Serving NEXRAD imagery with Open-Source GIS

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Iowa Environmental Mesonet

- We collect, analyze, display, disseminate, and archive environmental data.
- Archive holds over 350 million obs.
- Each day we process ~200,000 obs.
- Build partnerships between private, public, and academic sectors.
Open Source / Open GIS

- Inter-operable
- Non-proprietary
- Cross-platform
- Community Energy
- Global collaboration

http://www.opengis.org
http://www.freegis.org

Penny Marshall discussing e-business strategy with Linux. “It is all about timing, kid” (IBM Commercial)
Mapserver
http://mapserver.gis.umn.edu

- Open Source
- GIS Web Mapping
- Supports WMS/WFS OGC standards
- Supports a vast number of GIS data sources
- Actively developed by a world-wide community
WMS: Web Map Service

- Server listens for HTTP GET or POST (xml encoded) requests
- Server responds with an image, an exception, or XML encoded capabilities
- Issues of transparency, time, and meta-data

ESRI ArcExplorer combining WMS layers from IEM Mapserver and Iowa State GIS Lab OrthoServer.
Available GIS Datasets

- Publicly accessible Spatial Database of observations
- National 2km & Midwest 1km base reflectivity rasters generated and archived every 5 minutes
- Numerous download pages of historical data in a GIS Ready format.

High res floater done for Hurricane Isabel. Archive is available for download.

http://mesonet.agron.iastate.edu
NEXRAD Web Map Service
http://mesonet.agron.iastate.edu/wms/comprad.php?

- Publicly Accessible WMS with composite base reflectivity
- Raw layers are available for HTTP download
- Will remain public until I get slashdotted

NEXRAD and TV radar both showing 'solar spikes' at sunset.
Mapping Applications

Estimated Daily Rainfall during 04 May 2003

15 Jan 2004: 17.11 AMS IIPS GIS  http://mesonet.agron.iastate.edu
RADAR Comparisons

- Dynamically compare 7 NEXRADs, 1 TV C-band RADAR, and a composite
- Powered by PHP MapScript with ~50 lines of code
- Click on the composite to compare the 8 RADARs

RADAR Base Reflectivity Comparison:

<table>
<thead>
<tr>
<th>Site</th>
<th>Distance</th>
<th>Site</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMX - Des Moines</td>
<td>239 km</td>
<td>KCCI-TV - Des Moines</td>
<td>248 km</td>
</tr>
<tr>
<td>ARX - La Crosse</td>
<td>545 km</td>
<td>NPX - Minneapolis</td>
<td>568 km</td>
</tr>
<tr>
<td>PSD - Sioux Falls</td>
<td>432 km</td>
<td>OAX - Omaha</td>
<td>197 km</td>
</tr>
<tr>
<td>DVN - Davenport</td>
<td>426 km</td>
<td>EAX - Pleasant Hill</td>
<td>137 km</td>
</tr>
</tbody>
</table>

Notes:
- This app is purely for educational purposes.
- Distances are measured from the RADAR site to the midpoint of the area you selected.
- Only radars in precip mode are shown.

http://mesonet.agron.iastate.edu
IEM Freeze

GIS Layers
NEXRAD
Road Temps
Air Temps
State Borders
County Borders
Label
Logo!

15 Jan 2004: 17.11 AMS IIPS GIS
http://mesonet.agron.iastate.edu
NEXRAD with warnings
Using NWS Warning Polygons

- Warnings are mined into a spatial database in real time
- Mapserver can use this as a data layer
- Warnings are synced with the NEXRAD layer for display
- Provides valuable insight for the specific areas and tracks the forecasters are concentrating on
- Great data-source for verification studies
Summary

• Where is the IEM going with GIS?
  – I don't know.

• What will I show next year at AMS/IIPS/GIS?
  – Perhaps I won't be invited!

• Who can use our software and data?
  – Anybody who likes Open-Source and isn't afraid to have some fun in the process!

• Will OSS/Mapserver/Linux rule the world?
  – YES! WHA-HA-HA-!!!
I'm done, questions?

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