Producing the Oklahoma Broadband Map:

A Description of, and Lessons Learned from this Stimulus Funded Project

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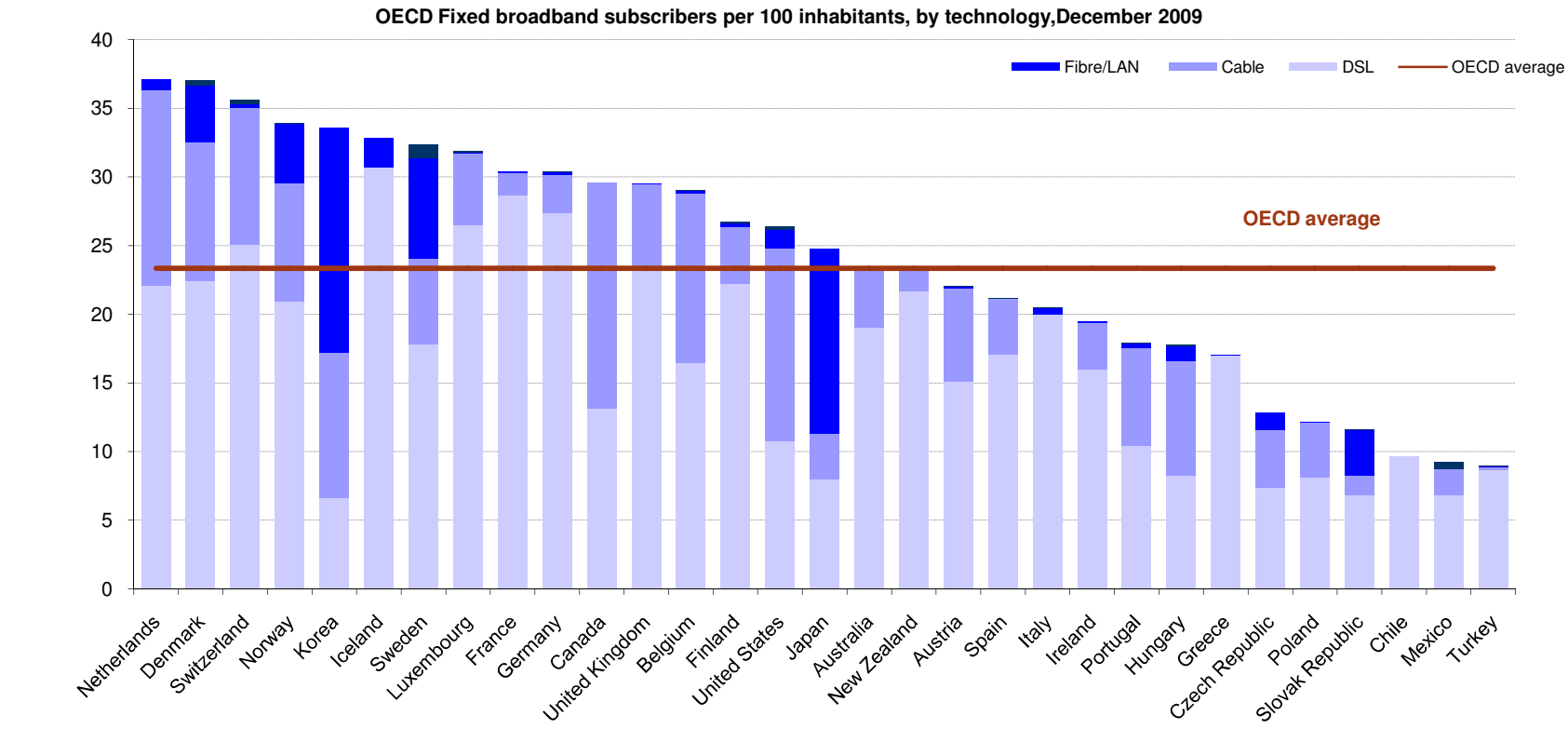
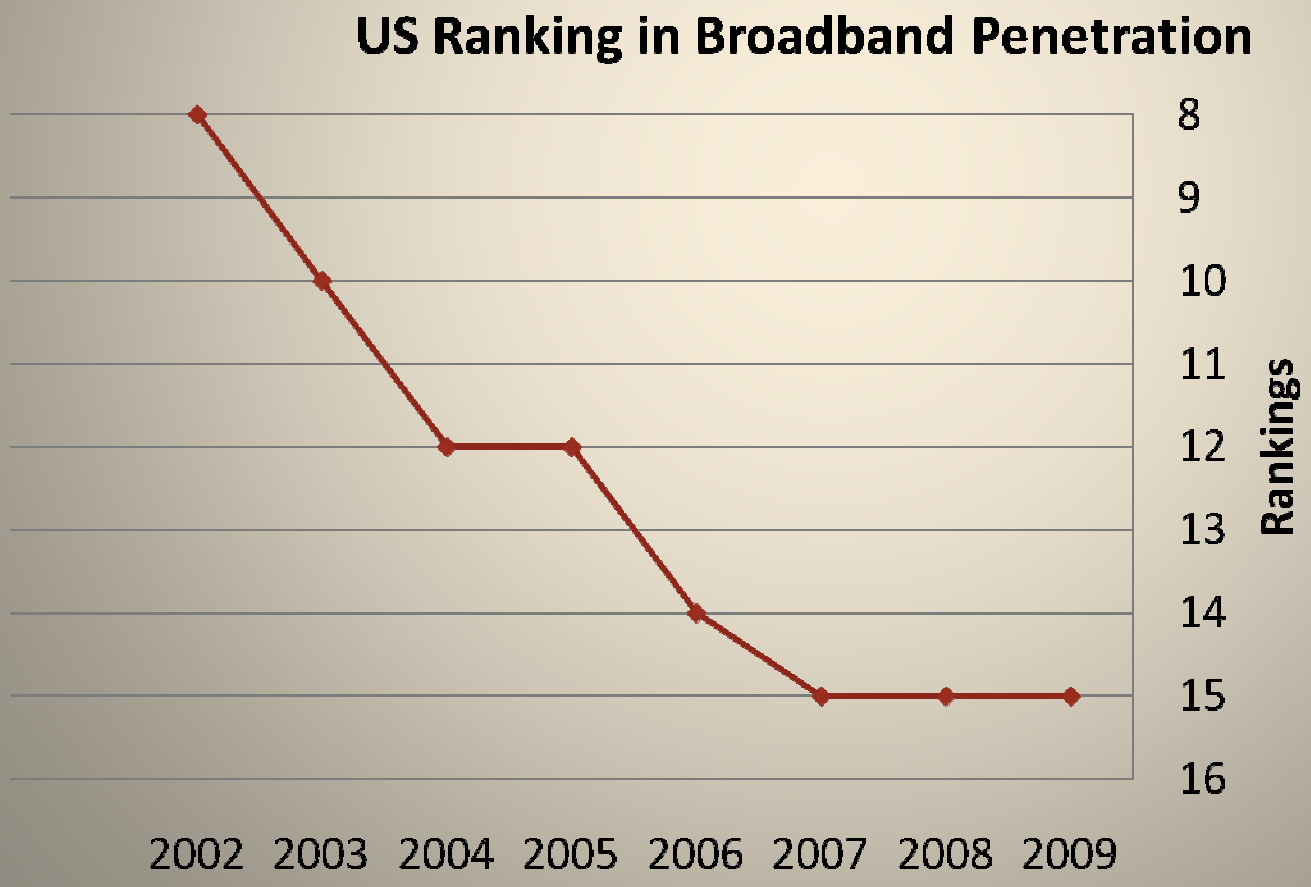
Broadband Penetration in Various Countries



Source: OECD

US Ranking in Broadband Penetration: A Decline or a Healthy Saturation State?

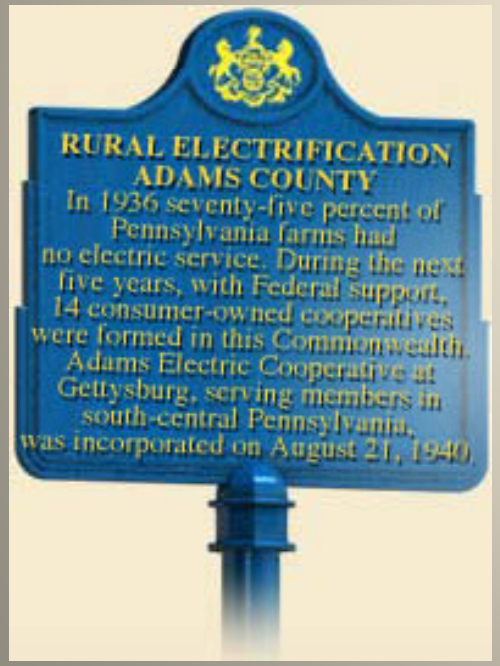


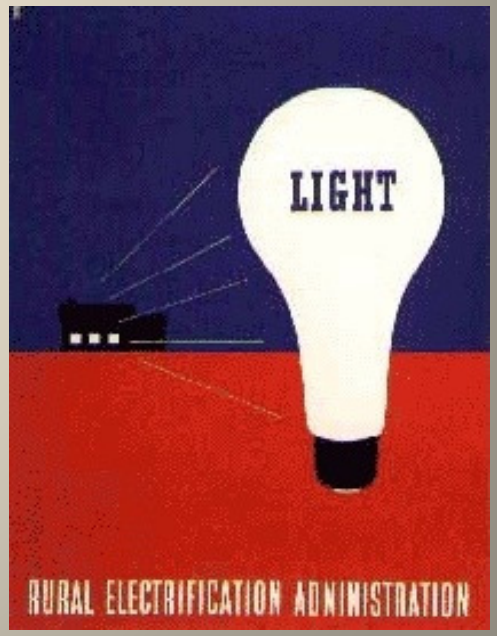
Why Broadband?

- Broadband availability key indicator of economic success
- Market vs. Government
- Digital divide – leveling of the playing field
- Stimulus-funding to states as grants for mapping and planning

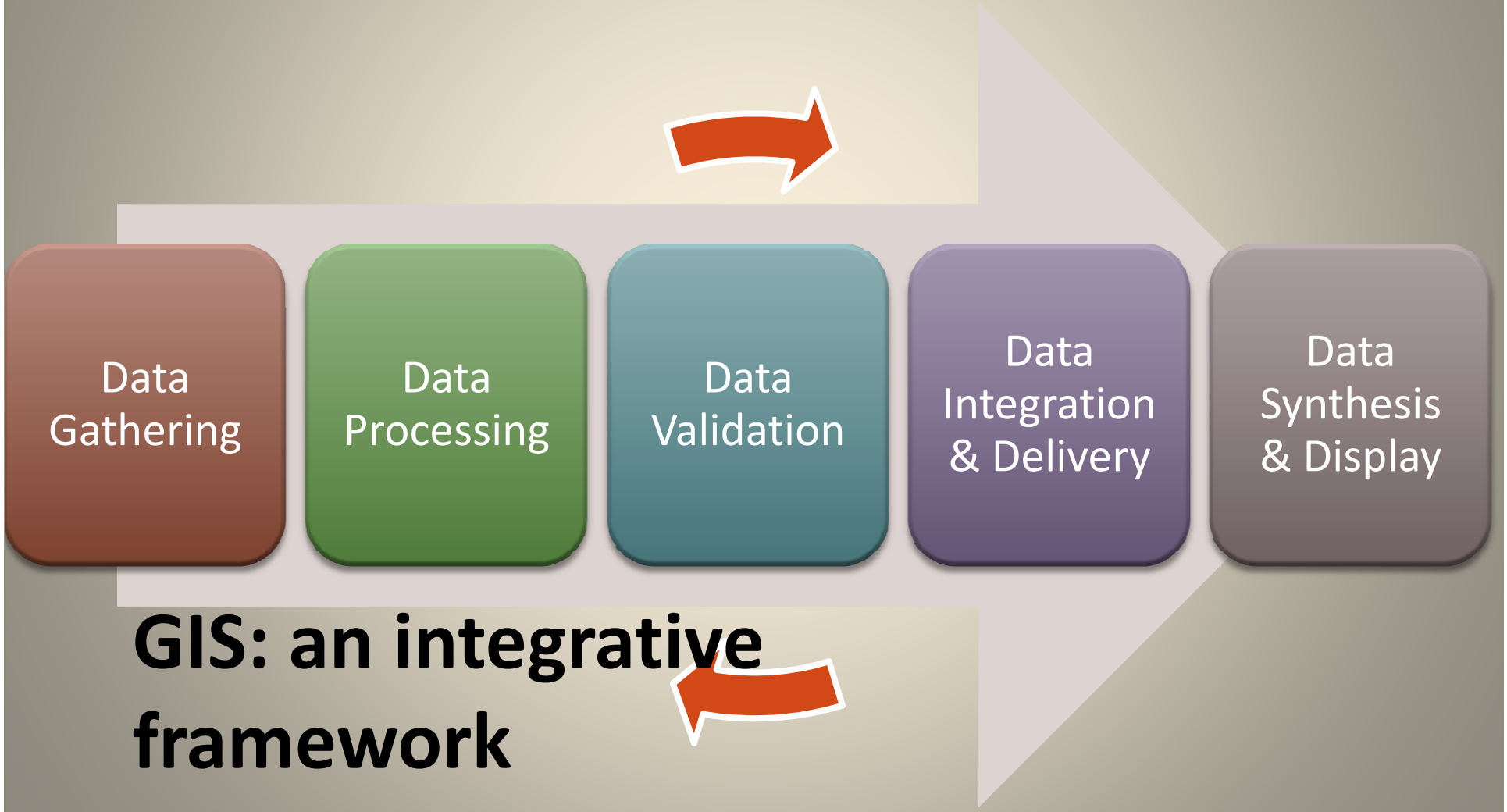
The Federal government has done this before

"Why would farmers need electricity; they have candles?"





NTIA'S State Broadband Data Development Program: Process Overview

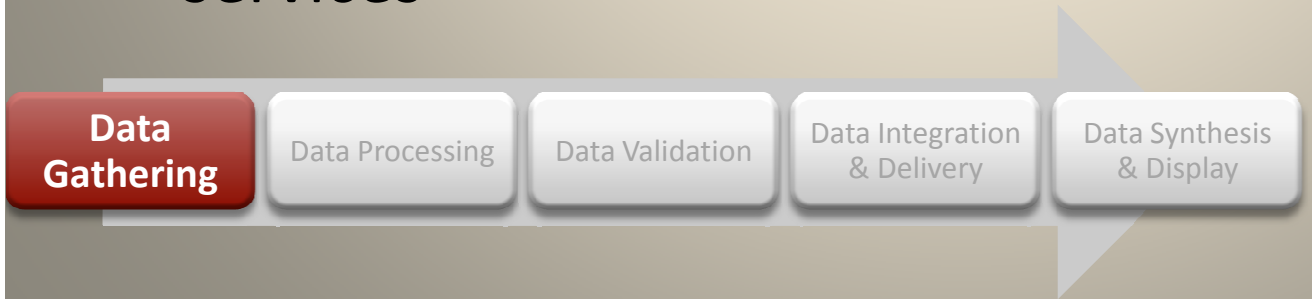


The National Broadband Map

- Provide grants to the states (stimulus funded)
- Create 50 state broadband maps
- Put the 50 states together for the national map

What are we gathering?

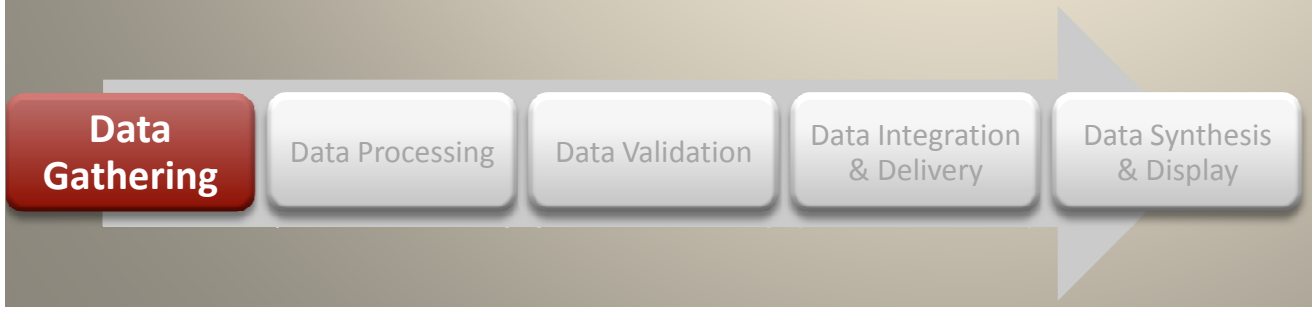
- Information about:
  - Where is broadband available?
  - What technology is used? cable/dsl/wireless
  - What speeds?
  - Where is the broadband infrastructure to deliver services
- Information from:
  - Providers of broadband
    - √ Public
    - √ Public
    - √ Public/Private
  - × No information from resellers



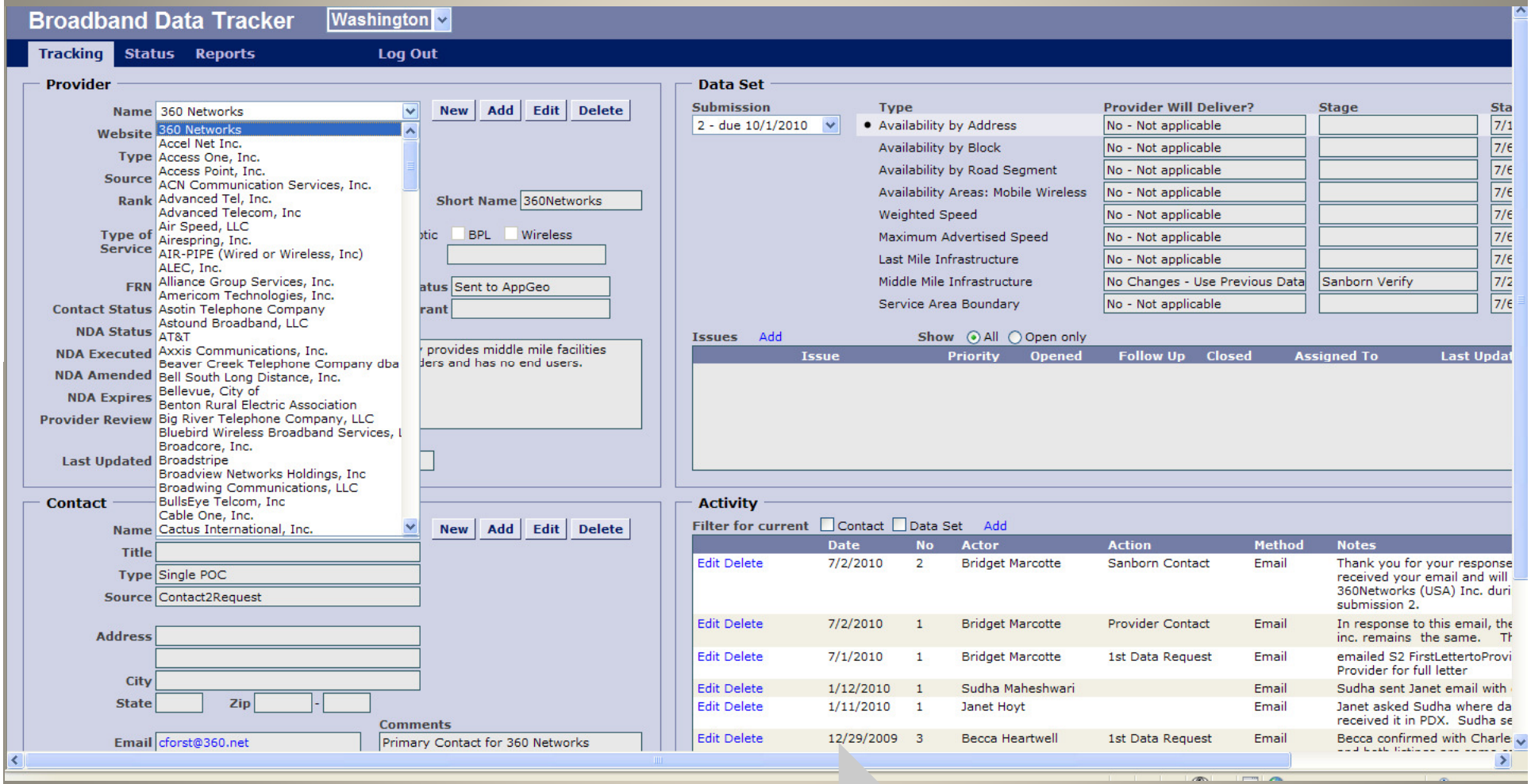
Access is particularly important for "Community Anchor Institutions"

Data Gathering

- Compile a list of providers
- Contact providers and inform them about the program
- Execute data sharing agreement with providers for confidentiality of data
- Collect data



Data Collection: Tracking Every Provider Interaction



Data Gathering | Data Processing | Data Validation | Data Integration & Delivery | Data Synthesis & Display

Data Collection: Crowd Sourcing of Community Anchor Institutions

Data Gathering | Data Processing | Data Validation | Data Integration & Delivery | Data Synthesis & Display

Logout

Community Anchor Institution Survey

Please answer the following questions to the best of your knowledge.

What category best describes the institution? School, K through 12

In which county is the institution located? OKLAHOMA

Please select the institution from this list BETHANY MS

(if you do not see your institution on the list, please select 'Other')

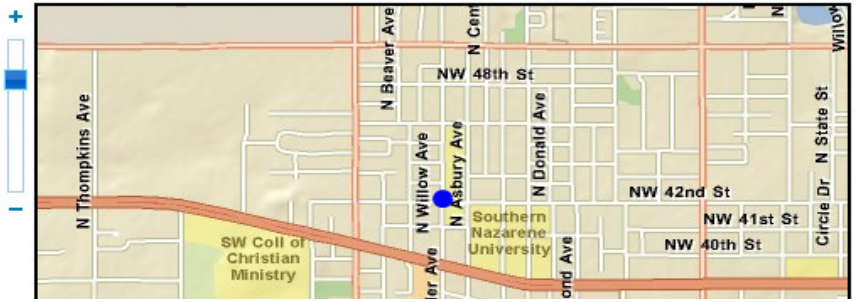
Street address of institution (no P.O.Box) 4312 North Mueller

City Bethany **Zip** 73008

Update Address on Map

Mapped Location

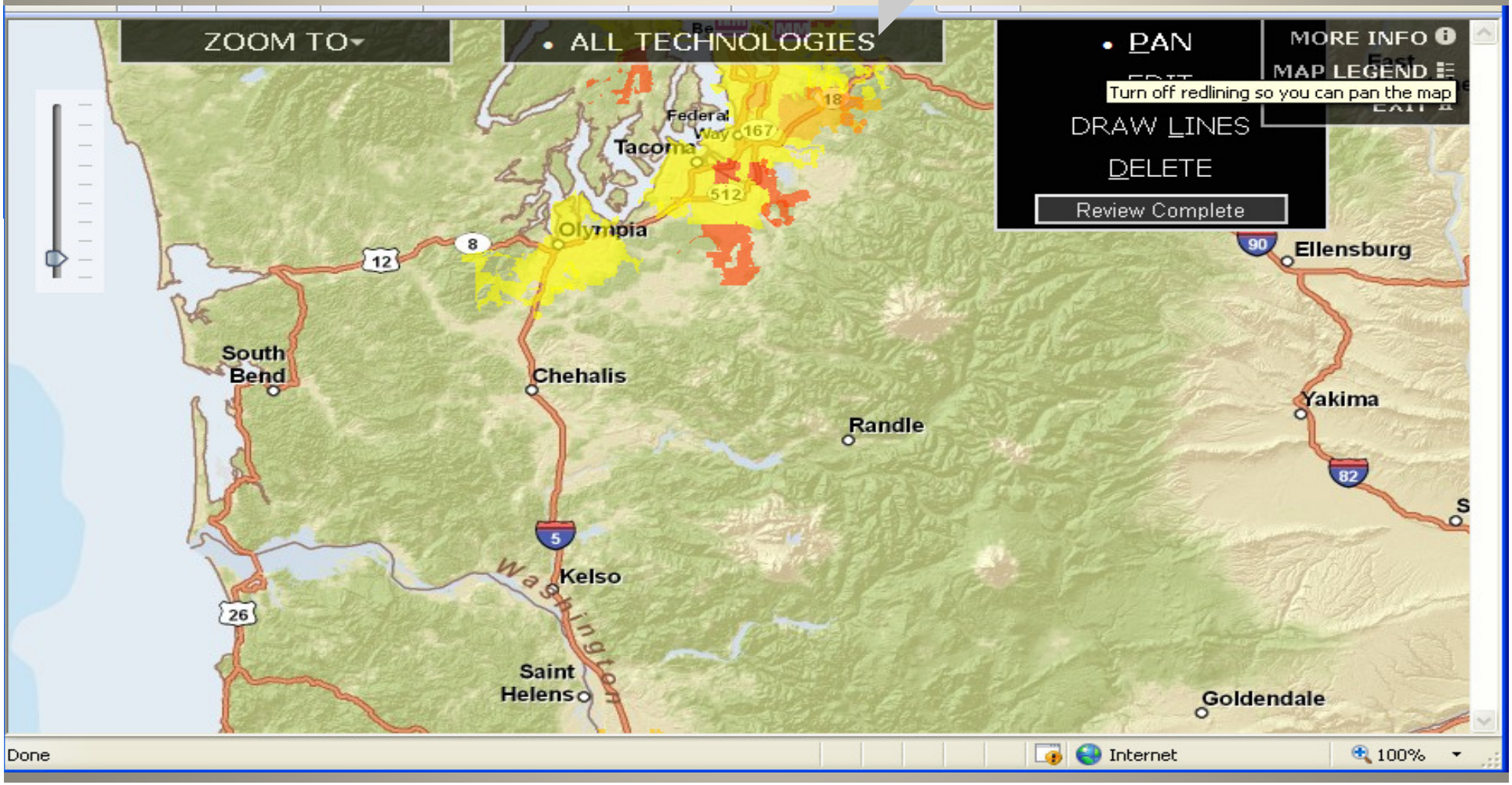
(please be patient while map loads)



If needed, use this tool to place the address point in the correct location on the map

Data Collection: Secure Provider Portal

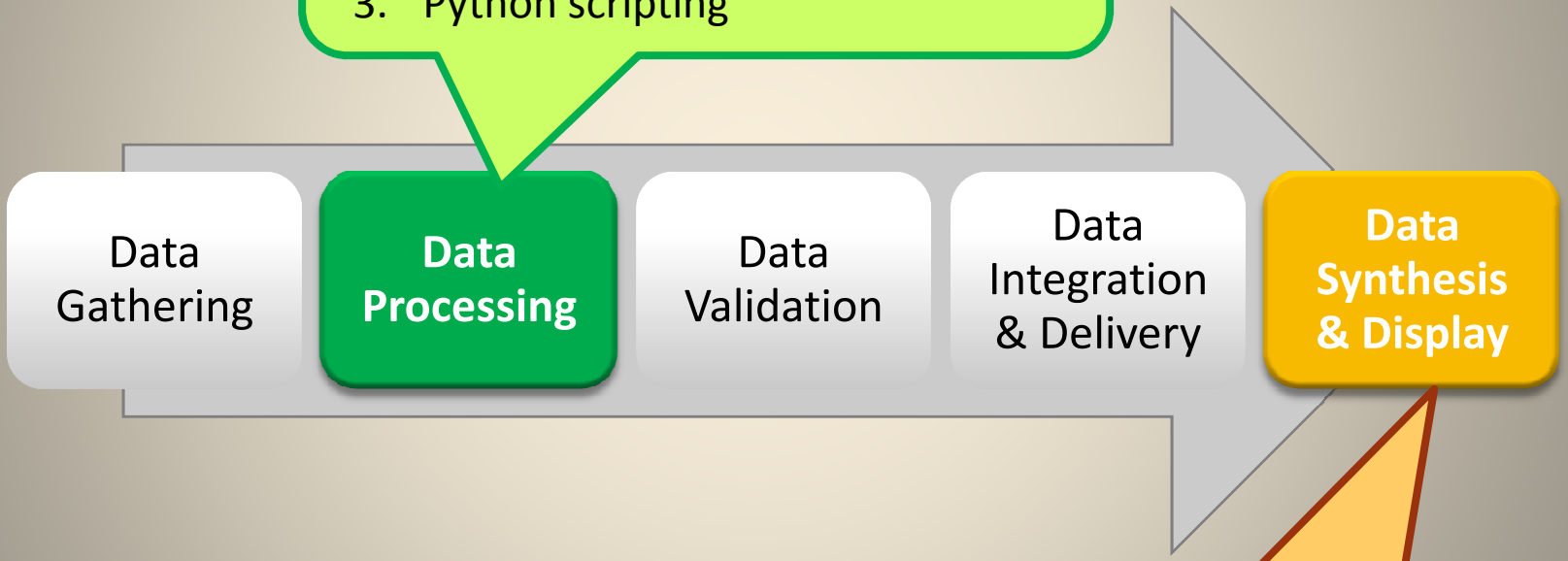
Data Gathering | Data Processing | Data Validation | Data Integration & Delivery | Data Synthesis & Display



Technical Elements of the Broadband Mapping Project

Focusing on use of automated tools:

1. ArcGIS Model Builder
2. Data Interoperability Extension
3. Python scripting



Focusing Public Interactive Web-site:

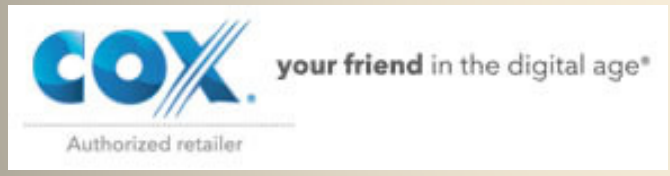
1. Using OK's Open Source framework
2. What the web-site does

How do you map broadband availability?

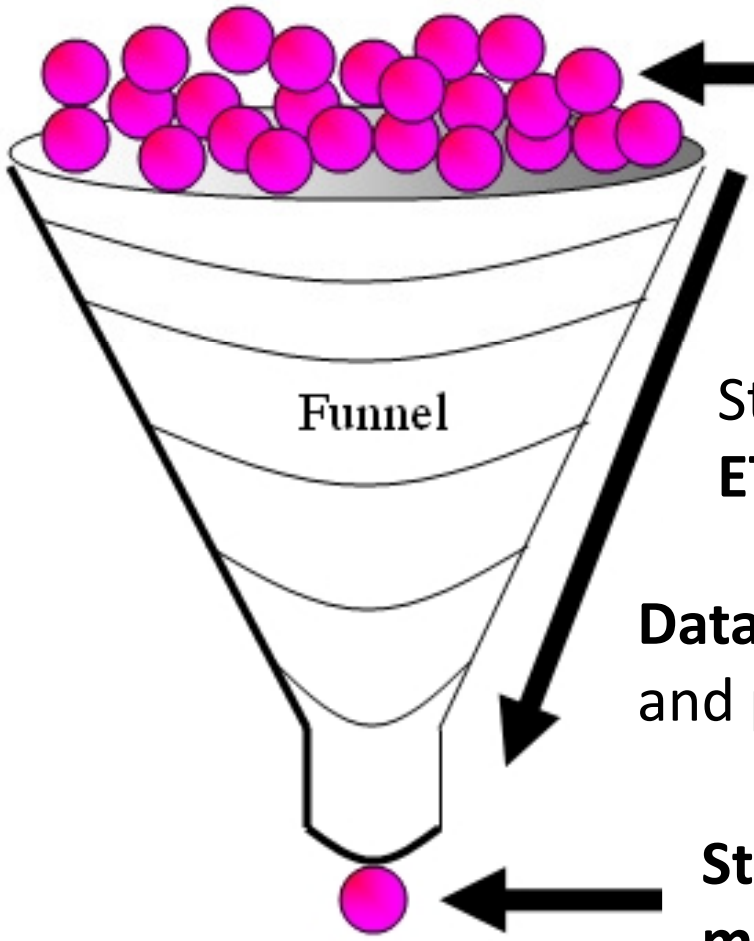
Knowing who currently has access, tells you where you need to provide access

Data Processing

Who has the map of broadband access?



Broadband mapping: It's a data aggregation process



Data from many providers, in many formats: 65 for Sept delivery

Standard set of largely automated **ETL data processing routines**

Data validation by states and providers

Statewide broadband availability map in a standard format

Data collection

Data for:

- Wireline
- Wireless
- Middle mile
- Plus base map info

Comes as:

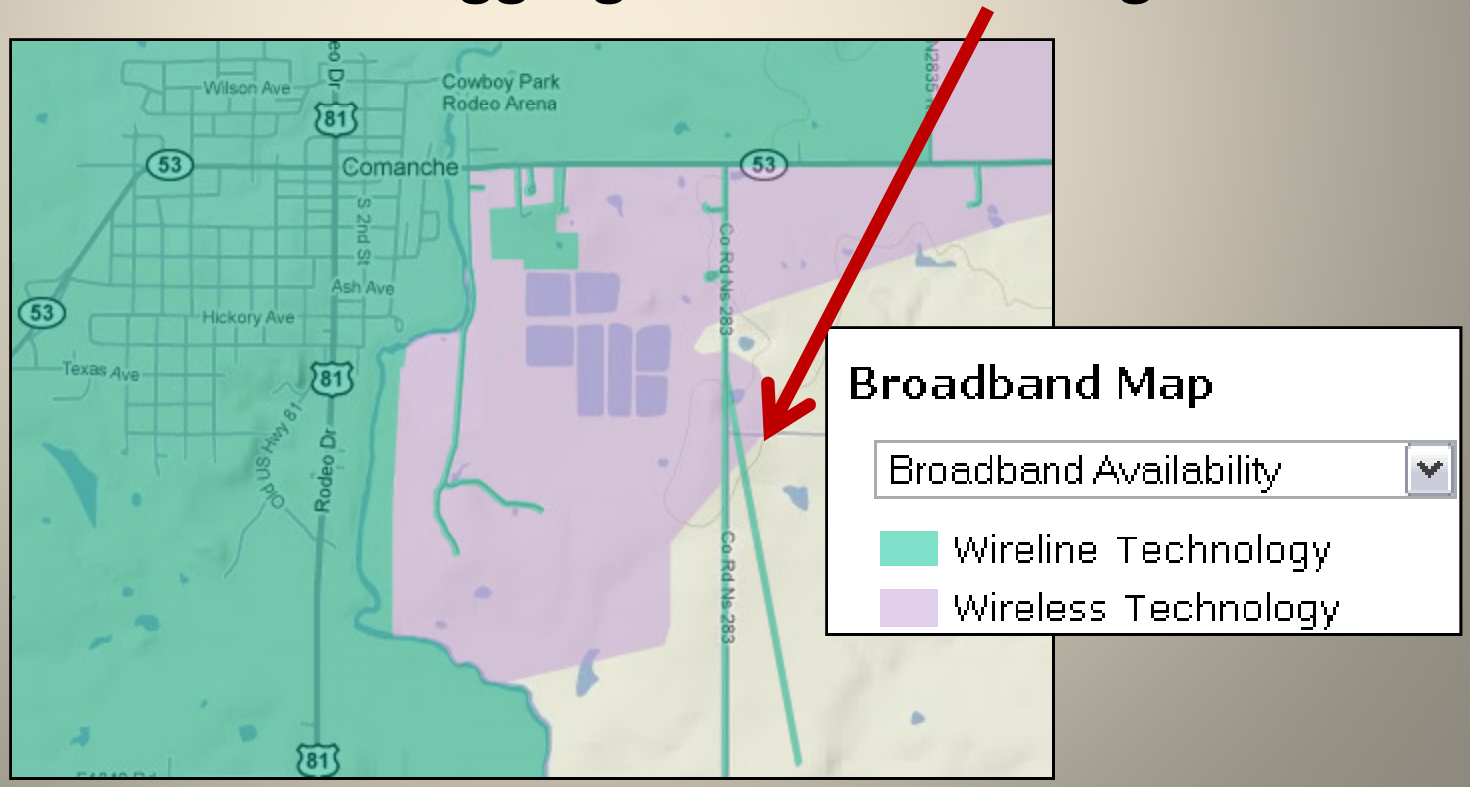
- Service area polygons
- Lists of customer addresses
- Census blocks with service
- Roads with service
- Buffers of cell towers
- Etc. Etc. Etc. Etc.

Comes from:

- Dozens of providers per state
- Under non-disclosure terms
- **Processed 65 data sets for OK**

Data Processing

- To protect provider customer data, all information is **aggregated to census blocks or street** segments
- If a census block is >2 sq. miles (indicating rural areas) information is aggregated to street segments



Overview of Geospatial Data Processing Maneuvers

- **Geocoding:** convert customer lists to locations
- **Overlay analysis:** to assign customers to census blocks or roads
- **Extract, Transform, Load (ETL):** to standardize attributes and domains across providers
- **Slicing and dicing:** to put features into the proper standardized schemas
- **Append:** to join multiple providers into a statewide view

It is critical to automate because this is a recurring program:

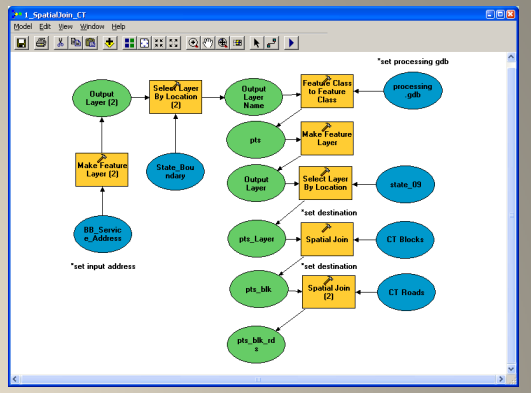
Do it over and over again for 2 years

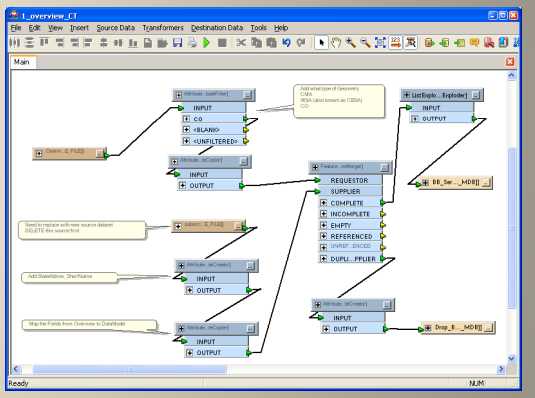
Two deliveries per year

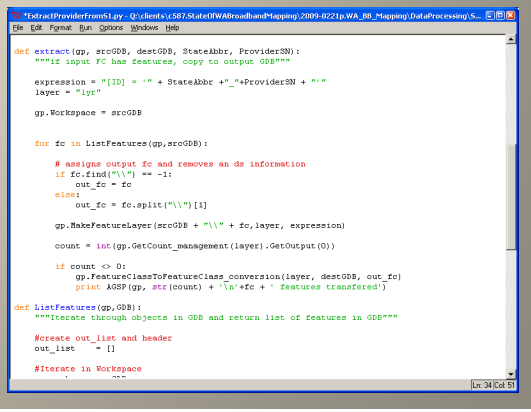
Possibility of a 3 year extension after that

Tools Employed

- ModelBuilder Models
- Spatial ETL Tools using ArcGIS Interoperability Extension (FME)
- Python scripting

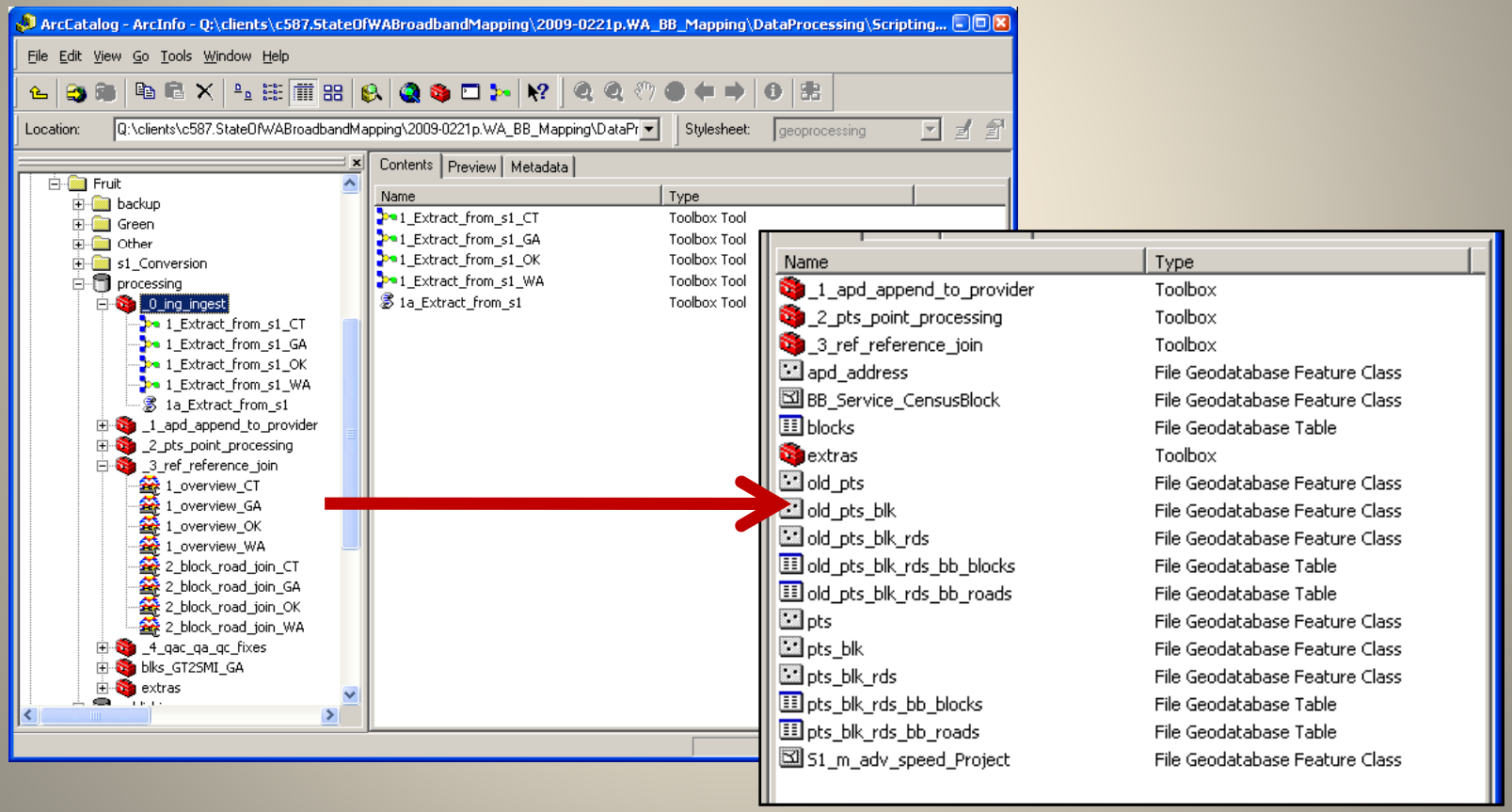






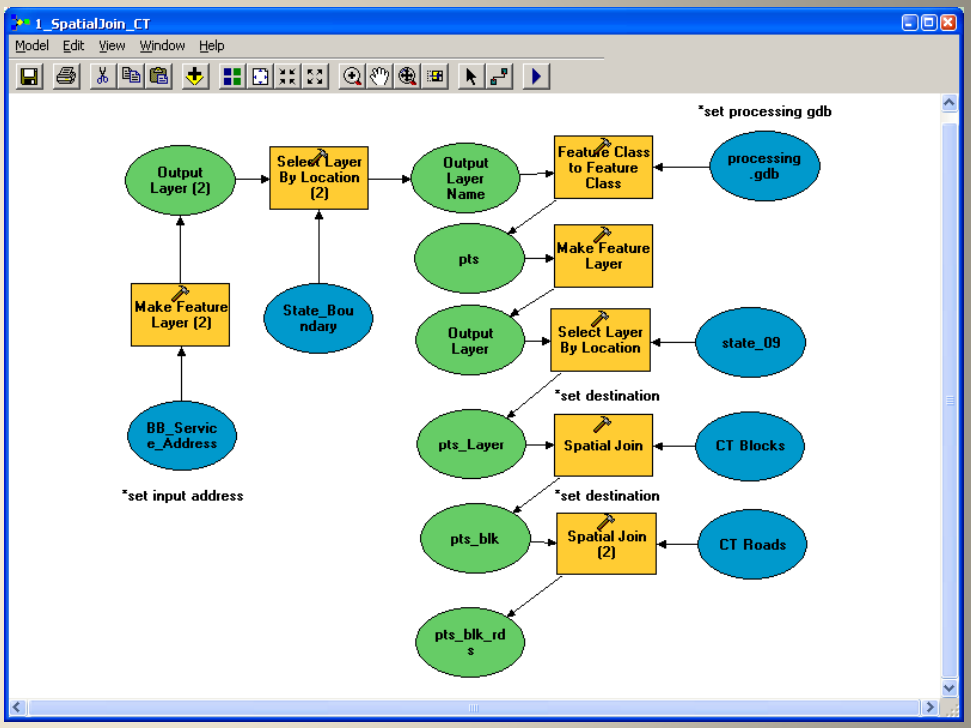
Processing GeoDB

- Toolboxes with tools are copied in from template GeoDB



ModelBuilder Models

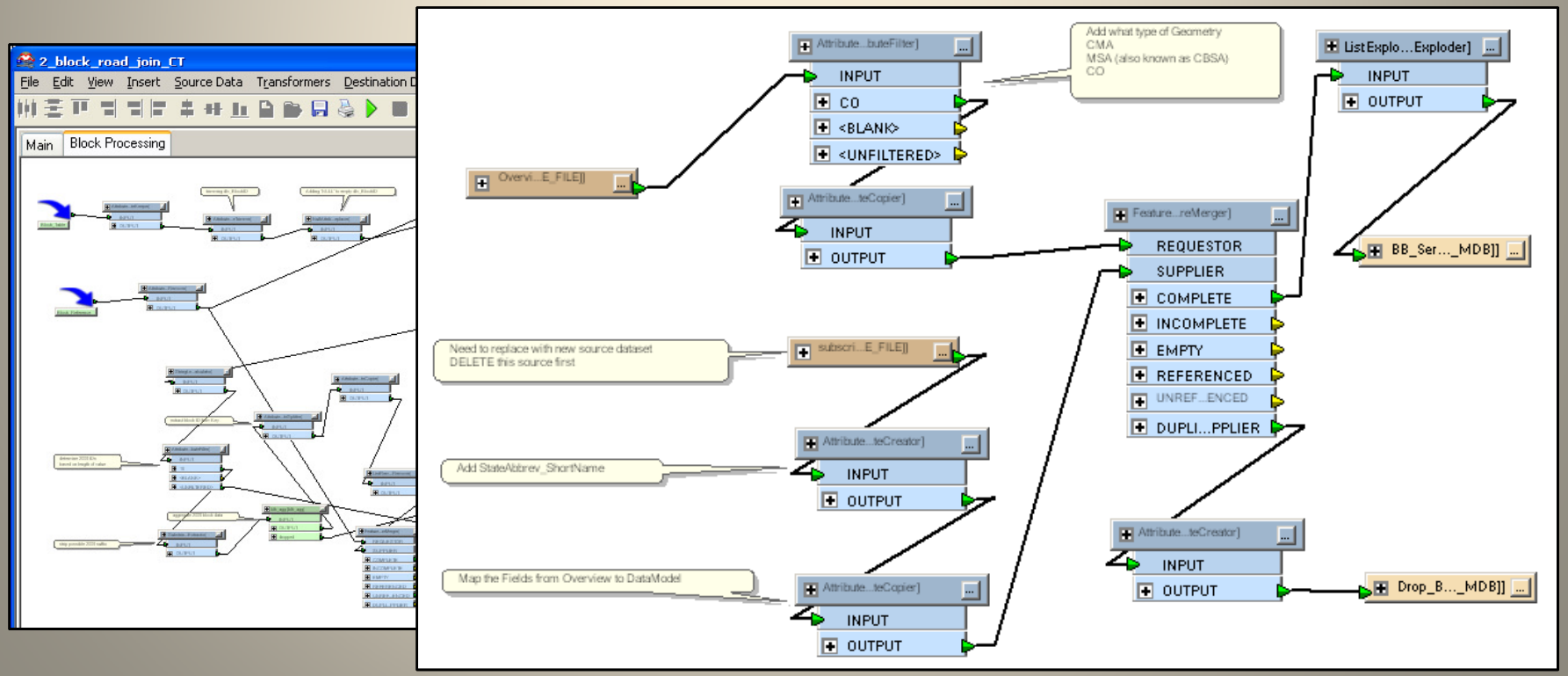
- Building simple (or complex) reusable processes
- Encapsulating and calling Python Scripts
  - Consistent operations
  - Traceable/documented inputs and process logic



This model takes address points within a state and joins them to blocks and road data

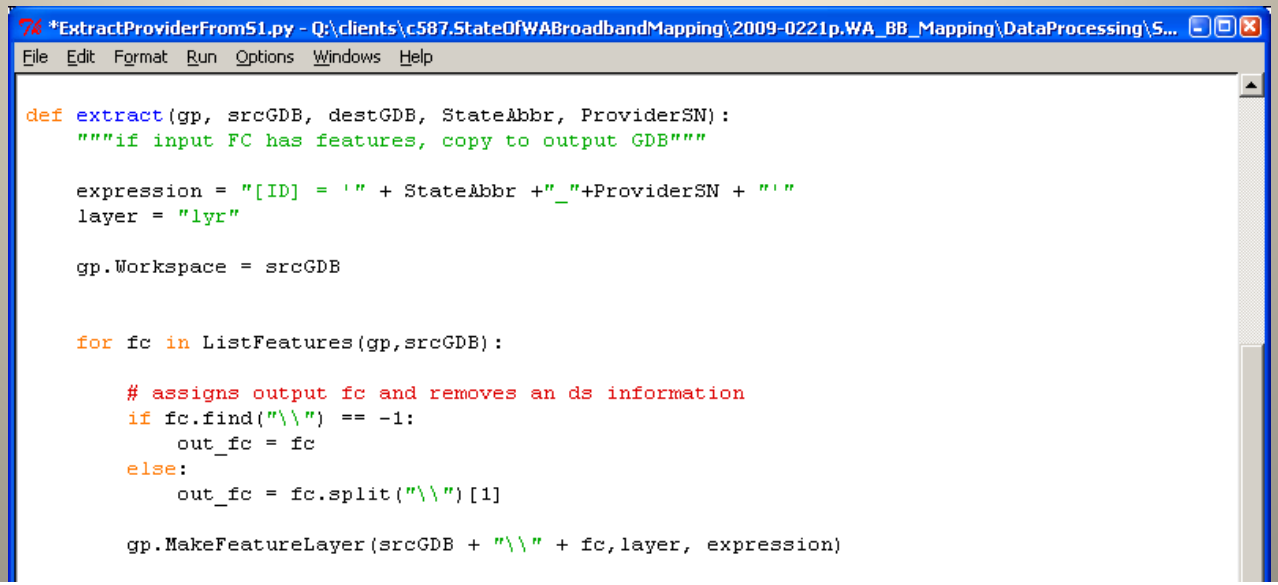
Spatial ETL Tool

- Used for:
  - Aggregation logic
  - Joining geometry
  - Filtering data into dropped tables



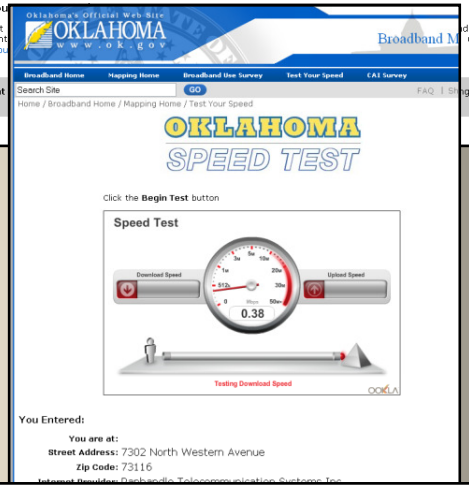
Python Script

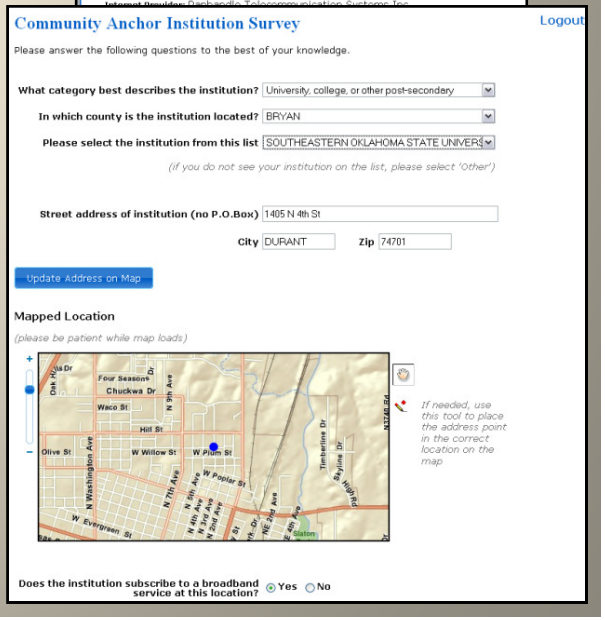
- Used for:
  - Building processing logic with ESRI tools
  - Calling Spatial ETL tools
  - Making SQL queries and tables in personal GDB
  - Automating feature by feature processes
  - Managing large processes

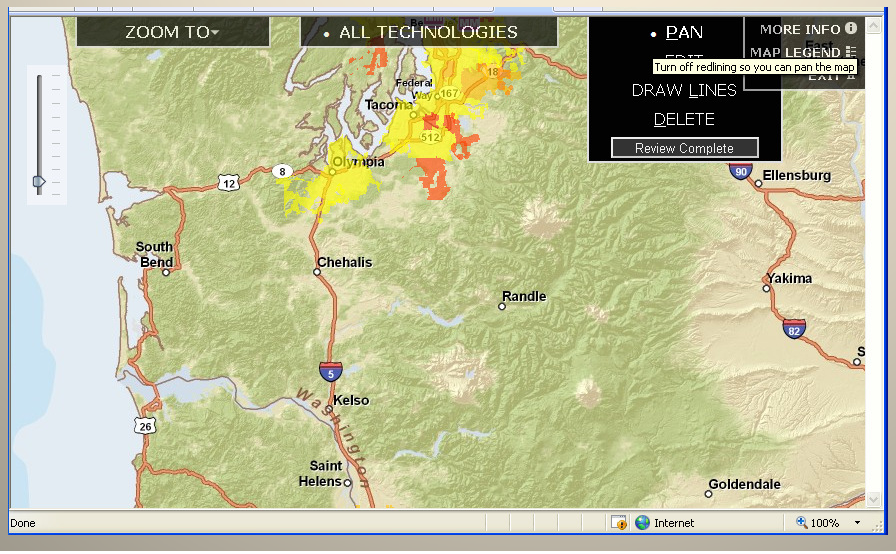


Web Mapping

- Several web-sites were constructed
  - On-line surveys and speed tests
  - Provider Portal to assist with validation
  - Public facing web map
    - Requirement from NTIA







Data Synthesis & Display

Public Interactive Broadband Map

Scheduled to be launched in October

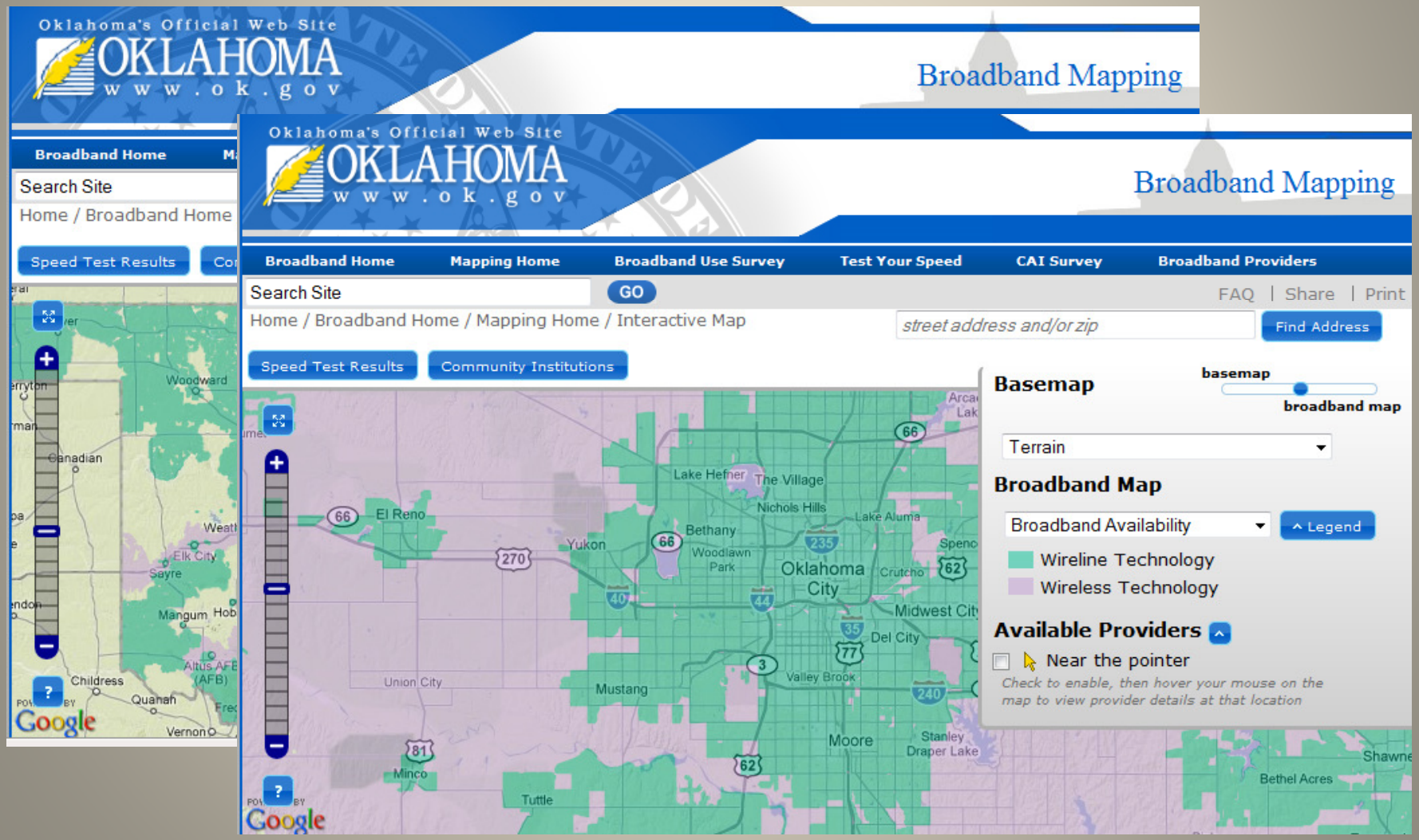
- Oklahoma specified that **Open Source** mapping technologies be used
- Matching OK.gov's Open Source stack:
  - **PostgreSQL** → Underlying database
  - **PostGIS** → Geospatial management w/in a DB (like ArcSDE)
  - **GeoServer** → Web Mapping Server (like IMS or AGS)
    - GeoWebCache → Tile Caching
  - **Google Maps** → For terrain base map and geocoding
  - **OGI OKMaps OGC web services** → For orthophoto service

Open Source Goal Was Simple

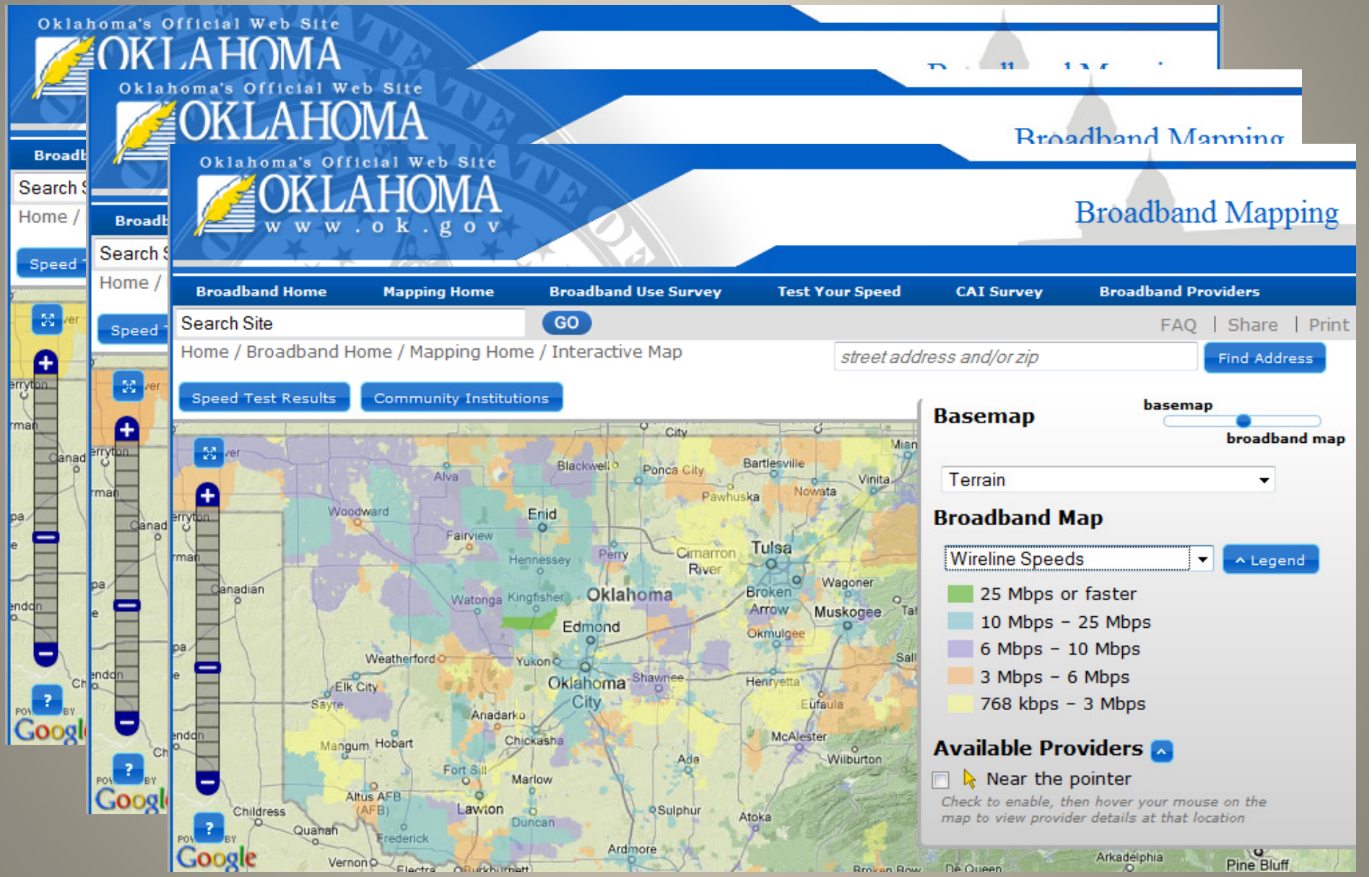
- Construct a good web-site
- Users don’t care what the backend is
- Ideally, no one knows it’s Open Source

What does it look like?

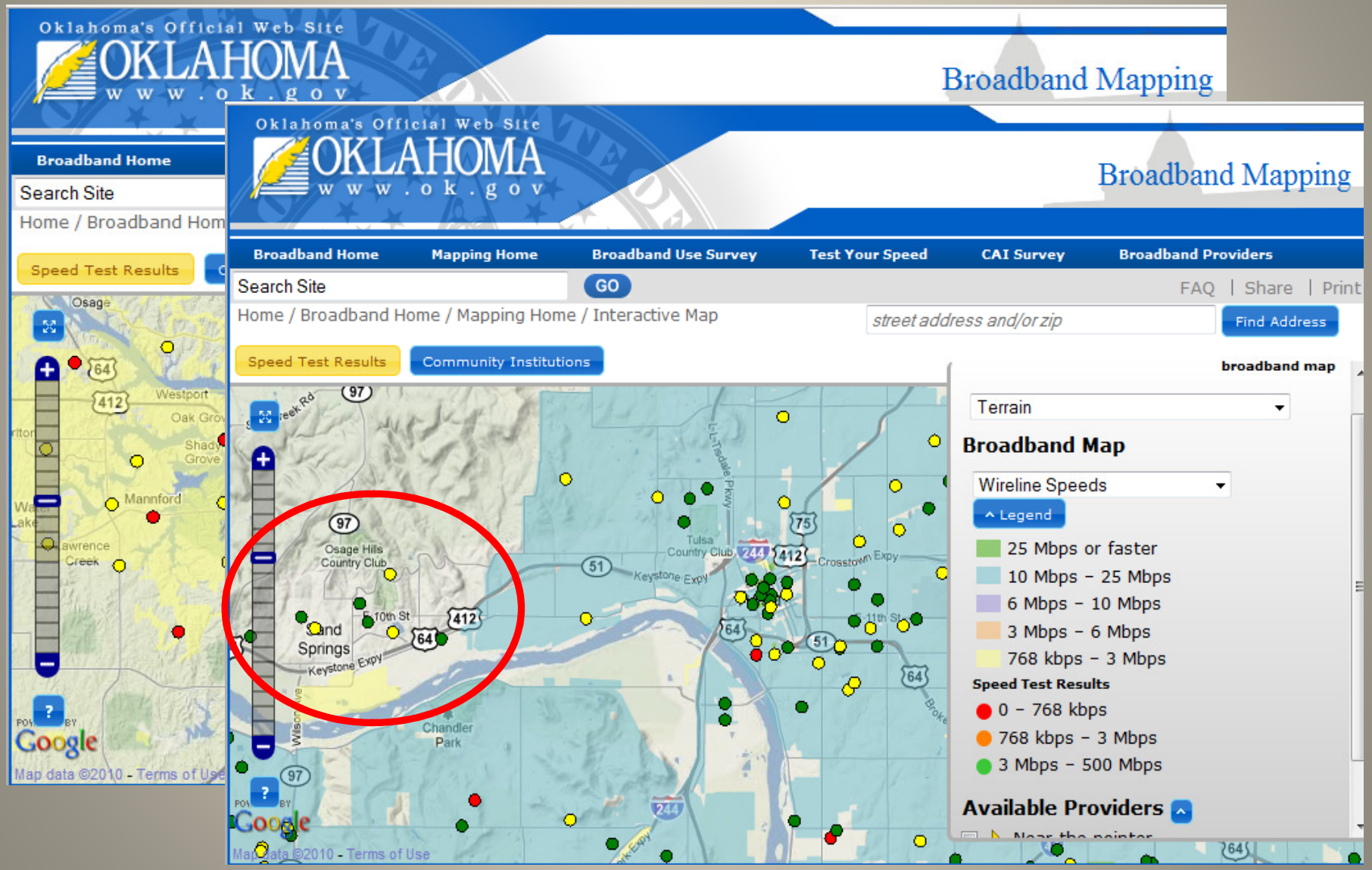
Focus is on broadband availability in OK



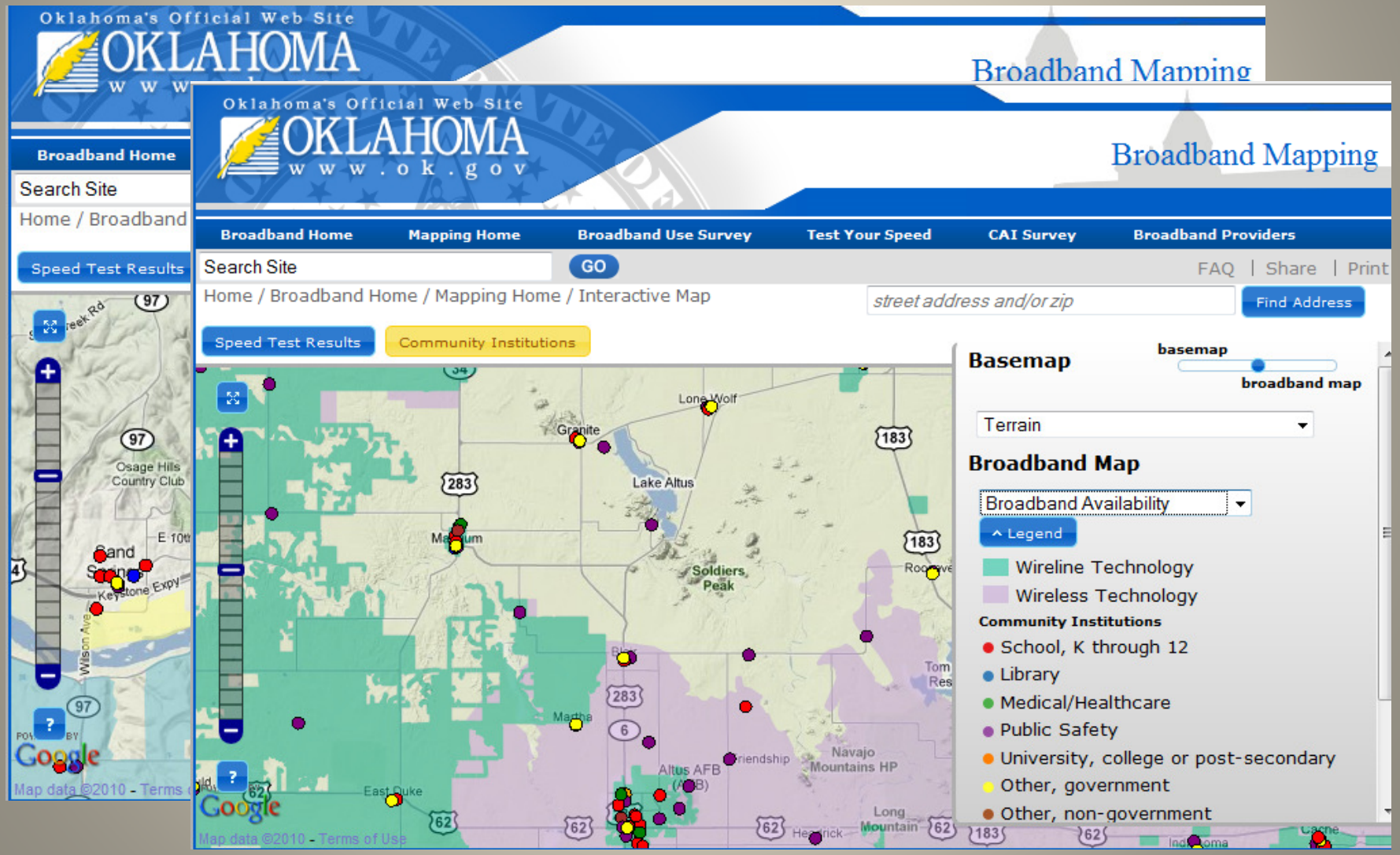
Multiple Views of Broadband Availability



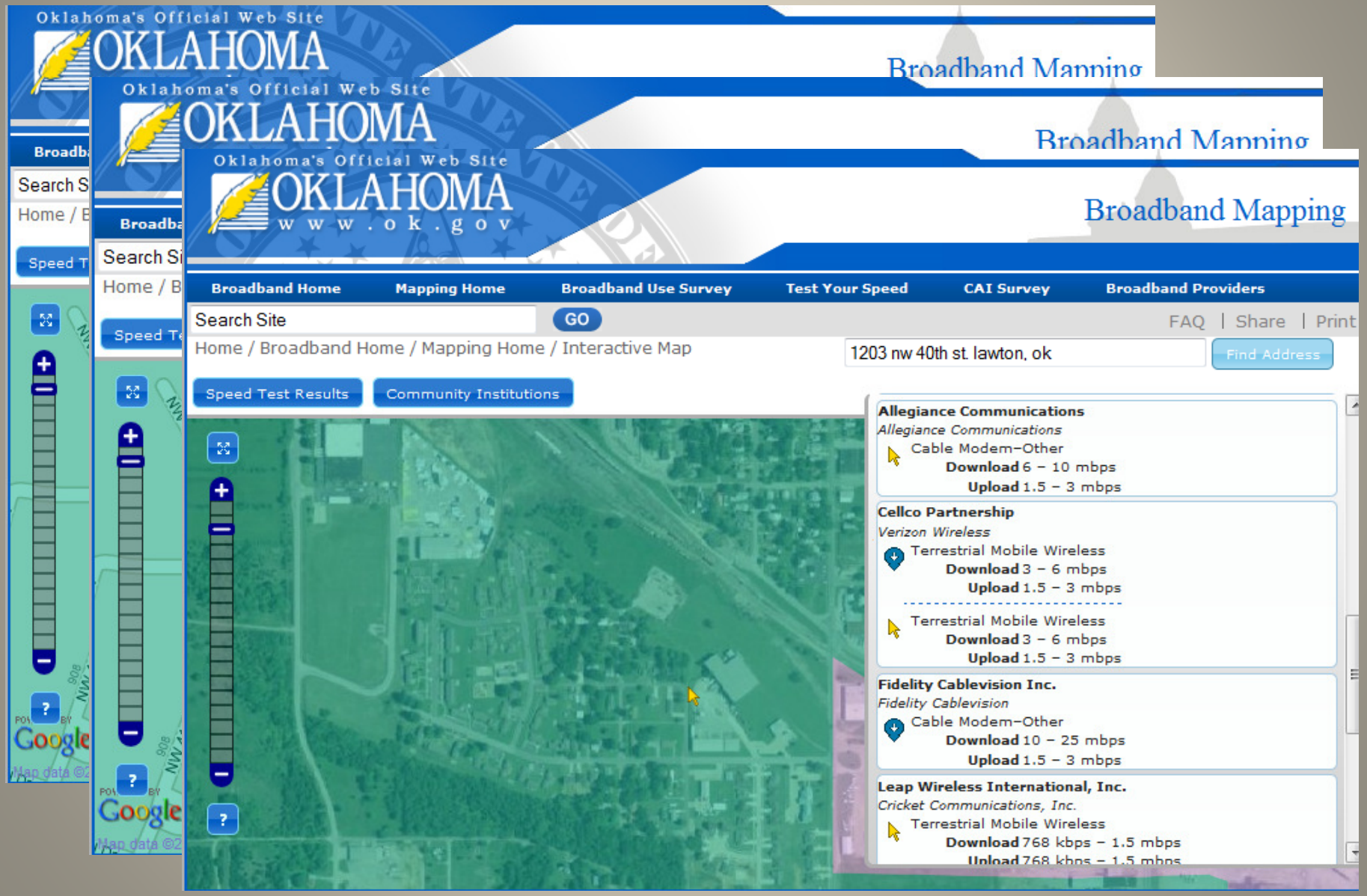
Speed Tests


Oklahoma's Official Web Site
OKLAHOMA
www.ok.gov
Broadband Mapping
Broadband Home
Search Site
Home / Broadband Hom
Speed Test Results
Oklahoma's Official Web Site
OKLAHOMA
www.ok.gov
Broadband Mapping
Broadband Home
Mapping Home
Broadband Use Survey
Test Your Speed
CAI Survey
Broadband Providers
Search Site
GO
FAQ | Share | Print
Home / Broadband Home / Mapping Home / Interactive Map
street address and/or zip
Find Address
Speed Test Results
Community Institutions
broadband map
Terrain
Broadband Map
Wireline Speeds
Legend
25 Mbps or faster
10 Mbps – 25 Mbps
6 Mbps – 10 Mbps
3 Mbps – 6 Mbps
768 kbps – 3 Mbps
Speed Test Results
0 – 768 kbps
768 kbps – 3 Mbps
3 Mbps – 500 Mbps
Available Providers
Osage Hills Country Club
Tulsa Country Club
Keystone Expy
Crosstown Expy
Chandler Park
Google
Map data ©2010 - Terms of Use

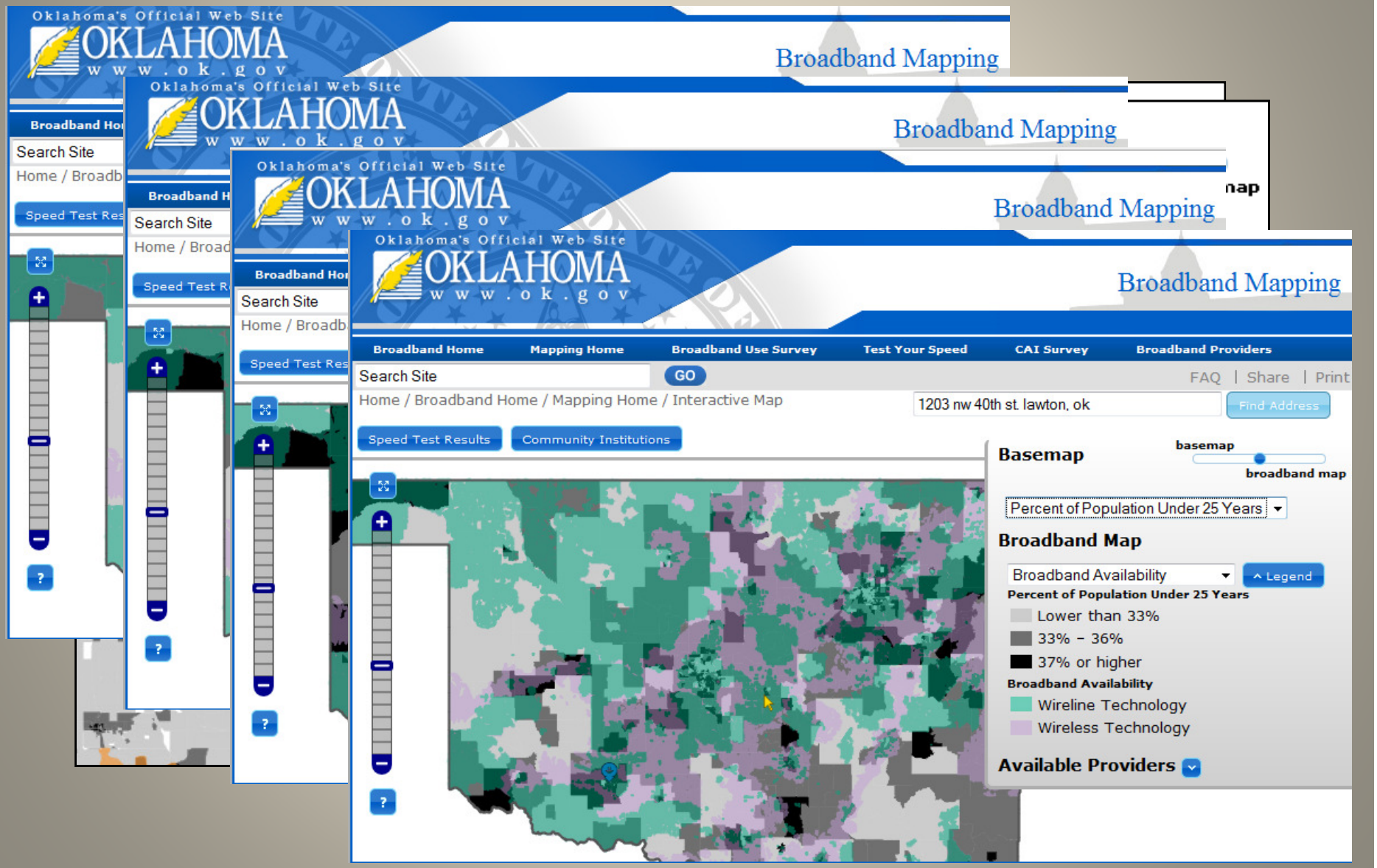
Community Anchor Institutions



Broadband Availability at a given location



Broadband & Demographic Data



To Track Project Progress

- Go To:

  http://www.ok.gov/Broadband

  http://BroadbandMapping.ok.gov

Thank you

Questions?