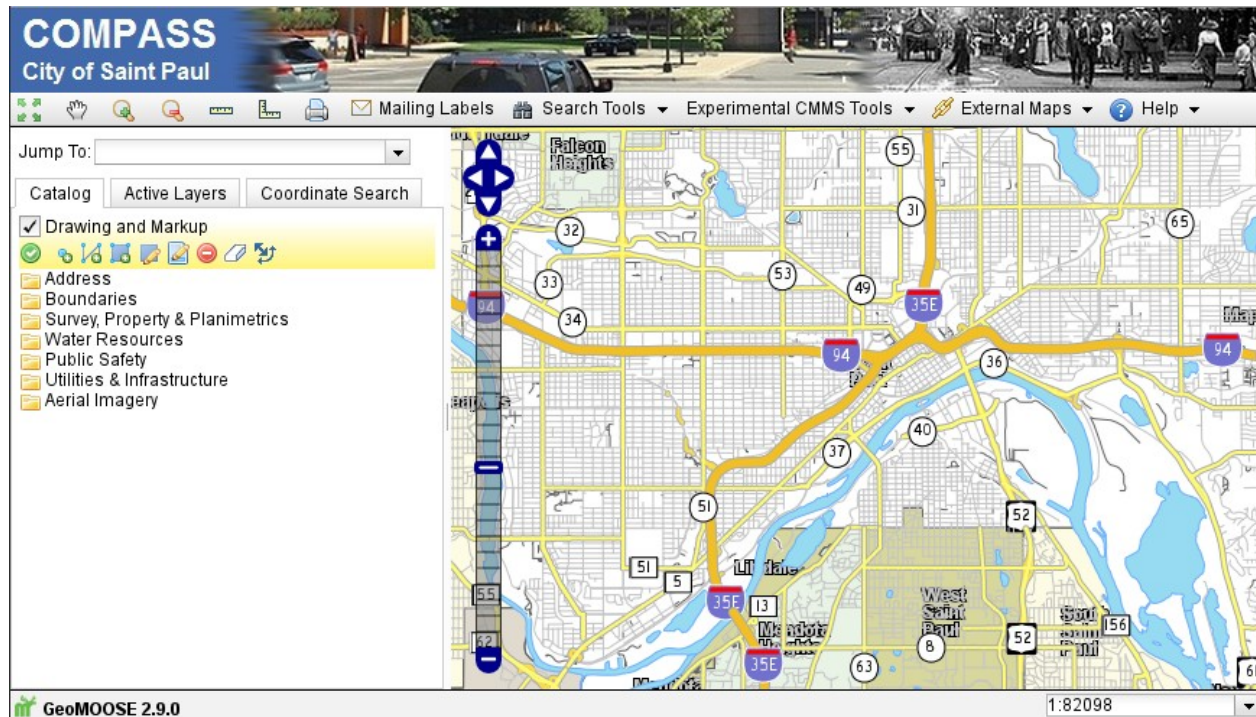


Take Your (whole)
Map System With You . . .

. . . or Have Your Raspberry Pi !
(and Map With It Too)

It all started with a simple question.

Can we take a map into the field and have it work just like at the desktop but without a network connection?



A Step Back

What is Compass?

- Internal web browser based GIS data distribution system
- Developed in various forms since the late 90's.
- Part of the primordial soup that evolved into GeoMoose

What is Compass?

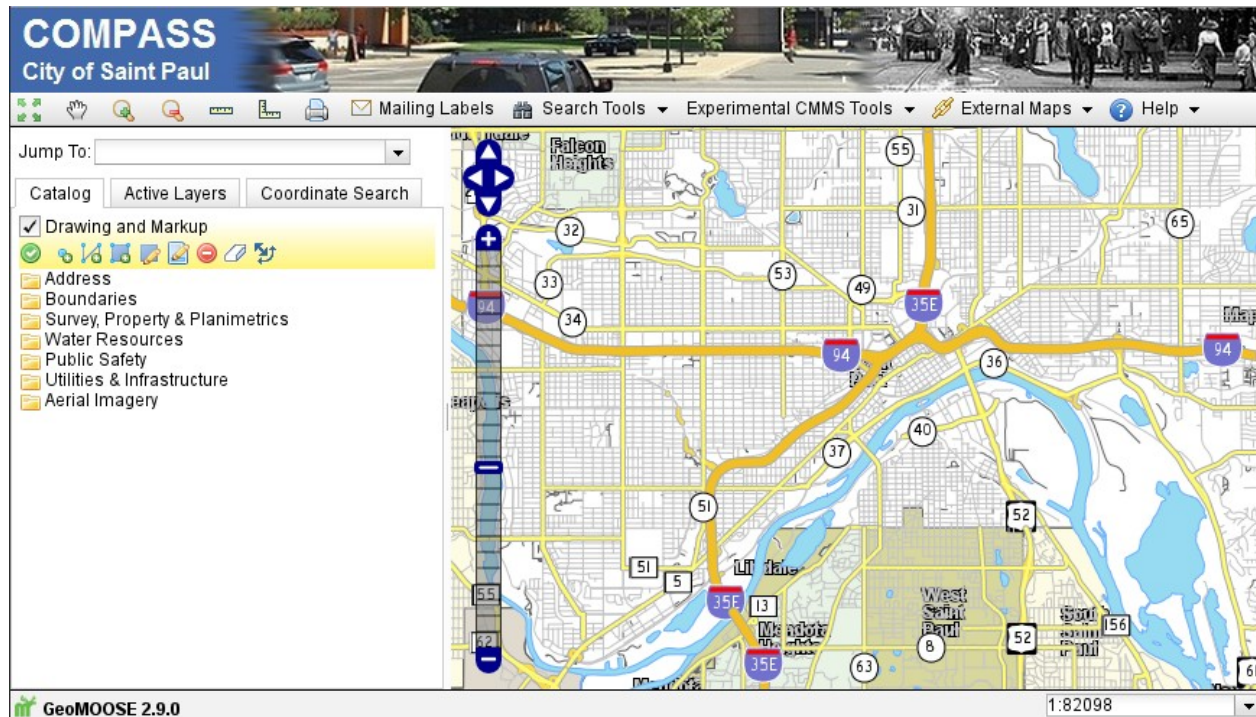
- About 300 layers and 4TB of data
- SHP/GPKG/GeoTIFF/...
- PostGIS Tables/Views
- Oracle Tables/Views
- Integrations with other systems via REST/WMS/WFS/Database connections

Compass Architecture

- Metadata Database
- MapServer (as WMS/WFS Server)
- Custom Web Services
- Integrations with other systems
- Data Storage (Subversion/PostGIS)

It all started with a simple question.

Can we take a map into the field and have it work just like at the desktop but without a network connection?



Capabilities we were looking for.

- Standalone Mapping Interface.
- Ease of data synchronization.
- Ease of configuring (a partial) replication.
- Ease of operation in the field.
- Easy to connect to by multiple devices.
- Also works as a backup appliance in a pinch.

New project.

Internally we labeled the project “MiniCOMPASS” after our desktop, “COMPASS” mapping system.



What didn't work

- Internet in the field
- Installing on existing Windows laptops/tablets
- Replicating **all** the data



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<https://www.flickr.com/photos/rexroof/3802694376/>



Raspberry Pi as a Server

- Compatible with existing software stack
- Can act as a WiFi access point
- Easy to power in field (car phone charger)
- Relatively Inexpensive

The Problem

- Limited data storage (32GB and 64GB SD cards deployed)

The Solution

- Let managers pick what layers are important to their teams.

The Problem

- Compass Layers are MapServer mapfiles
- Mapfiles are complex (and not maintained by us).
- How do we know what to copy?

The Solution

- It's Impossible.... give up, go home, get beer.

The Solution

- It's Impossible.... drink beer...
- Realize most mapfiles, in practice, are simple

The Solution

- It's only theoretically impossible....
- Realize most mapfiles, in practice, are simple
- Wrote a tool to analyze the dependencies of most mapfiles
- Warn if the mapfile is too complex
- Handle complex mapfiles manually
- Code available: <https://github.com/klassenjs/map-deps>

map_deps

```
$ ~/map_deps ./basemap.map
Found Mapserver:
MapServer version 7.0.4 ...
Trying mapfile "./basemap.map"
Required Files:
  Refs:  Filename:
1      /home/jimk/gm3-demo-data/demo/statedata/county.sbx
1      /home/jimk/gm3-demo-data/demo/statedata/county.sbn
1      /home/jimk/gm3-demo-data/demo/statedata/county.shp
1      /home/jimk/gm3-demo-data/demo/statedata/county.prj
1      /home/jimk/gm3-demo-data/demo/statedata/county.dbf
1      /home/jimk/gm3-demo-data/symbols/symbol.sym
1      /home/jimk/gm3-demo-data/demo/statedata/county.shx
3      /home/jimk/gm3-demo-data/fonts/Vera.ttf
1      /home/jimk/gm3-demo-data/fonts/fontset.list
1      /home/jimk/gm3-demo-data/demo/statedata/basemap.map
1      /home/jimk/gm3-demo-data/demo/statedata/muni.qix
1      /home/jimk/gm3-demo-data/demo/statedata/muni.sbn
2      /home/jimk/gm3-demo-data/fonts/VeraBd.ttf
1      /home/jimk/gm3-demo-data/demo/statedata/muni.dbf
1      /home/jimk/gm3-demo-data/demo/statedata/muni.sbx
1      /home/jimk/gm3-demo-data/demo/statedata/muni.shp
1      /home/jimk/gm3-demo-data/demo/statedata/muni.shx
```

How it works

- Manager picks layers of interest from metadata database
- Metadata database points to mapfiles
- Map-deps finds files needed for each mapfile
- Build list of all files needed
- Manually add files & tables for complex mapfiles
- Rsync flat files, sync PostgreSQL
- Cache data from other systems in PostgreSQL

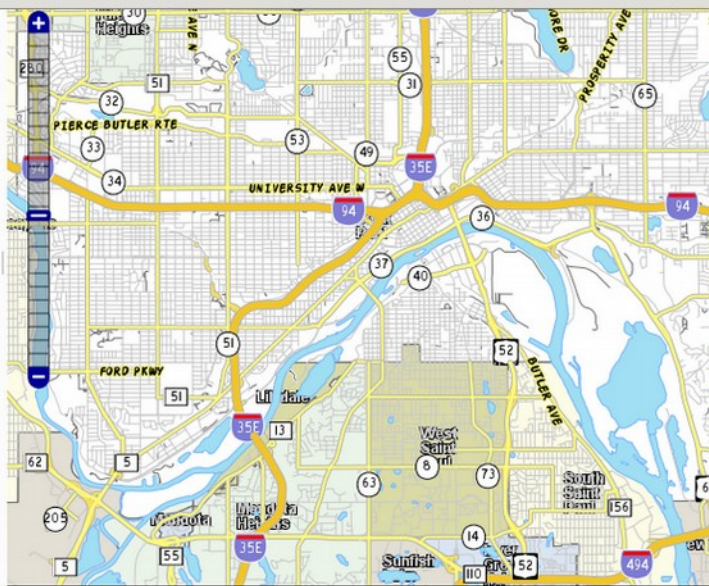
Finishing Touches

- Add some scripts to automate updates when RPi on the internal network
- Realize this same process can be used for building backup nodes and DMZ servers

COMPASS

Try it at: <http://www.wspwgis.water.stpaul.city/apps/billboard/cgi-bin/bb.pl?d=00000000893933fb>

- Drawing and Markup
- Scalebar
- Address
- Boundaries
- Elevation
- Survey, Property & Planimetrics
- Land Cover
- Community Services & Recreation
- Demographics (Projected for 2012)
- Water Resources
- Public Safety
- Public Facilities
- Utilities & Infrastructure
- Aerial Imagery
- Base Maps, Scanned Maps, Grids & Charts
- NOAA Weather Radar



GeoMOOSE 2.8.1 1:78903



Mailing Labels Search Tools External Maps Help

Jump To:

Catalog Active Layers Updated Date Search

- Drawing and Markup 2 minutes ago
- Scalebar 47 days ago
- Address 48 days ago
- Boundaries 92 days ago
- Elevation 93 days ago
- Survey, Property & Planimetrics 93 days ago
- Land Cover 104 days ago
- Community Services & Recreation 109 days ago
- Demographics (Projected for 2012) 109 days ago
- Water Resources 109 days ago
- Public Safety 116 days ago
- Public Facilities 116 days ago
- Utilities & Infrastructure 116 days ago
- Aerial Imagery 340 days ago
- Base Maps, Scanned Maps, Grids & Charts 340 days ago
- NOAA Weather Radar 372 days ago



Device	Status
Survey 4	Updating
Survey 1	Update Completed
Traffic 5	Update Completed
Traffic 3	Update Completed
Traffic 4	Update Completed
Survey 3	Update Completed
Survey 2	Update Completed
Traffic 1	Update Completed
Traffic 2	Update Completed

Device	Status	Updated
Survey 4	Updating	2 minutes ago
Survey 1	Update Completed	47 days ago
Traffic 5	Update Completed	48 days ago
Traffic 3	Update Completed	92 days ago
Traffic 4	Update Completed	93 days ago
Survey 3	Update Completed	104 days ago
Survey 2	Update Completed	109 days ago
Traffic 1	Update Completed	116 days ago
Traffic 2	Update Completed	340 days ago



Conclusion/Questions

- We created a MiniCompass Appliance with Raspberry Pis.
- It is deployed in the field and working
- It works, but there are still rough spots to cleanup.