Network Enabled Data Access and Analysis

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http://tinyurl.com/ksvpgse

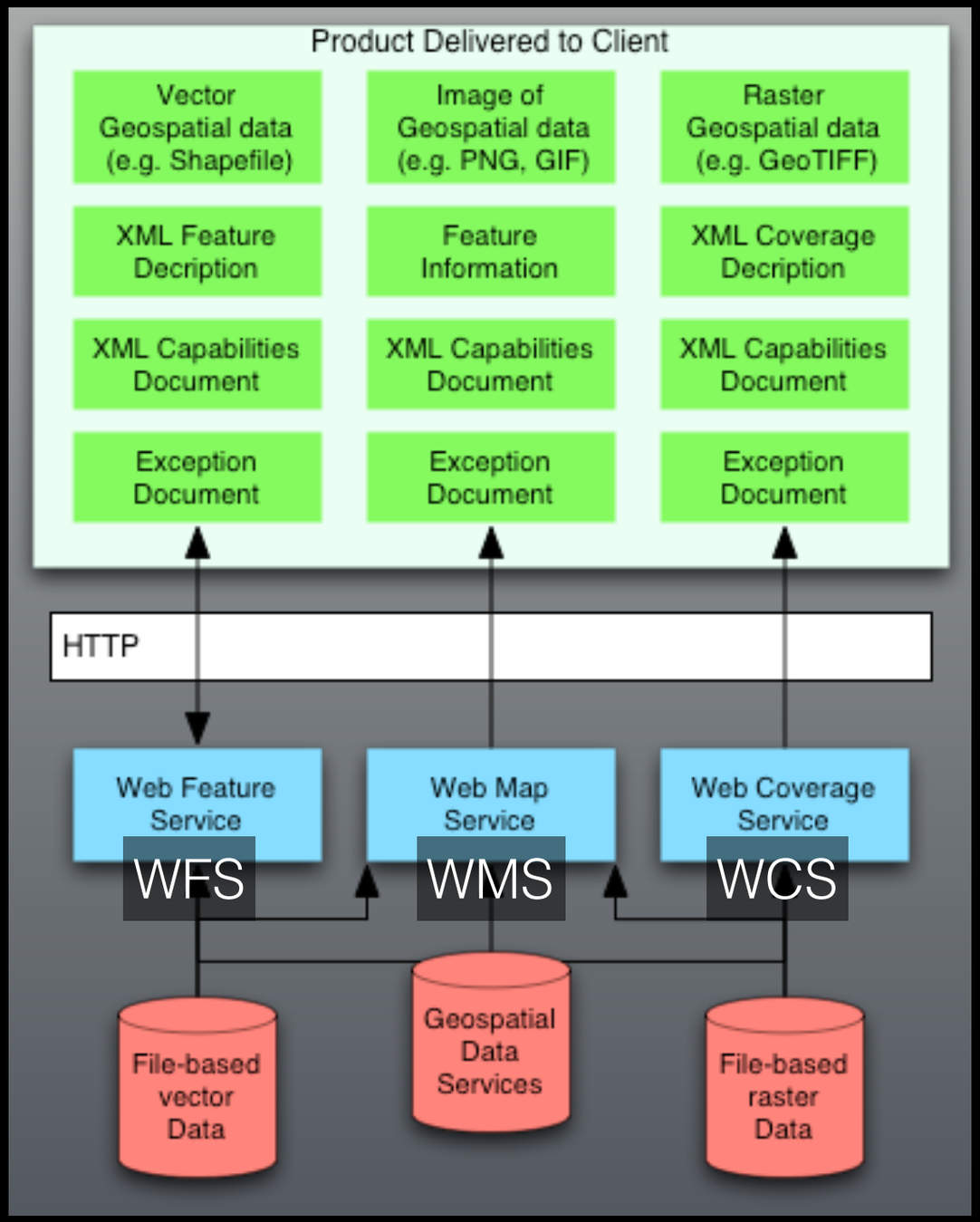
Introduction

Overview

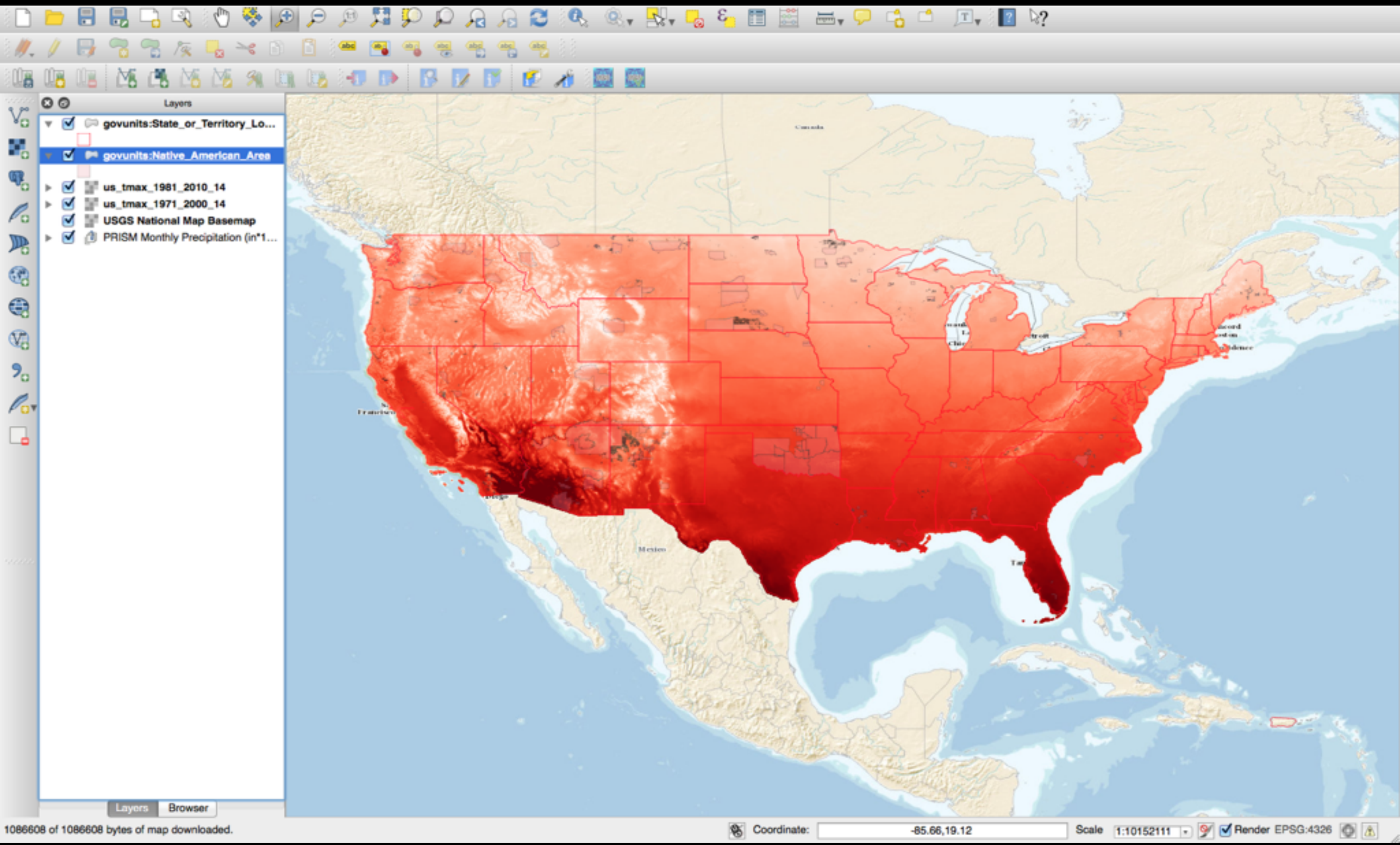
- Geospatial Data & Visualization Services
  - Quantum GIS
  - OpenLayers Javascript Framework for Web Mapping
- Hybrid Discovery Service with File-based Data Download
- Data Services

Geospatial Data & Visualization Services

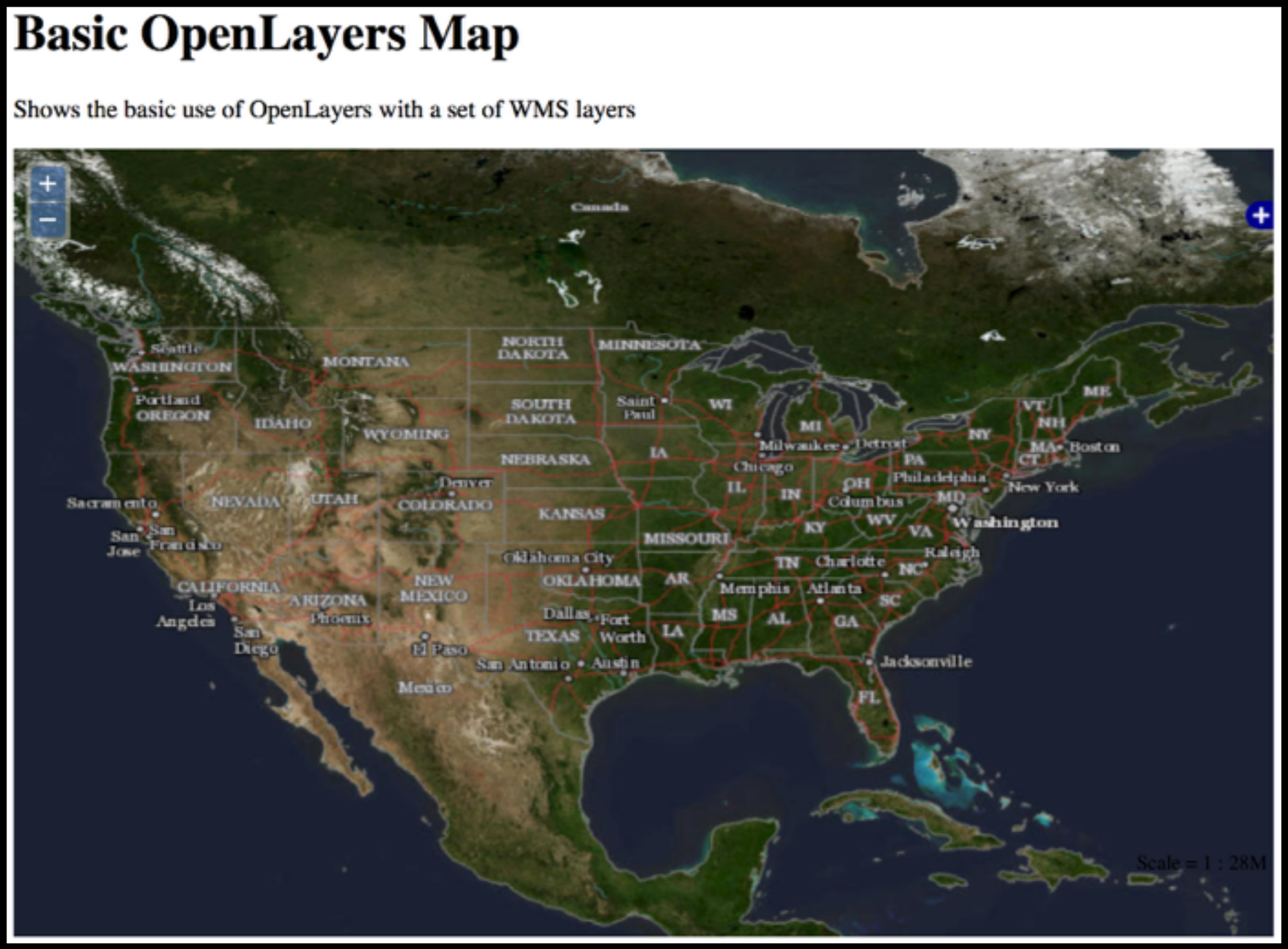
Open Geospatial Consortium Standards



Quantum GIS Demonstration



Integration into Web Clients - OpenLayers Example



http://karlbenedict.com/presentations/2014-04-CI-day/examples/openLayers10_wms01.html

Hybrid Discovery Service & File-based Data Download Demo

GSToRE V3 Stable Experimental Architecture

GSToRE V3 API Documentation

Geographic Storage, Transformation and Retrieval Engine Version 3

Architecture

A brief description of the GSToRE architecture.

View docs

Stable API

Versioned, stable services.

View docs

Experimental API

Services listed as experimental may undergo significant changes to the routing or service responses. Use at your own risk.

View docs

http://gstore.unm.edu/docs/index.html

SNOTEL Data Discovery & Download

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File Edit View Insert Cell Kernel Help

Markdown

Network Data Access - Data Discovery Through Web Services and File-based Access to SNOTEL Data

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An Analysis

This analysis demonstrates searching for datasets that meet a set of specified conditions, downloading, processing and plotting the data from the files.

Enable the needed python libraries

In [74]:
```
import urllib
import zipfile
import StringIO
import string
import pandas
import matplotlib.pyplot as plt
import numpy as np
from IPython.display import HTML
import json
```

Set some initial variables

In [75]:
```
county_name = ""
start_date = "20140101"
end_date = "20150101"
diag = False
```

https://compute.karlbenedict.com:8888

Download Notebook: http://karlbenedict.com/presentations/2014-04-CI-day/examples/notebook_01.ipynb

Data Services

USGS Home
Contact USGS
Search USGS

REST Web Services

HOME | REST SERVICES | SOAP SERVICES | DOCUMENTATION | EXAMPLES | LINKS | FAQ | CONTACT US

USGS Instantaneous Values Web Service

You can use this service to retrieve recent and historical values for streamflow as well as data for other regular time-series parameters served by the USGS. This service provides these USGS water data in Extensible Markup Language (XML), Javascript Object Notation (JSON) and the legacy RDB (tab-delimited) format currently available from the USGS Water Data for the Nation site. More media types will follow.

Please join the USGS Water Data for the Nation Notification List. This way you will receive an announcement when changes are made to this web service, or if it there are significant problems with the service.

Quick Links

How the service works

- This is a REST-friendly service, which means it is URL accessible and can be run from a browser
- The service can return recent water readings for one or more sites in one request
- Data from October 1, 2007 to the present can be returned with one request. However, certain operational data that is not quality assured (this typically includes temperature and precipitation) is limited to 120 days or less by the local USGS water science center responsible for the data.

With thousands of sites monitored across the nation, and with the majority of these sites having measurements for more than one type of data, the amount of data available is very large. No one user is allowed to download all of the data with a single call. The service has consequently been designed and engineered to facilitate common mass queries, defaulting to returning a narrower set of data. You are encouraged to make your queries efficient too, mindful that many others need access to the data. **Always specify the minimum amount of data you need in your request, using built in filters and date ranges to the maximum extent possible.**

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http://waterservices.usgs.gov/rest/IV-Service.html

USGS NWIS Service

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File Edit View Insert Cell Kernel Help

Markdown

Network Data Access - USGS NWIS Service-based Data Access

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An Analysis

This analysis demonstrates searching for datasets that meet a set of specified conditions, accessing via advertised services, processing and plotting the data from the service.

Service Documentation: http://waterservices.usgs.gov/rest/IV-Service.html

Enable the needed python libraries

In [2]:
```
import urllib
import zipfile
import StringIO
import string
import pandas
import matplotlib.pyplot as plt
import numpy as np
from IPython.display import HTML
import json
```

Set some initial variables

In [3]:
```
county_name = ""
start_date = "20140101"
end_date = "20150101"
diag = False
```

Options

In [21]:
```
trieve the bounding box of the specified county - if no county is specified, the bounding boxes for all NM counties will be requested
yBBOXlink = "http://gstore.unm.edu/apps/epscor/search/nm_counties.json?limit=100&query=" + county_name  ## define the request URL
 countyBBOXlink ## print the request URL for verification

ile = urllib.urlopen(countyBBOXlink) ## request the bounding box information from the server
ata = json.load(bboxFile)
nt bboxData

 data for BBOX defined by specified county(ies)
nties = []
ountyBBOX in bboxData["results"]:
inx,miny,maxx,maxy = countyBBOX[u'box']
yDownloadLink = "http://waterservices.usgs.gov/nwis/iv/?bBox=%f,%f,%f,%f&format=json&period=P7D&parameterCd=00060" % (minx,miny,maxx,maxy) # retrieve data for the s
rint myDownloadLink
yCounty = {u'name':countyBBOX[u'text'],u'minx':minx,u'miny':miny,u'maxx':maxx,u'maxy':maxy,u'downloadLink':myDownloadLink}
yCounties.append(myCounty)
```

https://compute.karlbenedict.com:8888

Download Notebook: http://karlbenedict.com/presentations/2014-04-CI-day/examples/notebook_02.ipynb

Conclusions

Acknowledgements

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  - NSF EPSCoR Program (Track 1 [Awards: 0447691, 0814449, 1301346] and Track 2 awards [0918635, 1329470])
  - New Mexico Resource Geographic Information System
  - NASA ACCESS Program

Some Technologies

- iPython Notebook: http://ipython.org/notebook.html
- matplotlib: http://matplotlib.org/
- Quantum GIS: http://www.qgis.org/en/site/
- Code from today's demos: https://github.com/karlbenedict/karlbenedict.github.io/tree/master/presentations/2014-04-CI-day