Going Open:

Challenges and Successes in Deploying Open Source Transportation Management Software

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A few words about Open Source and “Free” software

What is Free?

Things you don’t have to pay for:

- *Facebook*
- *Broadcast TV*
- *Public Library*
- *Open Source Software*

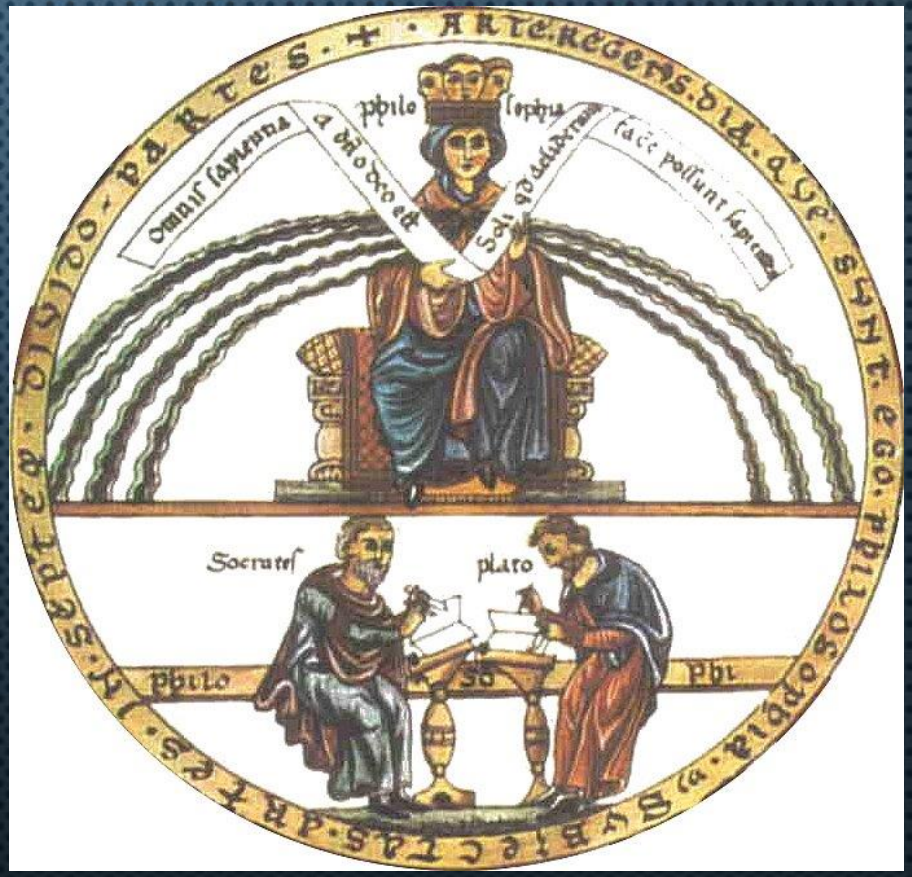
What is Freedom?

Things you can use like you want:

- *Speech*
- *Public domain books/art*
- *Open source software*

What Does "Open Source" Mean?

- Both Legal and Philosophical Concepts
- *Free Software Foundation's "Four Freedoms"*
  - *Run as you wish*
  - *Study and change*
  - *Distribute original*
  - *Distribute modifications*

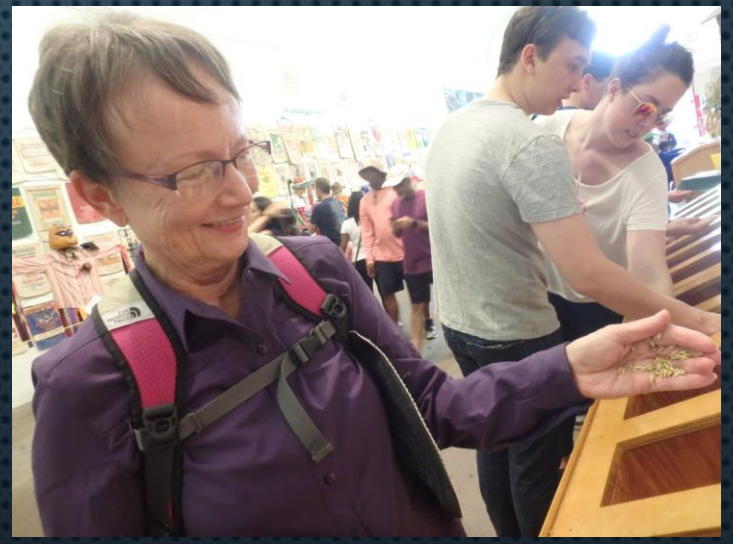


What are benefits?

- No entity owns the program/code, so no licensing costs
- Development is a collaborative, shared expense with enhancements available to all
- Freedom to change to suit your needs (“forking” the code), or stay compatible with core users (“mainline” code)

Who Uses Open Source Software?

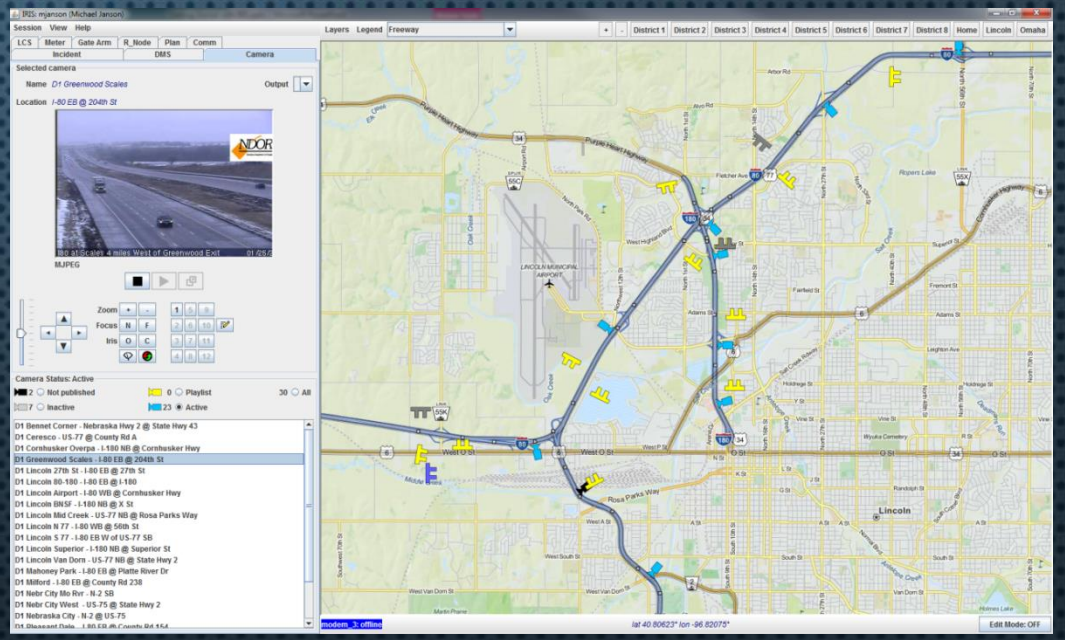
- Google (Android and server farms)
- Facebook
- About half of the web sites on the Internet
- Traffic signal controllers
- Linda – my mother in law



Note: list is not exhaustive

Open Source in the ATMS World - IRIS

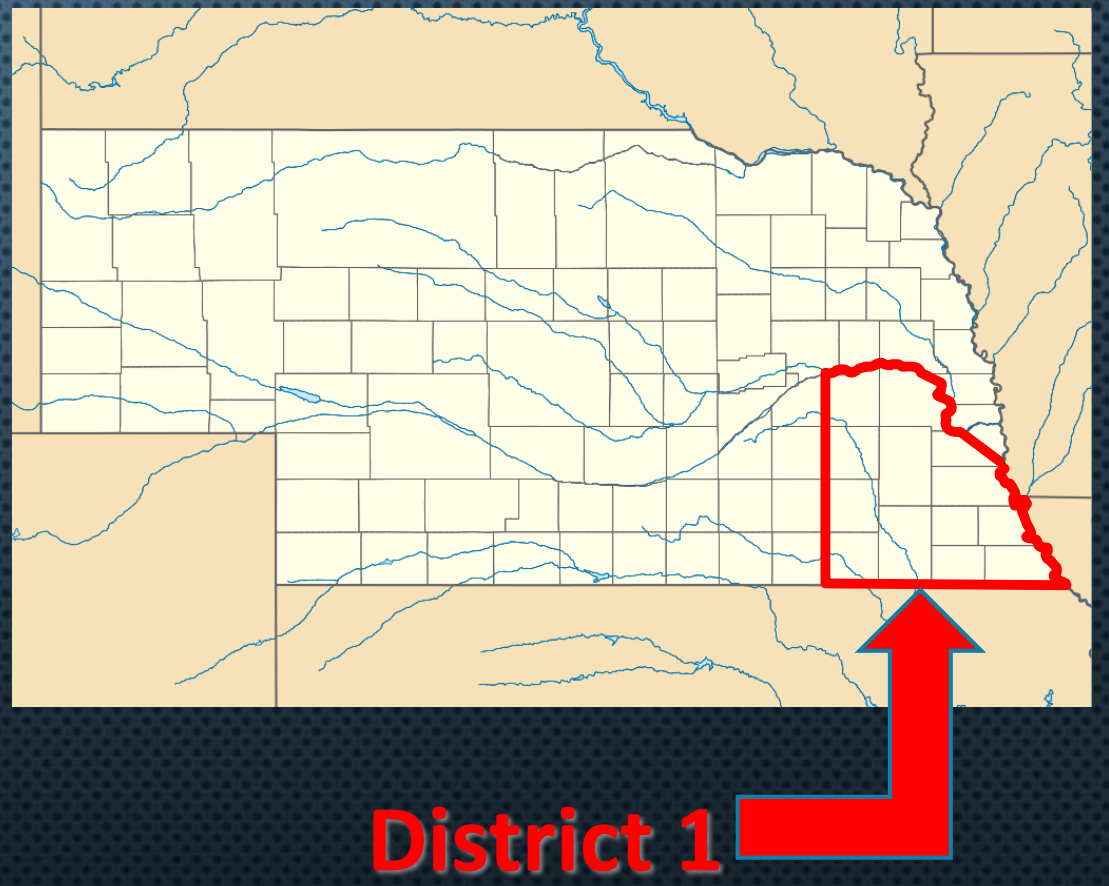
- Intelligent Roadway Information System
- Developed by MnDOT in 1990s
- Monitor/control DMS, CCTV, detectors, gates, lane control signals, RWIS, ramp metering, work zones
- Other functions: incident management, traffic map, travel times
- Toll lane management



Other IRIS Users

- California DOT (Caltrans)
- Wyoming DOT

- **Nebraska DOR**
- NDOR began exploring in 2014
- Overall open philosophy
- More control, lower costs



Nebraska Experience - Deployment Challenges

- Short timetable (~100 days) for initial capability
- New code Development
- Create new mapping data
- Configure & test field devices
- Integrate with legacy ITS infrastructure (dial-up modems)
- Run IRIS simultaneously with unsupported legacy software

Current Status

- IRIS deployed in District 1 as of November 2015
- Statewide deployed/tested summer 2016
- NDOR developing transition plan:
  - Changes in operating procedures
  - Training

How is Using Open Solutions Different?

Procurement

- No “procurement”, more like “fee for service” – similar to design work
- On-going support can also be fee for service

Development

- Code is shared with other users
- MnDOT is creating a pooled fund to manage code
- Maintains competitive environment

How Using an Open Solution Helped

- **Expedited schedule**: NDOR contracted for engineering services via on-call contract, no need for traditional vendor procurement
- **Source code modification:** critical for issue resolution, such as conflicts with legacy systems – can't fix a car if you can't open the hood
- **NDOR control:** set own priority for adding/expanding functions at their discretion, not vendor's

Data Collection

- **All data structures are open – no "secret sauce"**
- **Real time data is published by system**
  - Detectors
  - Incidents
  - DMS messages
  - Configuration
  - http://www.dot.state.mn.us/tmc/trafficinfo/developers.html
- **All data is archived future analysis:**
  - http://www.d.umn.edu/~tkwon/TMCdata/TMCarchive.html

Lessons Learned in Nebraska

- Properly implemented, open solutions can better suit an organization's needs (owner control)
- Don't need to be a software developer to use open source
- Carefully consider making changes to source code – ensure your changes will go "upstream" (don't fork)
- Open Source may not be the cheapest solution in the short term
- Work with partners that have an interest in your success

Thanks!

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