Response to NTIA Broadband Data and Development Grant Program

DATA COLLECTION:

1. The Introduction mentions that Oregon can scale back the program to meet the minimum requirements of the program. What are the biggest changes that would take place under this scenario and what impact would that have on the proposed budget?

With additional guidance from NTIA, Oregon's scaled back proposal results in the collection of address point data in only seven of Oregon's 36 counties for which there are no known data available, or in which there are significant data quality concerns. The impact of this change on the proposed budget is a decrease of $1,640,399 in the cost of address point data acquisition, from $1,915,254 to $274,855.

Several aspects of the hardware and software platform have been changed so that the solution is aligned with existing infrastructure in Oregon (basically moving from a Sun/Oracle configuration to a Windows/SQL server configuration). The estimated budget impact of this change lowers the cost of the technological environment over two years by $110,130 (from $178,330 to $68,200).

Including the decrease in the mapping project years from 5 to 2, the total cost of the broadband data collection and mapping portion of Oregon's grant application is now $1,609,692, of which the address point acquisition is approximately 17%. In addition, Oregon continues to seek grant funding in the amount of $498,460 for broadband planning. Oregon's total grant request is now $2,108,152.

In order to illustrate the address point data changes, two files are attached. The first is a map of Oregon depicting the distribution of address point data and whether its source is commercial (NAVTEQ) or local government (Oregon Address Point Source Comparison.jpg). The second is a table depicting the relative quality and availability of address point data by county (OR Pt Address Data Eval.pdf).

2. Please provide more information about your potential plans to automate data collection with providers.

As we described in the "processes and functions supplement" to Oregon's broadband grant proposal, all broadband service providers will be contacted to request subscriber, service area, and infrastructure data. Upon receipt of a representative sample of responses, we will design a schema to facilitate the automated import of providers' data into our template database. Furthermore, and to the extent that providers are willing to cooperate, we will integrate NTIA reporting needs into their billing and serviceability systems where feasible and cost justified. If that is not feasible, we will provide the following options: secure FTP (file transfer protocol) site, where providers can post their data as required by NTIA; email (data will be conflated into the database staging area); and fax (data will be scanned into the database via OCR (Optical Character Recognition) technologies).

a. Is your expectation that most providers will have data in a format that makes an ETL process feasible? What are the costs associated with developing these scripts?

We believe that most providers will have data in a format that makes the ETL format process feasible. Based on our experience, including information from a national telecom association that represents 29 providers, we have high confidence that provider data is in one of several usable digital formats that will minimize manual interaction. The providers represented all employ database-driven systems that lend themselves to ETL processing. The data can be received directly through API access, raw database tables, or modified database tables in various formats (such as .csv, .txt, and dBase).

With multiple sessions of data collection planned, automation at the data entry point provides the most cost efficient method of data ingestion, minimizing the overall costs of data collection for both the sender and receiver over time. The cost associated with developing ETL scripts will vary by partner. Based on our experiences we anticipate these scripts might take from 40-80 hours to develop, but decisions on this additional work will depend on the overall cost-benefit analysis to the project and each instance will be evaluated once relationships are established with Oregon Broadband Providers

3. Please provide more detail about how you will integrate data that arrives from the fax interface.

BroadMap will utilize OCR (Optical Character Recognition) technologies as an automated translation method for capturing and moving data into its databases. As a secondary means, we will manually transfer any provider information received via fax into the broadband database.

4. What type of "assistance will be offered and available to those providers who lack the ability to gather and submit their data"?

BroadMap will engage with individual providers to assess their abilities to gather and submit data. If a provider lacks the ability to efficiently manage these tasks, BroadMap's assistance includes evaluation of their internal systems with recommendations leveraging our database and automation expertise.

While it is difficult to predict the exact needs associated with each provider until we are in a position to understand their specific situation, we have identified the following methods for gathering and/or submitting data to assist the providers:

- Database Export Tools - creating or leveraging existing tools that allow direct database export without custom modification
- Custom Scripts - create custom scripts or programs that allow the flexibility to modify or transform existing data to a data structure that facilitates data gathering and submission
- Automation Tools - Allows for scheduled data extraction and transfer without manual interaction

5. How will the OPUC "engage" providers that do not submit their information?

As a supplemental narrative for Oregon's Broadband Grant Application, the OPUC will take the following steps to engage broadband providers:

- Once grant approval is received, the OPUC will contact providers. A letter from the Chairman of the Oregon Public Utility Commission will introduce the program and its importance, and its selected vendor. The letter will also request the provider designate a contact and provide that contact directly to the OPUC.
- A letter from the OPUC to the provider's contact will explain the details of the project, its process, timeline, and the provider's involvement.
- Provider Associations and Coalitions, like the Oregon Telecommunications Association and the Oregon Cable Telecommunications Association, will also receive a mailing introducing the project and enlisting their support. Once engaged, provider data submission efforts will be monitored by the OPUC and follow-up will occur.

Other than those lacking the ability, should a provider fail to submit data (offender), the OPUC will send a follow-up letter to the provider with a copy to the NTIA. No other action has been planned at this time because of the high confidence for full participation.

6. Please explain the use of the term "offender" in reference to those providers who do not participate in this program.

An "offender" is a provider that does not engage in the data gathering process and therefore *upsets* the purpose and possibly the final product. Please see last bullet of 5 above.

7. What "other means" of gathering data are contemplated when/if providers do not participate?

The following other means of data gathering have been contemplated and may be used in conjunction with one another:

- Utilize Form 477 data
- Utilize 3rd party commercial data aggregators such as ComSearch, Am Roamer, and Media Prints
- Perform infrastructure analysis to model coverage based on available 3rd party data such as Fiber Networks, Central Offices, and Tower Locations
- Scrub marketing material that is freely published by providers in their marketing material and web sites
- Utilize Internet community forums and user groups
- Utilize a grass roots approach employing user-generated input and the results of survey techniques

ACCURACY AND VERIFICATION:

1. Please explain how the Team will "review 'sample representative' data".

Our sampling process involves creating a geographically distributed sample set of locations for which a follow-up survey will be conducted. Initially this will be done by leveraging the work being done to support the Anchor Institution requirements of the project. We believe these "anchor institutions" are highly incented to provide quick and accurate responses. In addition to Anchor Institutions, our plan includes leveraging the expertise of our data partner, InfoUSA, for surveying business and residential consumers. InfoUSA data is a recognized industry standard and is collected and refined to the highest standards. A Crowd Sourcing Tool is deployed via the web to the public in order to solicit location, serviceability, and internet diagnostics that can be gleaned through their Internet Connection (i.e. speed tests). To ensure the sample data are representative, the sampling process takes into account that we will associate a different confidence level with each type of response. This will be a continuous process as data updates are made.

As a supplemental narrative for Oregon's Broadband Grant Application, BroadMap employs a holistic approach to data verification. Following the initial mapping of providers' coverage area and serviceability claims, the following may be used separately or in conjunction with one another for a high-level comparison view:

- Visually and programmatically compare the coverage against 3rd party aggregate data. All differences identified are analyzed. 3rd party aggregate data providers include ComSearch, American Roamer and MediaPrints.
- Visually compare the coverage against any marketing material or websites depicting coverage for that provider. All differences are analyzed.
- Allow carriers to review their data, displayed through a controlled web interface, to ensure that accurate information was supplied. This step helps control against partial data delivery, corrupt data delivery, or translation and ingestion issues that can occur during processing.
- Perform infrastructure analysis: We create predictive coverage models based on available components such as Fiber Networks, Central Offices, and Tower Locations to compare against coverage claims provided from the carriers' data for which differences are identified and analyzed. Infrastructure components are sourced directly from the providers as well as 3rd party aggregators such as Geo-Tel, ComSearch and Navteq.

2. Please provide more information about the plan to provide "spot checks".

The process of spot checking is managed by our Quality team. They continuously evaluate data samples from our Oregon Broadband database to ensure that there are no issues with the conflation of provider and 3rd party data into the dataset.

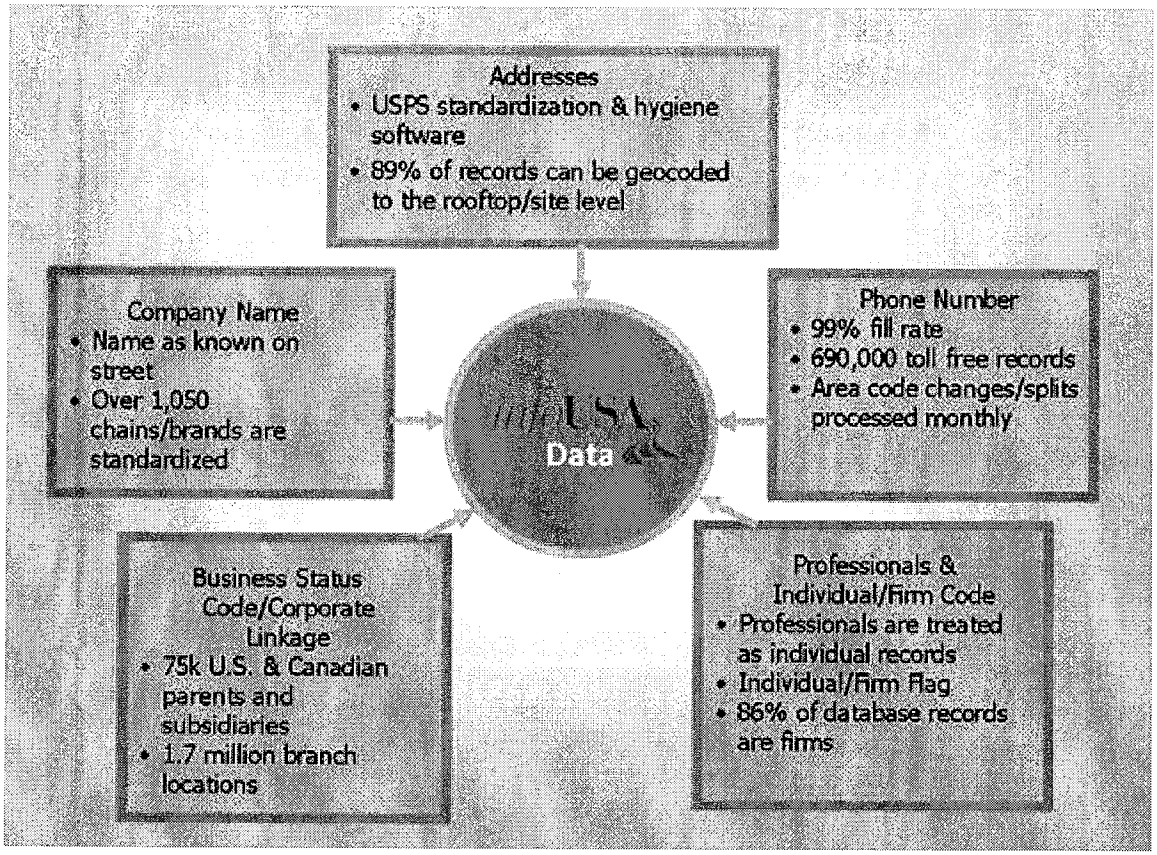
3. Please provide specific examples of how some of these 20 layers of data provided by the Oregon team will be utilized for quality control and verification.

Quality control and verification will depend on the nature of the dataset in question. A combination of various data layers will be utilized depending on the area. The team deploys a compilation process whereby multiple data sources are used in conjunction with comparison techniques to identify areas of disagreement. When disagreements are found, they are further analyzed to suggest the correct resolution. As we discussed in question 1 above, we deploy multiple techniques for quality control and verification. Specific examples include:

- Address Locations Data Layer is compared against the imagery layer, parcel layer, other point addresses from public and private data providers, and the street centerline based, address geo-coded locations.
- Anchor Institution Locations Data Layer is compared against the imagery layer, parcel layer, other point addresses from public and private data providers, and the street centerline based, address geo-coded locations.
- Wireless Coverage Layer is compared against the digital elevation model and signal propagation data.

4. Who is the "conference center partner" and who are the "data partners" listed in the verification section. Please provide additional information about these partners and its role in this project.

Our conference center partner is InfoUSA and it is the leading compiler of data in the United States. Established in 1972, InfoUSA has over 4000 employees nationwide. Each day, infoUSA.com data specialists scour thousands of sources to add new data,, update existing records and eliminate duplicates. Their process is like no other in the industry. In fact they do something no other company does - they make more than **20 million phone calls** each year to verify all information that they collect. As part of the State Broadband Data and Development Program, InfoUSA will utilize their conference calling facilities to assist us in determining what type of Broadband Services are available at Anchor Institution and Businesses throughout Oregon. Below is a chart that details the completeness of heir database:



InfoUSA will also participate as a data partner providing a comprehensive list of commercial and household addresses in Oregon. In addition, there are several other examples of public and private providers of geographic content for landmarks and points of interest such as state agencies, NAVTEQ, Market Data Retrieval and others. The Oregon Team partners with many sources including the service providers themselves – to ensure the highest possible quality of data to be supplied.

5. Has the web-based data access tool already been created? If not, will its costs be shared across all of the One Economy contractor projects?

The web-based data access tool has not been created. The cost for the web based tool will be distributed across all of the One Economy contractor projects. BroadMap is currently building the core technology for the following web-based data access tools:

1. Single provider access for map data verification and quality control
2. Crowd Sourcing tool
3. Oregon State Broadband Map

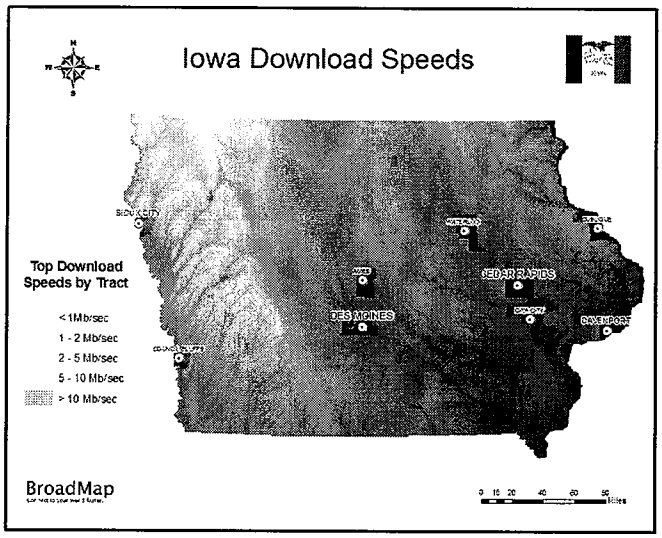
ACCESSIBILITY:

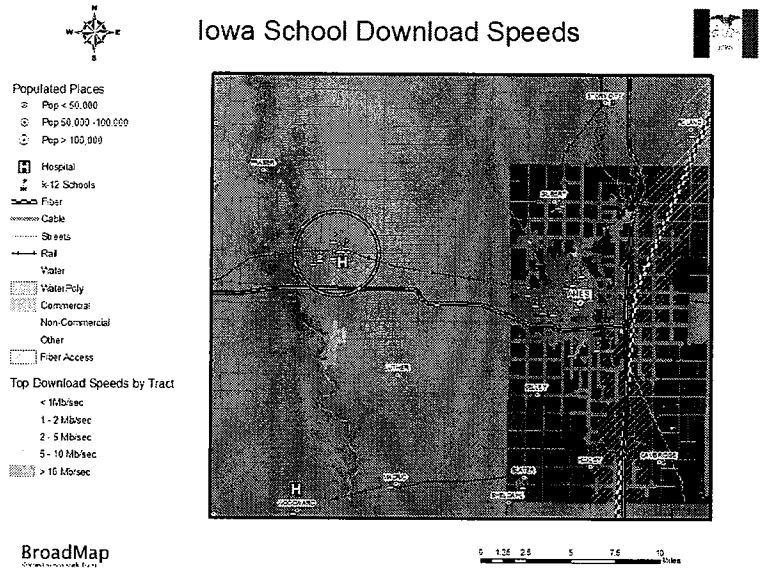
1. In the section describing the Broadband Portal's potential uses, many planning purposes are proposed. Are there costs associated with these uses now, or is this simply a description of potential uses.

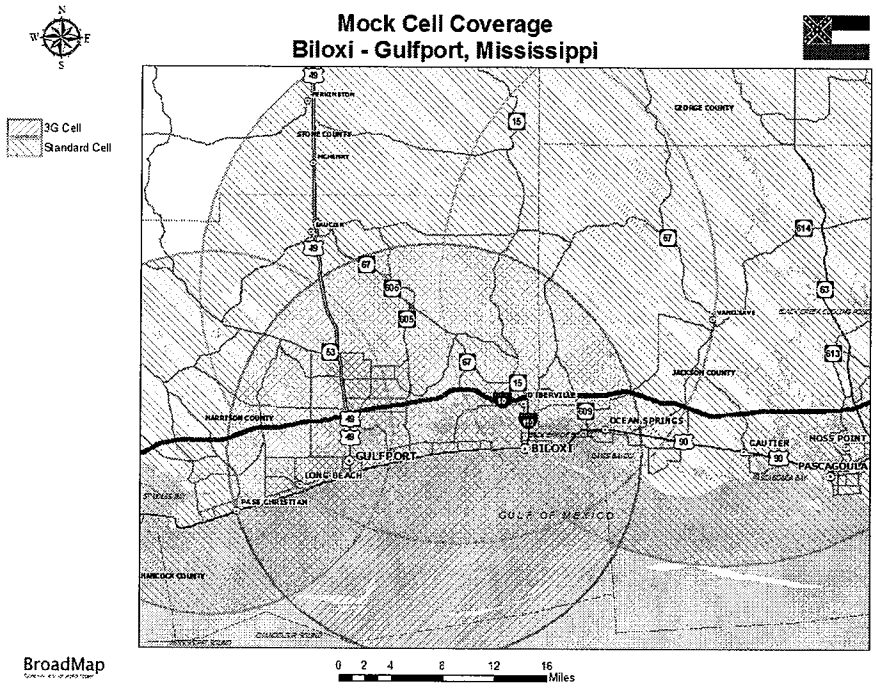
This is a description of potential uses.

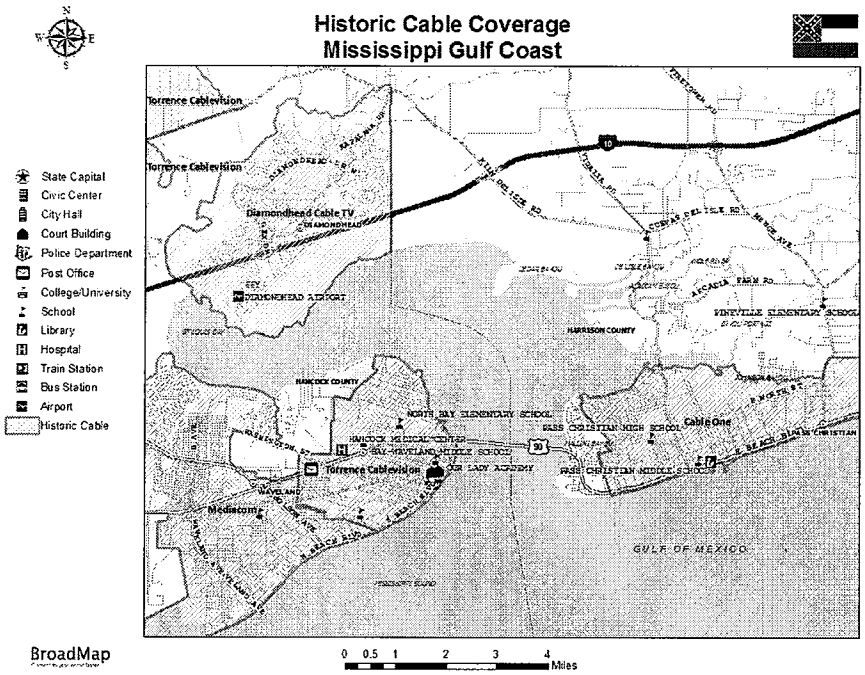
2. Are mock-ups or more detailed descriptions of map available? If so, please provide.

Please see below for mock-ups. Please note these are samples, and the final map will be provided via the State of Oregon Portal and the BroadMap Portal.




Iowa School Download Speeds
Populated Places
Pop < 50,000
Pop 50,000 - 100,000
Pop > 100,000
Hospital
k-12 Schools
Fiber
Cable
Streets
Rail
Water
WaterPoly
Commercial
Non-Commercial
Other
Fiber Access
Top Download Speeds by Tract
< 1Mb/sec
1 - 2 Mb/sec
2 - 5 Mb/sec
5 - 10 Mb/sec
> 10 Mb/sec
AMES
BroadMap
0 1.25 2.5 5 7.5 10 Miles


Mock Cell Coverage
Biloxi - Gulfport, Mississippi
3G Cell
Standard Cell
GEORGE COUNTY
STONE COUNTY
JACKSON COUNTY
HARRISON COUNTY
HANCOCK COUNTY
GULFPORT
BILOXI
OCEAN SPRINGS
LONG BEACH
PASCAGOULA
GULF OF MEXICO
BroadMap
0 2 4 8 12 16 Miles



SECURITY AND CONFIDENTIALITY:

1. What is meant by the sentence in the *Accessibility* section that "data identified through contractual agreements to be confidential will be excluded unless already publicly available"?

The intent is to ensure that all confidential information provided under non-disclosure agreements (NDA) is carefully controlled and not made publically accessible. Derivatives or simplified versions of data may be used for display or public consumption.

No NDA contracted under Oregon's NTIA grant will restrict the delivery of the data required by the NTIA.

2. Reference is made to the One Economy firewall, but in other sections the program implies or states that BroadMap will be involved in much of the actual mapping work. Please provide more information about the specific data security protocols in place and whether the partner who maintains the data currently secures any data with security implications.

BroadMap's protocols are supplementary to One Economy's protocols. BroadMap's security protocol is two-fold: IT-based (role-based user/password, and IP-locking as examples) and metadata-based (explicit identification of confidential data within the system to ensure that it is filtered, summarized, or otherwise reduced to an acceptably non-confidential level in publicly accessible interfaces).

More specifically, BroadMap's wide variety of security measures includes:

- Encryption: When data with security implications is stored on computers, it is stored in encrypted files.

- Air Gap: When BroadMap receives data with security implications, it is stored on a computer that is isolated from BroadMap networks via a high-resistance air gap, meaning that the computer will not be physically connected to the BroadMap network or any other network, and the computer will not have any wireless networking capabilities, including, but not limited to 802.11b and Bluetooth.

- Database: Direct access to databases will not be enabled for entities outside the BroadMap network. Database access to data with security implications will only be accessible via applications that implement https. Database access to data with security implications will only be granted to users who need-to-know, have strong usernames and passwords and specific roles.

- Passwords: Employees use strong passwords on domains and change them monthly. Previous passwords will not be allowed.

- Experience: BroadMap' employees have had secret Department of Defense security clearance. We have had training and experience with managing proper protocol for handling data with security implications.
- Software: BroadMap implements Norton Internet Security software on all BroadMap computers. BroadMap implements Symantec Enterprise Security Manager Software to prevent data spills.

- FTP: BroadMap employs SFTP, or secure ftp. This means all information passed between client and server is encrypted, including both the login credentials and the data itself.

Metadata:
The IT-based measures ensure how hardware and software are used to securely control access to the confidential data. This is possible because at the same time, metadata inside the core database and within the MapConnect product make it clear what data can and should be accessible.
There are two main components of metadata that apply to security and confidentiality:

- Inheritance: Confidential data is flagged during its first inclusion in the database and monitored at all times through its life within the process flow. As features are copied, split, merged, edited and validated the metadata associated with each attribute is inherited onto the resulting feature(s) appropriately.
- Summarization: The BroadMap internal database used for all compilation, conflation and other process steps has full access to source data, whether confidential or not. However, when this data is converted into a product form and location, the metadata is used to properly filter, summarize, or otherwise reduce the data to a confidentiality level appropriate to the authorized

audience. For a public web application, for example, no confidential data will be accessible or even present on the web server.

BroadMap and One Economy currently handle confidential information in a secure environment. Additional layers of detail can be provided on request.

Does the Oregon OPUC or the DAS currently maintain or has it ever maintained sensitive information. If so, what are the protocols cyber security protocols in place and will this be required of the contractor?

Both the OPUC and the DAS maintain sensitive information related to their employees and their constituent customers. Each state agency in Oregon is subject to executive branch information technology policies and protocols, and may also have developed substantive security methods and procedures beyond those statewide policies. At minimum, all state information assets are subject to the following policies: Acceptable Use of State Information Assets (107-004-110); Controlling Portable and Removable Storage Devices (107-004-051); Information Asset Classification (107-004-050); Information Security (107-004-052); Information Security Incident Response (107-004-120); and, Transporting Information Assets (107-004-100). These policies can be referenced at http://oregon.gov/DAS/OP/policies.shtml.

In addition to the protocols and practices described above, any contractors/vendors associated with the NTIA grant for Broadband Mapping will be required to demonstrate their compliance with information security protocols prior to contract execution.

Is the project team working with the Oregon Department of Homeland Security on this project?

There are no plans to work with Homeland Security at this time

APPLICANT CAPACITY:

Budget Information

1. State Staff Utilization:
    a. It appears that there is no in-kind or funded staff time by the State of Oregon for this project. How will project management take place? Please explain.

State Staff will be managing, monitoring and overseeing all major activities and deliverables in its oversight role as mentioned on page 15 of the Narrative. Staff time was not originally budgeted because existing resources were to be used in the course of their normal job functions without representation as in-kind funding. A revised budget is attached as Oregon Budget Worksheet and it includes State Staff

activities and expenses as an in-kind match under the Staff Staffing tab within the Worksheet. The in-kind match is one melded hourly rate applied to the estimated hours for each broad function supporting the project.

b. Reference is made to the qualifications and activities of the State of Oregon staff, but staffing information is not included in the project. Please explain.

Below are the Oregon departments/positions/activities for the Mapping and Planning projects. Not all staff listed is included in the budget but they represent examples of additional resources that can readily be brought to bear should they be needed. The Staff included in the budget are currently projected to provide direct management, guidance and oversight to the project. The Oregon Team's project management budget shows the various broad categories of tasks the team will undertake in managing the mapping project and the cost estimates represent a melding of the salaries associated with the staff associated with each task.

The Oregon Business Development Department (OBDD) has the following staff position that will provide management support for the Planning project.

OBDD Telecommunications Strategist assists communities with telecommunications infrastructure issues. The position is currently filled by Chris Tamarin. He has seventeen years experience in marketing voice and data telecommunications services and equipment used in small and large communities by multi-location companies, electric utilities, healthcare providers, schools, and government agencies. He has five years teaching experience at Eastern Oregon University. He has an MBA from the University of Nevada and an MS in Telecommunications from the University of Colorado.

A newly enacted Oregon Broadband Advisory Council (OBAC) attached to the OBDD will have 14 members assigned. The Council is charged with developing and ensuring the implementation of statewide broadband strategies.

The DAS Enterprise Information Strategy and Policy Division has the following staff positions, in addition to those named in Oregon's original application, that will provide management support for the Mapping and Planning projects.

GEO Framework Coordinator oversees the development and dissemination of statewide geospatial base layers in alignment with Oregon geospatial data exchange standards. Development activities include: outreach, grant application consulting, contract management, and data acquisition. This position is currently filled by Milt Hill. His 20 years experience with Geographic Information Systems (GIS) in State Government encompass a broad range of activities including GIS analysis, GIS data collection, GIS project management, program administration, contract administration and consultant management. Prior to his current position in GEO, Milt worked with the Oregon Department of Transportation and Oregon Fish and Wildlife. Milt is a certified GIS Professional (GISP) and has completed the Oregon Project Management

Certification Program (OPMCP). He earned his Bachelor of Science in Geography from Portland State University in 1989.

GEO Subject Matter Expert administers Oregon's Enterprise GIS Technical Environment and the Oregon Geospatial Data Clearinghouse. Responsible for working with BroadMap and One-Economy on technical and geospatial data aspects of the project. The position is currently filled by David Mather. David has been the GIS Data Administrator and lead technical expert related to Statewide Geospatial Data and Data Access since 2005. Prior to his work at the State of Oregon, David worked as the GIS County Coordinator for McLean County, Illinois, the USDA and the Army Corps of Engineers. He has a Bachelor of Science degree in Geology and a Master of Science degree in Geography, with an emphasis in GIS.

OPUC has the following staff positions, as well as contract support from the Department of Administrative Services (DAS) - Procurement and the Department of Justice (DOJ), that will provide management support for the Mapping and Planning projects.

OPUC Telecom Administrator manages and directs all staff activity related to telecommunications issues and administers all personnel and budget functions of the Telecommunications Division. This position is currently filled by Bryan Conway who has over 9 years of management experience in the public sector. He graduated from Oregon State University with a Masters in Economics with an emphasis in Industrial Organization.

OPUC Delegated Procurement Officer oversees all agency contracts at the agency level along with a DAS Procurement Analyst. This position is currently filled by Julie Curry who has 8+ years of experience in this position.

OPUC Budget Analyst oversees budget to actual comparisons and performs accounting related to agency contracts. Currently this position is filled by Laurel Anderson, a CPA with 20 years of experience in accounting, budget, audit and tax work with 4.5 years in state positions. Private sector positions included experience as a senior accountant in an international company performing Federal NIH grants monitoring.

OPUC Senior Telecom Policy Analyst position works on current state and federal telecom policies, regulations and oversight and is a Staff member of NARUC. This position is currently filled by Shelley Jones who has 30 years of telecom experience, 28 in the private sector including 7 years as a contract negotiator and 3 years as a program manager of service development and delivery.

DAS Procurement Analyst manages all Federal Stimulus related contracts and those involving the Governor's office. This position is currently held by a person with 15 years of state contract experience.

DOJ Contract Attorney performs legal review of all procurement contracts and defends the agency in the event of contract dispute.

2. Travel Costs: How will on-the-ground verification work be conducted? Currently no funding is allocated to in state travel.

We have included $8,000 for travel within the State of Oregon. This will cover travel expenses for the Regional Staff. The travel expenses for the Digital Connectors will be minimal.

3. Personnel (General): Please explain why regional staff for the hardware program would not be hired locally rather than "deployed" from elsewhere.

Management Staff for the Digital Connectors Program will be responsible for specific areas within the state. The term Regional is meant to represent their larger area of focus. The Digital Connectors will be locally based in their respective communities.

BB PLANNING AND MAPPING BUDGETS AND NARRATIVES:

Please provide additional detail to the budget spreadsheets and narratives such that the information below is completed for the first two years of your proposed budget. Please retain a separate budget narrative and spreadsheet for mapping and planning. A sample is attached to this email.

Your budget narrative should provide narrative detail (such as description of position or calculation of travel costs), while your revised spreadsheet should include detail for all budget areas. Please ensure that you continue to detail the differences in costs between years one and two. We have attached a spreadsheet that you may use as a guide to delineate this information in a spreadsheet format. If your budget already provides the information needed for the tabs "Detailed Mapping Budget," "Detailed Planning Budget," "Contracts Budget," please still complete the "Overview" tab.

NARRATIVE INFORMATION:

Personnel Salaries: For each position allocated to the projects, provide a description of the position responsibilities, annual salary, and percentage of time dedicated to this project for Year 1 and Year 2. Please ensure that costs are clear for both Years 1 and 2, as opposed to both years cumulatively. Be sure to clearly indicate if a portion of time is paid through an in-kind match (i.e. clear federal vs. match distinction). If a contractor is providing personnel support this should be listed in the subcontracts section, not in this section.

For State Staffing mapping and planning activities in years 1 and 2, see the State Staffing tab within the attached Oregon Budget Worksheet and refer to the responses to question 3 below and question 1b above.

Planning:
There are four positions that will be funded by the planning grant. The first is a Senior Project Manager who will be paid $60,000 from a half of full time employment (.5FTE) of $120,000. The second is a Regional Staff person; an Oregonian who will lead the community outreach and who will be paid $45,000 as .75FTE of $60,000. The third will be a Digital Connector Director who will direct the training of the trainers and oversee all Digital Connector activities who will be paid $20,000 at .5FTE of $40,000. The fourth and final position is the Digital Connector Trainer. There will be 5 Trainers who will be paid $750 per week per instructor for eight weeks which comes to a total of $30,000. These four positions combine to cost $155,000 in Year 1 with no cost for Year 2.

Mapping: All vendor mapping personnel costs are incorporated under the Contractor Section.

> **Personnel Fringe Benefits:** For each position allocated to the projects, provide the cost for fringe benefits, if available. As above, benefits for contractor support should be clearly delineated in the project section.

Planning: The Senior Project Manager and the Regional Staffer are both allotted 25% of their salary as fringe pay, $15,000 and $12,000 respectively. The Digital Connector Director and Digital Connector Trainers are allotted at 8% of salary for a total of $1,600 and $2,400 respectively. These come to a total of $31,000 for Year 1.

Mapping: All vendor mapping personnel fringe benefit costs are incorporated under the Contractor Section.

> **Travel:** Provide additional information such that the basis for all figures is clear. For example, if assuming airplane travel, provide an estimated cost for each roundtrip ticket and how many trips are expected. For mileage, provide an estimate of how many miles are expected and how many trips, etc. Be sure to distinguish between federal funds and any matching funds. Please provide additional information about partner meetings.

Planning:
The Regional Staffer will be travelling from a home base of Portland, OR to town meetings around the state. This is estimated to cost $1,000 per month for eight months for a total of $8,000 for Year 1.

Mapping:
BroadMap has detailed its travel budget in the accompany spreadsheet. Expenses, shown below, are broken down into airfare/rail, hotel, transportation and meal per diem. BroadMap plans a minimum of six trips to Oregon. Current airfare/rail and hotel rates were utilized to determine costs for this section. Where possible, BroadMap has incorporated trips to multiple partners to decrease the overall expense of the flights/rail.

A quarterly trip to Washington DC is included in the travel cost section. The expense for that trip has been shared across our seven partners. Expenses are broken down by airfare/rail, hotel, transportation and meal per diem. (Example: 5 nights at 240/night = $1,200/7 = $171)

Our final trip to Oregon will be used for Shipping, installing and setting up the Broadband data server and its software for Oregon, which adds $1,900 to the Year 2 costs. We have broken the expense out into four different sections including airfare/rail, hotel, transportation and meal per diem.

	Oregon		
	Nights Stayed	Daily Cost	Total Costs
Client Visits			
Airfare			$700
Hotel	4	$150	$600
Transportation	4	$75	$300
Meals	4	$75	$300
Trips Per Year			6
Cost Per Year			**$11,400**
Washington DC Trip (Shared Expense)			
Airfare/ Rail			$43
Hotel	5	$240	$171
Transportation	5	$75	$54
Meals	5	$75	$54
Trips Per Year			4
Cost Per Trip			**$1,286**
Transition of Hardware and Software			
Airfare			$700
Hotel	4	$150	$600
Transportation	4	$75	$300
Meals	4	$75	$300
Trips Per Year (2nd Year Only)			1
Cost Per Trip			**$1,900**
Total Costs 1st Year			**$12,686**
Total Costs 2nd Year			**$14,586**

Equipment: For hardware costs, provide a detailed description of all equipment to be purchased, when it will be purchased in the first two years, and the basis for the figures used. Be sure to distinguish between federal funds and any matching funds.

Mapping: We have worked with our Partners to create a robust, yet affordable server and platform solution for Oregon. The server includes all hardware and software that are needed to manage the Broadband project. The purchase of the server will be made upon award of grant. Our solution includes the following:

Server	Dell PowerEdge R710 Dual Quad-core Intel® Xeon® X5550, 2.66Ghz, 32GB RAM 600GB, 2 x 300GB 15K SAS		1	$35,000	$35,000
Storage	Dell PowerVault MD1000 Direct-Attach Storage 3.0 Terabytes 5 x 600GB 15K SAS		1	$7,000	$7,000
Shipping for Above					$500
	Hardware Subtotal				**$42,500**
	Software		**Qty**	**Price**	**Total**
OS	Windows Server 2008 Standard R2 (5 CALs)		1	$700	$700
RDBMS	SQL Server 2008 Licensing (4 sockets)		1	$25,000	$25,000
Map Server	ArcGIS Server Standard (Oregon State License)		1	$0	$0
Desktop GIS	ArcEditor (Oregon State License)		1	$0	$0
	Software Subtotal				**$25,700**
Hardware and Software Cost					**$68,200**

Planning: The equipment costs incurred in Year 1 are concentrated around the devices and software that the Digital Connectors will be using. We will be purchasing an iPod Touch for each Digital Connector at $220 each, plus $30 for software and installation is $250 per Connector; multiplied by 200 Connectors is $50,000.

Item	Cost
iPod Touch	$220
Data Aggregation Software	$30

Total Connectors	200
Total Cost	**$50,000**

Materials/Supplies:

- For software costs, provide a detailed description of all equipment to be purchased, when they will be purchased in the first two years, and the basis for the figures used. Be sure to distinguish between federal funds and any matching funds.
- For all supplies expected to be purchased, please provide the information such that the basis for figures is clear. Be sure to distinguish between federal funds and any matching funds.

Data Licensing – We have incorporated all data licensing and software costs into the materials section of the budget. These annual costs are recurring costs that are associated with gaining access to and ingesting relevant Broadband Serviceability, anchor institution and business data and demographical data for the Broadband Project. These data sources and their associated costs are reflected below. These Oregon costs represent a savings based on a discount due to the number of contracts One Economy has in place for NTIA grant work.

Map and Information Data:	Costs
Digital Baseline Maps	[redacted]
Digital Baseline Maps for Server	
Anchor Institution and Business Listing & Survey Data	
Household Demographic Data	
Educational Database	
US Zip Code and Zip+4 data	
Map and Information Data Total	
Broadband Data	
Cable DSL and Fiber Data	
Fiber Networks	
Fiber Lit Buildings	
Spectrum Holdings for Wireless Providers	
Geographic Boundary Data For All Cable Systems	
Wireless Marketed Coverage Patterns	
Wire Center Boundaries	
Central Office Locations	
Carrier Exchange Information	

Carrier Information		[redacted]
Crowd Sourcing Data		
Tower Maps		
Wireless Internet Service Provider Data		
Broadband Data Total		
Software and Platform		
Proxix - Geo-coder		
Proxix - Online Mapping Geocoder		
Software and Platform Total		
Per Year Cost for Year 1 and 2		

Subcontracts: For any significant subcontract, please provide the cost allocation in a format similar to the one listed directly above. Your current contractor budget only allocates personnel hours. If the contractor will be purchasing any equipment, performing any travel, etc. that should be clearly delineated.

Planning:
There are two allotments for subcontract work on the Planning phase. The first is $32,500 for the time for a Senior Data Analyst. The second is $7,500 for a Contractual Report Writer who will work with the entire project team to complete the planning report. These two positions combine to cost $40,000 in Year 1 with no cost for Year 2.

Mapping: Details of subcontractor costs are in the attached Oregon Budget Worksheet under the Mapping tab for the Broadband Mapping initiative. The subcontractor hours were broken down into four sections:

- Program Management and Collaboration
- Quality and Sourcing
- GIS Mapping and Customer Support
- Product Design and Development

All work is detailed by position. You will see that each section has the positions that will be responsible for doing the work as well as the numbers of hours that will be needed to complete the work.

Other: For training purposes not related to travel, please describe in detail and provide a calculation of the cost. For other activities or existing data sets, provide the value and calculation of such value. Be sure to distinguish between federal funds and any matching funds.

Mapping: All vendor other costs are incorporated under the Contractor Section.

Planning: There are some miscellaneous costs as well. $10,000 will be spent on apparel and book bags for the Digital Connectors as a uniform for them while they are on the ground collecting data. The curriculum for Digital Connector training costs $50 per Digital Connector for a total of $10,000. The training itself will cost $115,000 total for three regional camps that will train a total of 200 Digital Connectors. This should cover the training costs and any remaining cost will be the responsibility of the Digital Connector. These three costs come to a total of $135,000 in Year 1 with no cost for Year 2.

Indirect Cost: (Administrative Overhead) Please provide a clear description of the costs attributed to administrative overhead.

Mapping: All vendor indirect costs are incorporated under the Contractor Section. The Oregon Staff Indirect rate is 19% as reflected in the attached Oregon Budget Worksheet.

Planning: The above constitute the entirety of the direct costs, which come to a total of $419,000. One Economy's indirect rate is 19%, which comes to $79,610. This is the calculation of the overhead costs associated with this project, which includes the time of One Economy's senior management team, rent, financial reporting and administrative costs, basic office supplies, and general work expenses. Adding the Direct and Indirect costs together comes to a total of $498,610. The Oregon Staff Indirect rate is 19% as reflected in the attached Oregon Budget Worksheet.

NOTE: Any requested pre-award costs should be allocated to the respective categories above. Be sure to indicate whether something is a pre-award cost.

APPLICANT CAPACITY, KNOWLEDGE, AND EXPERIENCE:

1. As described in the NOFA, please provide a description of the knowledge and experience of the applicant and associated project personnel. If you have not yet hired for certain positions please provide a description of the qualifications and expected work activities for these positions and note whether these are new hires. Substantial information about state staff is provided, but staff information about One Economy and BroadMap are not included. (In reference to the budget request above, the personnel described here should be accounted for in the revised budget above. For example, what percentage of time will a Senior Web Designer spend on this project?

We have provided an overview of our experience below and following this response document are resumes to illustrate the depth of knowledge and experience of One Economy and BroadMap. Estimated hours are provided in the budget spreadsheet.

QUAN VU – CHIEF TECHNICAL OFFICER - Quan has over 23 years of digital mapping experience and is a senior executive who has worked for leading GIS mapping and navigation companies, such as Etak, subsidiary of News Corporation, subsidiary of Sony and Tele Atlas, one of the leading global digital mapping companies. Throughout Quan's career, he has served in various management and senior management roles and responsibilities from Engineering, Operations, Product Management, Product marketing, Sales and Business Development. Quan has over 18 years of international business experience and traveled the globe to develop GIS / navigations products and global partnerships in various industries. Quan holds a BS degree in Computer Science Engineering from San Jose State University.

MARK NEWCOMB – SENIOR DIRECTOR, PRODUCT DESIGN & DEVELOPMENT - Mark accumulated over 19 years of experience designing, managing, developing, documenting, and supporting relational databases, spatial databases, and digital map products at Etak and Tele Atlas. As a database designer and manager, map production expert, GIS Engineer, Sales Engineer, Product Architect, and Product Manager, he understands all the details related to complex geographic and non-geographic databases. He was recognized as the subject matter expert on Tele Atlas global map products. He was the last line for customer support and on the front line communicating product details with Product Managers and technical teams of major partners and customers. He received a Bachelor of Arts in Geography from the University of California at Santa Barbara in 1988.

JESSE SHERIDAN – SENIOR DIRECTOR, GIS MAPPING AND SUPPORT - Jesse has been a professional in the GIS industry for over 15 years. During that time he has focused on product, database, and quality design in support of thousands of customer applications. In his tenure at Geographic Data Technology (GDT) he managed the Customer Support department and later developed their Transportation and Display product lines, including hands-on involvement with all aspects of the production. At Tele Atlas he managed the global specification department, distributed across North America, Europe, and Asia. In all roles he has been a go-to GIS engineer when needed and the preferred interface for important partners around the globe. He graduated from the University of Vermont in 1993 with a BA in Geography, and a strong minor in Pure Mathematics.

Chris Mabey, Senior Mapping Technician and Customer Support – Chris has over 14 years of GIS experience from the GDT/Tele Atlas direction. The majority of his efforts were in managing the Mapping Services Department, where deliverables ranged from presentation quality maps (to support global sales and marketing), to large scale cartographic production of atlases, locator maps, and custom territory boundaries. Other roles that Chris undertook included managing the Customer Support department, and coordinator of the Database Improvement Department (which encompassed the core production of Geographic Data Technologies' North American dataset). He graduated from Johnson State College in 1987 with a BA in Environmental Studies.

Dennis Ulatowski, GIS Mapping Technician and Customer Support – Dennis has over 12 years of GIS implementation experience and spatial analysis expertise in small- to large-scale organizations within both

the public and private sectors. During his career, Dennis has spearheaded a number of high-profile projects, including complex spatial analyses to support major urban planning projects in New York City, deployments of GISs to satisfy mandates for emergency preparedness to meet Department of Homeland Security requirements, and the establishment of technical quality assurance frameworks for deliverables to navigation database customers. He holds a B.A. in Geography from SUNY-Geneseo and an M.S. in Resource Administration from Antioch New England Graduate School.

Aaron Fritz, GIS Tools Engineer - Aaron comes to BroadMap from the Cayman Islands Government, where he was a lead GIS Programmer working with Land Registry projects for various Caribbean Islands. His role involved many of the same tools, methodologies and goals that we share at BroadMap, lending a specialized understanding for our Island partner projects. Prior to working in the Cayman Islands, Aaron worked at Tele Atlas and GDT developing prototype and production GIS code in a variety of languages and contexts. Aaron built the core internal tools, such as, the metadata storage and maintenance systems, conflation technologies, editing environments, and the baseline mapping toolset. Aaron holds a B.S. in Wildlife Management from the University of New Hampshire and an M.S. in Geography (GIS/Remote Sensing, Software Engineering) from Utah State University.

Mike Davern, GIS Tools Engineer – Mike comes to BroadMap with over 13 years experience in the GIS, mapping, and navigation arenas. His experiences include digital cartography and technical development at Rand McNally, technical support at Intergraph Corporation and Geographic Data Technology, and data analysis and process automation at Tele Atlas/GDT. Michael has developed production tools and processes to support GIS data evaluation and standardization, conflation activities, and metadata maintenance, just to name a few. Michael holds a Master of Arts in Geography – Physical Environmental Systems from Binghamton University, and a Bachelors of Science in Geography from SUNY-Cortland.

Todd LaClair, Senior Systems Administrator – Todd, an experienced IT technician with over 14 years experience is responsible for building and maintaining our vast data center. He works closely with both our partners and technical teams to ensure highest availability of all production systems and maintains the technical infrastructure to meet the workflow standards needed to set by all groups; technical and business.

BRIAN SCAFFIDI – SENIOR DIRECTOR, QUALITY ASSURANCE AND SOURCING – Brian has accumulated over 11 years of experience in the digital mapping space. His background includes project management and product quality roles at Tele Atlas. Additionally, Brian has experience in digital cartography management, product analysis and database architectural development and engineering. Brian received a Bachelor's Degree in Geography from the State University of New York
Brian and his team are responsible for Quality Assurance and Quality Control, Technical Sourcing Acquisition, and Product & Services Testing. Additional responsibilities include:

- Development QA/QC strategies and programs.
- Development of source code control methodologies, Quality Assurance methodologies.
- Interface with broadband source providers and other data sources

- Code, script, and process development of QA/QC programs to meet standards developed by NTIA and the State of Georgia.
- Sourcing of Broadband and related data sources

MARKETING

JOY MOREL, CHIEF MARKETING OFFICER - Joy brings a wealth of experience and leadership in enterprise and consumer business marketing. She most recently helped establish GPS as a major consumer category in her work at Tele Atlas, a global mapping company, by creating strategic partnerships with national retailers including Best Buy, Wal-Mart, Target, and RadioShack as well as OEMs within the automotive navigation space. Earlier in her career, at AOL Joy managed areas within Interactive Marketing and Communications, building integrated marketing campaigns. Her work with AOL grew to include Partner Marketing where she helped to drive awareness and demand for broadband service, expanding the company's reach via the promotion of large consumer partner brands. Joy leverages her proven expertise in managing complex marketing activities and in building partnerships to enable long term growth, profitability and client satisfaction. A graduate of the Pamplin College of Business from Virginia Tech, Joy holds a Bachelors of Science in Marketing and Communications.

Caroline Life, Director, Partner Marketing – Caroline is a consummate marketing and communications professional, much of her time being spent in the GIS world, including over eight years at Etak/Tele Atlas in various marketing roles. Most notably, Caroline helped to launch the Tele Atlas brand in the U.S., as well as the company's first turn-by-turn map database. She most recently was part of their Channel Marketing team, where she cultivated relationships with large retail partners including Best Buy, Target, and Wal-Mart. Caroline will lend her expertise to each state/territory broadband mapping program to drive consumer awareness and adoption of broadband. Caroline has a BA in English from the University of Wisconsin–Madison.

Todd Schmitt, Senior, Product Manager – Todd, a GIS professional, joins BroadMap from GDT/Tele Atlas, where over the last 11 years he performed a number of roles in project management, product management, and marketing, including bringing several new products to market. Throughout his career at Tele Atlas, Todd worked closely with clients in a variety of industries including tool providers and application developers, business intelligence, risk management, banking, demographics, utilities, state governments, and telecommunication companies. Todd maintains a holistic and structured product management process enabling BroadMap to bring the best possible product to market. Todd holds a BS in Financial Management from Franklin Pierce College and an MBA from Plymouth State University.

PROGRAM MANAGEMENT CENTER OF EXCELLENCE

Tony Hook – Program Management Center of Excellence - Tony has extensive experience in Project Management. He carries Project Management Professional (PMP) and Prosci Change Management certifications. He has over 13 years experience in developing, implementing and monitoring projects

including responsibilities for project management governance, tools and processes. His previous work experience includes key roles with Brown-Forman Corporation and United Parcel Service. Tony holds a Master's of Science Degree (Applied Information Technology) in 2006 from Bellarmine University and a Bachelors of Administration in Finance from the University of Louisville in 1993.
Tony and his team are responsible for:

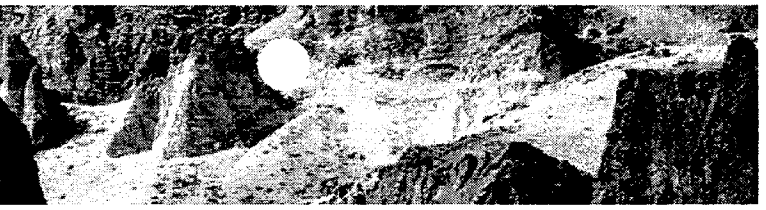
- Development and implementation of the Program Management Center of Excellence focused on the development of a project management methodology including templates, guides, best practices and techniques
- Oversight of the enterprise project portfolio management application
- Program Management of all Broadband Mapping initiatives
- Resource capacity management
- Project Administration Metrics

Kristen Rousseau, Business Analyst – Kristin has spent the last 8+ years in numerous GIS roles, including business architect, project manager, quality architect and operations. Throughout her career, she has worked to improve internal processes and quality. Kristin is responsible for eliciting requirements, developing functional use cases and managing requirements while developing processes for these activities. She manages these processes by working with our internal teams and clients to facilitate requirements understanding and application specification development. Kristin is a Lean Six Sigma Yellow Belt, earned at the Thayer School of Engineering at Dartmouth, she is an Internal Auditor ISO/TS 16949:2002 - QAI – Training for Quality, holds a Project Management Certificate from the University of New Hampshire and has a diploma in Computer Technology from the ECPI College of Technology.

Melissa Hipes, Financial Analyst – Melissa comes to BroadMap from Capital One, where over the last 10 years she has held numerous leadership roles in Accounts Payable, Accounts Receivables, Cash Management and Fraud Detection. Throughout her career, she has worked with cross-functional teams to develop and improve internal processes. Melissa is responsible for BroadMap's internal processes for capturing employee time, billing, contract management, audit, project and department budgeting. BroadMap employees have worked on projects for the states of New York, Tennessee, Connecticut, Pennsylvania, California, and many others as well as for FEMA, USDA, DEA, FBI, CDC, DOT, and DOE.

GOVERNMENT MAPPING EFFORTS

Our team has worked closely with State and County departments (Police, Neighborhood Services, Assessor and Tax Collector) to engineer applications specific to the customer's specifications before some of today's more advanced technologies even existed giving us a strong understanding and knowledge of the intricacies needed to develop the mapping needs of today. Here are some examples:
SFGIS: (San Francisco Enterprise GIS Dept.)
http://www.sfgov.org/site/gis_index.asp



We also developed many application designed to be housed behind City firewalls for "in house" use for Police, Fire, 911, Public Utilities Commission, and Street Departments as some examples.
Internal cartography development: http://www.sfgov.org/site/gis_index.asp?id=368
SFGIS Applications: http://www.sfgov.org/site/gis_index.asp?id=371
SF Prospector: http://sfgov.org/site/sfprospector_index.asp
http://gispub02.sfgov.org/website/sfprospector/ed.asp?cmd=start2&nvis=ncor
SF CrimeMaps: http://www.sfgov.org/site/police_index.asp?id=23813
SFGIS GIS Data Catalog: http://gispub02.sfgov.org/website/sfshare/index2.asp
SFParcel: http://gispub02.sfgov.org/website/sfparcel/INDEX.htm
SFViewer: http://gispubweb.sfgov.org/website/sfviewer/INDEX.htm (IE - Internet Explorer required)
SFFind: http://gispubweb.sfgov.org/website/nuviewer/monsmap.asp
SFPUC: (San Francisco Public Utilities Commission): Many of the "in house" GIS web mapping applications for the SFPUC are not displayed to the general public due to Homeland Security concerns:
http://sfwater.org/msc_main.cfm/MC_ID/35/MSC_ID/393
http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/117/MTO_ID/218

PLANNING & CROWD SOURCING

One Economy has years of experience in the Broadband Planning space and has assisted lower income families in their efforts to gain access to Broadband at an affordable cost. Their experience in the Broadband space extends back to the early days of Broadband. New America provides our consortium with an enormous amount of experience in the wireless space and access to some of the most innovative crowd sourcing tools available. Their relationship with Google allows for our team to have access to infrastructure across the country to collect speed and user data that is being incorporated into our database.

M-labs

www.measurementlab.net

Through the creation of the MeasurementLab (M-Lab) platform, New America provides consumers and academic researchers with real-time feedback on the speed and quality of their Internet connections. The M-Lab was founded by New America's Open Technology Institute (OTI), Google Inc., the PlanetLab Consortium at Princeton University, and other academic researchers to enhance Internet transparency and to sustain a healthy, innovative Internet.

Since its launch in late January, millions of individual consumers have used M-Lab to test both the speed and the quality of their broadband connections by briefly communicating with a server elsewhere on the Internet. This provides the consumer with immediate feedback, provides Internet researchers with aggregate data to discern patterns and, in the context of broadband mapping, M-Lab can add geographically specific queries in order to generate views and reports that reveal the actual user experience in discrete local areas. All data collected via M-Lab is openly available to the academic research community to allow researchers to build on a common pool of network measurement data.

Greene County, NC – Beyond Tobacco
http://www.co.greene.nc.us/beyondtobacco.aspx
Beginning in November 2003, a diverse team of stakeholders, including the Greene County local government, the school system, grassroots leaders, and social service providers, used technology and its tools to positively impact the pressing economic needs in the area. The technology infusion began at the school-level by bringing Apple I-Books to each 6th through 12th grader in the County. However, the schools and the community quickly realized that without broad-based, affordable access to the Internet, the benefits of technology would be severely limited in the community. In November 2003, Greene County Leadership began working with One Economy to help develop Internet tools and content for the community. Over the next 24 months, Greene County developed free Internet hotspots at schools and fire stations. The County then contracted with Internet Service Provider, Wavelength, to create a municipal broadband solution for the entire County.

One Economy's Community Outreach and Web Planning Tools:
http://www.thebeehive.org/
http://www.247townhall.org/
http://www.ziproad.org/
http://www.pic.tv/

We are also in the process of developing a relief web site for our partners in American Samoa helping them recover from the current tsunami crisis: http://americansamoa2009.emergencyzone.org/

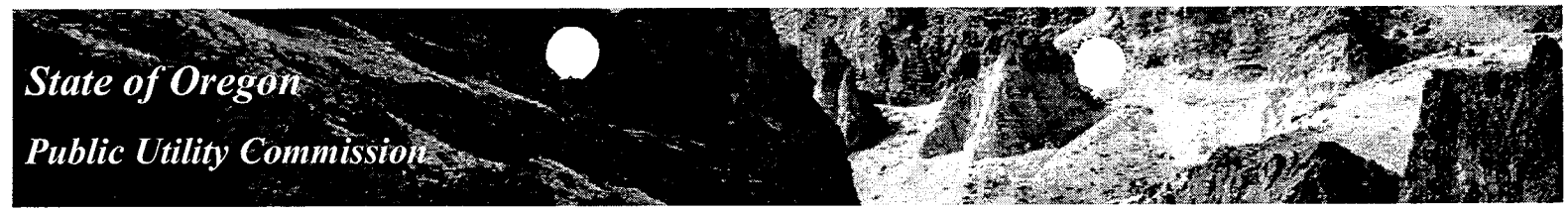
Our team also built a tool to collect real-time, consumer feedback about the changes happening in their local communities, used this data to verify changes in the map data, then after verifying the data and accuracy, incorporated the real world changes into the map: http://mapinsight.teleatlas.com

2. Please provide specific examples of past mapping projects completed by the contractors.

BroadMap employees have over one hundred eighty years of experience designing, implementing, and executing mapping projects for customers in the Automotive, Navigation, and Government markets. BroadMap employees have worked on projects for the states of New York, Tennessee, Connecticut, Pennsylvania, California, and many others as well as for FEMA, USDA, DEA, FBI, CDC, DOT, and DOE.

One such project was the creation of a single, enterprise-wide street database for use by all state, municipal, and county agencies in the State of Tennessee. The custom database covered all of Tennessee's 95 counties as well as more than 50 contiguous counties in eight bordering states and was credited with cutting costs and improving public safety response.

3. Please ensure that you clearly specify the responsibilities for each partner mentioned in the project.



Partner	Responsibilities
Oregon PUC (OPUC)	The OPUC, as the state's eligible entity, provides overall management of the broadband data collection, mapping, and planning activities to ensure compliance with the Grant requirements and the additional state requirements by 1) developing and managing vendor contract services, deliverables, milestones, delivery schedules, acceptance criteria and payments; by 2) filing quarterly reports with the NTIA; and by 3) providing broadband provider engagement support.
Oregon Business Development Department (OBDD)	The OBDD is responsible for promoting access to broadband services to all Oregonians and will support the Planning project by engaging stakeholders in planning outreach efforts and with developing adoption/demand aggregation programs based on survey results.
Department of Administrative Services/Geospatial Enterprise Office	The GEO is responsible for coordination of geographic information systems (GIS) activities of the state government enterprise and federal agencies, local governments, non-profits, and businesses in Oregon. It will be responsible for providing Oregon state-wide base layer data, hosting the state-wide map and sustaining the program beyond the end of this Grant. In addition, its functions in the data collection and mapping project include support of: base layers, database design, data access and reporting outputs.
BroadMap	BroadMap personnel will be responsible for broadband and base map data collection, database design, data verification, data access, data management and aggregation, report design, application design and customization, quality control and digital mapping.
One Economy	One Economy will lead the Planning project. It will facilitate the identification of 1) unserved and underserved areas in Oregon, 2) the roadblocks to adoption, 3) possible solutions

	to low adoption rates, and 4) ways to advance deployment to areas in need such as demand aggregation. One Economy will establish an affordable hardware acquisition program for the underserved and unserved communities.
Sanborn	Sanborn is responsible for developing address point data sets where none exist in support of the creation of a master address file for the project.

EXPEDIENT DATA DELIVERY:

1. Please explain the purpose, use and estimated cost of integrating Form 477 data into the initial set of data.

In the Grant Application, Form 477 data was to be used to establish a baseline look at broadband availability if the more recent version that included census tract information was made available. Now, Form 477 data may be used, if the data is easily lifted, for high level spot checks and in some instances may assist with data verification of provider submitted data when other forms of verification indicate a conflict.

2. Please provide substantially greater detail in your timeline. For example, what is the expected timeline for provider outreach? When will on-the-ground verification and sampling activities take place? What is the expectation in regard to the development of NDAs?

Project Timeline		
Tasks and Deliverables		Timeframe (From Assumed Grant Award Date of 12/1/09)
Draft NDA	Currently in Review	
Introductory Provider Letter from OPUC	Complete	
Secondary Technical Provider Letter from BroadMap	Now drafting	
Initiation - Concept, Stakeholder List, Project Charter, Project Contract	12/10/09	10 Days
Planning - Work Plan, Training Plan, Project Management Plans, Data Source Plans & Designs	12/20/09	20 Days
Acquisition of hardware, software and data sources	1/1/10	1 Month
Finalize NDAs with Providers	1/1/10	1Month
Start development of interactive Oregon Broadband Map	12/15/09	15 days
Requirements Definition - High-Level Functional Requirements, Federal & State Reporting Requirements, Functional Use Cases, Data Requirements, Technical Requirements	12/15/09	15 Days
Initial configuration, integration, implementation, data ETL, output definition	1/1/10	1 Month
Generation of initial analysis and results includes a complete set of availability data for anchor institutions and anchor institution shape file.	1/15/10	45 Days
Refinement of analysis and results includes a substantially complete set of broadband mapping data verified by sampling, on-the-ground verification and integration of additional sources & capabilities	2/1/10	2 Months
Full integration of all carrier serviceability data and third party source data. Refinement of analysis and results includes a complete set of all broadband mapping data verified by sampling, on-the-ground verification and integration of additional sources & capabilities.	3/1/10	3 Months
Completion of the development of the interactive Oregon Broadband Map. Provide hypertext link to Oregon Broadband Map to NTIA.	7/1/09	7 Months

Data Updates 1 - Verified broadband service provider updates, Community Anchor Institutions updates; public access data updates, newly licensable data as they become available; core digital map updates; state, regional and municipal agencies updates; key demographic information updates; updated reports and datasets as required by the NTIA	9/1/10	9 Months
Data Updates 2 - Verified broadband service provider updates, Community Anchor Institutions updates; public access data updates, newly licensable data as they become available; core digital map updates; state, regional and municipal agencies updates; key demographic information updates; updated reports and datasets as required by the NTIA	3/1/11	15 Months
Data Updates 3 - Verified broadband service provider updates, Community Anchor Institutions updates; public access data updates, newly licensable data as they become available; core digital map updates; state, regional and municipal agencies updates; key demographic information updates; updated reports and datasets as required by the NTIA	9/1/11	21 Months

3. What is meant by Broadband Data Sampling interface will be launched to allow Carriers data sampling"

This web interface provides carriers a view into our representation of their coverage. It allows the carrier to visually sample data within that coverage to ensure accuracy. This step helps control against partial data delivery, corrupt data delivery, or translation and ingestion issues that can occur during processing.

4. How will the Applicant encourage consumers and other stakeholders to take speed tests? What specific information will be captured in each test?

We will take the following steps to inform the consumers of the speed test tool and to encourage consumers and other stakeholders to take speed tests:

- To make the public aware of the existence of the website, we are already working actively with the State and their communications and marketing teams to do public outreach.
- We have create a media outreach program that includes press releases and public forums
- We are working to develop a Broadband Portal that will illustrate Broadband serviceability within the partner's territory. Additionally, the Broadband Portal will provide useful information and education on Broadband services and other related content
- We are leveraging social media websites (Facebook, Twitter) with One Economy and New America to discuss Broadband and encourage the public to visit the Broadband Portal and to

take a speed test. We will work with Google on an AdWords campaign to drive users to our website
- We will work with experts to place Op-Ed pieces in technical forums and contribute to suitable blogs.
- We will link the Broadband Portal to existing partners websites
- We will work with experts we have within the State to place Op-Ed pieces in technical forums and contribute to suitable blogs.

The base level data that will be captured with the crowd sourcing program are: Verified Location, Technology of Transmission, Service Provider, Upload Speed, Price and Download Speed.

5. In the description of the Complete Set of data, what is meant by "Full automation of Wireless Spectrum and Serviceability Data"

Simply put, all data sources for Wireless Spectrum and Serviceability information will be fully ingested into our database, and processes will be established to automate all future updates to this data.

6. "What is meant by "crowd sourcing ingestion tool completed"?

The crowd sourcing tool includes a web access front end that enables internet speed testing and location verification, and includes a serviceability questionnaire as well as tools built and used for automatic ingestion of the data. We will be implementing the ingestion tool roll-out to automatically ingest the entire incoming crowd sourcing data that is being accumulated by Google, MLabs and New America.

PROCESS FOR REPEATED DATA UPDATING:

1. Please explain how your method will account for construction of new middle-mile and last mile infrastructure and access to new areas?

We partner with 3rd party data providers to ensure that regular maintenance plans are in place to update our data sets with new information. We will allow providers to submit addition and deletion files on a continuous basis that will be ingested into our database. We anticipate that, at a minimum, we will receive updates on a quarterly basis but will work with the partners to do it on a monthly or twice monthly basis. In addition, we will be leveraging our relationships with each individual carrier to create the same updates processes and update timetables to provide consistent and reliable updates.

2. Please clarify whether your primary sources of data for repeated data updating are FCC 477 data and crowd-sourcing?

FCC 477 and crowd-sourcing data will not be our primary sources for updating. Through our relationships with all data providers, we establish regular ongoing maintenance plans whereby we receive regular

updates of data to maintain complete and up to date maps. These providers include carriers, 3rd party sources, surveys, Form 477 data, and crowd sourcing.

PLANNING AND COLLABORATION:

Collaboration

1. Have all of the potential partners already been contacted or is this process ongoing?

Many of the potential partners have already been contacted but not all as this remains an ongoing process.

2. Please provide a summary of outreach to Indian Tribes regarding this project.

A letter from the State of Oregon will detail the process of collecting and mapping broadband data and provide a point of contact that can address any questions or concerns the Indian Tribes in Oregon may have. Many of the providers of broadband service on Tribal lands are currently known, however, feedback directly from the Tribes will be solicited and used. The Indian Tribes will be invited to engage in all phases of the Planning Project.

Planning:

1. Much of the text in the "problems to be addressed" section include action items rather than a description of problems. Please integrate all actions into the "proposed solution" section and mention which problems the individual actions address. You will also need to ensure that your planning budget narrative accounts for the activities described in your solution.

Broadband Planning Proposal

Problems to be Addressed

Broadband planning is needed to drive and support critical infrastructure funding and policy decisions by corporations and governments in Oregon. Broadband is an engine of economic growth and a collaborative Oregon broadband policy will keep the state competitive in a global economy and foster valuable urban-rural business and social relationships. Oregon business, health care, education, government, public safety and the public at large depend on broadband infrastructure.

To this end, One Economy plans to address several problems through the use of the planning funds from the NTIA as a first step towards creating policies that will enhance statewide broadband availability and usage. These problems include:

(1) Broadband service is not available consistently and affordably across Oregon. Oregon wants to improve the quality and extent of broadband availability, particularly to areas of the state that are

unserved and underserved. This means extending service to places where it doesn't exist, improving the quality of broadband service statewide, and providing affordable service for Oregonians.

(2) Oregon wants to improve adoption rates for all broadband services as well as the utilization of broadband in rural areas and in sections of urban areas among individuals, residences, businesses, government, public safety institutions, and community anchor institutions (e.g., schools, healthcare providers, and libraries). Those who do not adopt and use broadband will not be competitive in the information-based global economy.

(3) The utilization of broadband technologies is uneven across Oregon. Oregon aims to improve its utilization of broadband for economic and community development. The state of Oregon and many of its residents do not take full advantage of all that broadband has to offer. Many businesses miss out on potential revenue by not having websites or selling their goods and/or services online. State and local governments miss out on valuable opportunities to connect to their constituents by not utilizing e-government strategies to improve access to services and information. Schools miss out on a pool of potential students—and vice versa—by not offering online classes and then Oregon, in turn, misses out on a larger pool of qualified and educated workers. The state underutilizes telehealth and telework which could reduce costs and improve the health of its residents, particularly those who live in rural and/or underserved areas. There is a need and opportunity for businesses to get more involved in the world of e-commerce, local governments to become more transparent and facilitate citizen engagement, schools to offer online education and workforce development, health centers to work with patients with limited mobility or who live far away to improve their health and interactions with healthcare professionals, and public safety institutions to have more ubiquitous contact with the public to prepare for or react to emergencies.

(4) The state's economy is experiencing general distress. This recession has led to economic hardships across all demographics. Broadband services are needed to support commercial and economic activity. Currently all 36 Oregon counties are classified by the state as distressed. Oregon's unemployment rate is one of the highest in the nation, with a statewide unemployment rate of 11.5% and 13 counties with unemployment rates greater than 12%. The expansion of broadband infrastructure is needed to support job creation, workforce development and economic growth.

Proposed Solutions

The Oregon PUC will work with OE and its Digital Connectors program, OE's local field staff and the Oregon Broadband Advisory Council in a collaborative effort to deliver methodical solutions to the problems that face state of Oregon. Each solution is arrived at by first gathering and analyzing data to accurately gauge and diagnose problems.

Proposed Solution – Broadband Planning Process / Methodology

In getting to the above solutions, the team will leverage the following activities:

- *Broadband Availability:* The project will utilize the specified supply-side data collected for Oregon Broadband Data Collection and Mapping Project to conduct an effective gap analysis of broadband service quality and availability.

- *Barriers to Broadband Adoption:* The project will collect demand-side data, with a focus on unserved and underserved communities to identify and understand the barriers to broadband adoption. A Broadband Planning Report will be prepared from this data that will include comprehensive and highly localized short, medium, and long term recommendations for increasing Broadband adoption and utilization throughout the state. Targeted action will then be taken with periodic monitoring of results.

- *Computer ownership and access programs:* The project vendor has extensive experience and a record of success in creating programs to increase broadband adoption and computer access among unserved and disadvantaged communities which will greatly assist Oregon in increasing computer access and use in targeted areas. The project vendor will also establish an affordable hardware acquisition program for the underserved and unserved communities in Oregon. The outcomes will be monitored through the evaluation of broadband adoption rates of targeted communities.

- *Small Business Adoption:* The project will collect demand-side data on the adoption and utilization of broadband by small businesses, the state's greatest source of job creation, to assess barriers to adoption and identify unmet needs

- *Local Community Engagement:* Oregon has an established history of local "grass roots" community involvement in broadband telecommunications issues. The recently created Oregon Broadband Advisory Council will work with the state's local organizations and consortia to make recommendations for the broadband plan and to identify and resolve broadband issues. The project vendor will enlist the support of the Broadband Opportunities Coalition which consists of the National Association for the Advancement of Colored People, League of United Latin American Citizens, National Urban League, National Council of La Raza, and the Asian American Justice Center, who will all volunteer resources to ensure that all communities are included in the planning process.

- *Service Provider Engagement:* Oregon has an established history of dialogue with telecommunications service providers on broadband issues through the Oregon Telecommunications Coordinating Council. The project will engage public and private

sector service providers through One Economy and the new Oregon Broadband Advisory Council to help identify and resolve broadband issues.

Through information gathering, planning and collaboration, Oregon can facilitate and stimulate the activities required to bring broadband to all areas of the state. Through planning and collaboration, the deployment and usage of broadband will be increased and Oregon's economy and quality of life will be improved.

Stakeholder input will be solicited in the assessment of broadband needs, such as download and upload speeds, and the development of a blueprint/solutions document to address findings. These stakeholders include but are not limited to:

- State residents
- Healthcare providers and consumers
- Pre-K-16+ educators and students
- Government (includes cities, counties, state agencies and Tribal Sovereignties)
- Libraries
- Public Safety agencies (law enforcement, fire, emergency medical technicians, public health)
- Community-Based Organizations
- Seniors
- Business Sectors
- Underserved populations, i.e., minorities, persons with disabilities, low income, seniors
- Telecommunications service providers (telephony and broadband)
- Potential investors for broadband infrastructure/services and economic development
- *Oregon Business Development Department (OBDD) www.oregon4biz.com*
- *Public Utility Commission of Oregon www.oregon.gov/PUC*
- *League of Oregon Cities (LOC) www.orcities.org*
- *Association of Oregon Counties (AOC) www.aocweb.org*
- *Telehealth Alliance of Oregon (TAO) www.ortelehealth.org*
- *Oregon Health Network (OHN) www.oregonhealthnet.org*
- *Oregon Economic Development Association (OEDA) www.oeda.biz*
- *Umpqua Economic Development Partnership www.umpquaedp.org*
- *Portland Development Commission www.pdc.us*
- *Baker City Economic Development Department www.bakercity.com/economic_dev.htm*
- *Coquille Economic Development Corporation www.cedco.net*
- *Central Coast Economic Development Alliance www.coastbusiness.info*
- *Southern Oregon Regional Economic Development www.soredi.org*
- *Columbia Gorge Economic Development Association www.cgeda.com*
- *Economic Development Council of Tillamook County www.edctc.com*
- *Corvallis-Benton Chamber Coalition www.cbchambercoalition.com*

- *Strategic Economic Development Corporation (SEDCOR) www.sedcor.com*
- *Albany Millersburg Economic Development District www.albany-millersburg.com*
- *Economic Development for Central Oregon www.edcoinfo.com*
- *Northeast Oregon Economic Development District www.neoedd.org*
- *Union County Economic Development Corporation www.ucedc.org*
- *Mid-Columbia Economic Development District www.mcedd.org*
- *Central Oregon Intergovernmental Council www.coic.org*

Proposed Solution – Anticipated Solution

Our community engagement efforts will provide the data necessary to give concrete solutions. We anticipate, based on our experience and current knowledge, that the following solutions will need to be implemented, but other solutions may surface once data is analyzed. Some of the anticipated solutions include:

1. Engage service providers
2. Aggregate demand
3. Stimulate demand
4. Provide relevant content and tools to encourage use
5. Provide low cost hardware options

Proposed Solution – Personnel

One Economy will work closely with the Oregon Broadband Advisory Council (OBAC) on strategic planning activities for the state. For background purposes, in the 2009 Legislative Session, the Legislative Assembly passed and the Governor signed into law the creation of an Oregon Broadband Advisory Council and a Broadband Advisory Council Fund to develop and ensure the implementation of statewide broadband strategies.

The Council members represent Oregon's cities, counties; telecommunications service providers, Tribes, educators, economic development organizations, public safety agencies, healthcare providers, e-government experts, the Public Utility Commission, the State House of Representatives and the State Senate.

The mission of the Council is to encourage coordination and collaboration between organizations and economic sectors to leverage the development and utilization of broadband for education, workforce development, and telehealth and to promote broadband utilization by citizens and communities. The Council is charged with reporting to the Legislative Assembly on the affordability and accessibility of broadband technology in all areas of the state and on the extent of broadband technology use in healthcare, energy management, education and government.

One Economy will work closely with the Broadband Advisory Council and with local governments and institutions to address the previously-stated problems through state, county, and city policy as well as through innovative programs to connect the citizens of Oregon to affordable broadband.

In addition to this work, and consistent with Oregon's approach on leveraging technology to promote economic growth, One Economy will create and develop a customized "Digital Connector" program for this project. Digital Connectors are a task force, who live in underserved areas, who are exposed to the benefits of information technology through a comprehensive curriculum, and further trained to be technology ambassadors in their communities. The main responsibility for the Digital Connectors in this program will be to aggregate survey data at the street level, conduct and gather data through town hall meetings, and to present communities with the project vendor's affordable hardware acquisition program. The energy and commitment of Digital Connectors have proven to be unmatched in terms of their willingness to train and assist underserved populations in technology use, as well as serve as living testaments to the power of technology and its ability to change lives.

One Economy will create a team of 200 Digital Connectors in this effort. The State feels that it is important that in this implementation, there are at least a few Connectors available in every county. Through this effort, there will be at least 2 connectors in each county (36 counties), and the remaining 128 connectors will be deployed in the most distressed counties and those that, upon the initial map deliverable, are identified to be the most unserved and underserved communities. In addition, One Economy will seek to partner with Tribes to provide Connectors in Tribal areas to work on demand side data aggregation and to provide a layer of technology support in their communities.

Timeline

December 2009 – Start of Engagement with Local Groups and Stakeholders

One Economy will engage all local groups, conduct meetings, increase awareness of the project, and start to gather community-level input. This process will continue through August of 2010 on a continual basis.

February 2010 - Identification of Unserved and Underserved Areas

As Oregon prepares the first data deliverable to the NTIA, One Economy will use this and other data to assess and prioritize the need areas by county for Digital Connector allocation. The areas are assessed on level of service availability and initial assessments of broadband adoption. The program manager will begin to meet with county/local governments and assemble the Digital Connectors with efforts focused on the communities with the greatest need.

May 2010 - Launch of Digital Connectors program

The Digital Connectors will undergo their training curriculum. Beyond the leadership curriculum, they will learn the process of data aggregation and be trained to aggregate demand data at the ground level.

August 2010 - Beginning of Data Analysis and Report Generation

The team will ensure consistent data aggregation, quality and insightful data analysis, and the generation of the strategic recommendations blueprint. Data from both the local engagement of the One Economy field staff, OBAC, and Digital Connectors will all be combined to deliver a comprehensive perspective.

October 2010 - Report Delivery

The final Digital Inclusion / Adoption Blueprint covering data findings, key insights and methodologies to achieve increased adoption along with a sustainability plan for the programs designed to ensure ongoing increases in broadband adoption and economic growth will be delivered to the state.

Anticipated Outcomes of the Project

One Economy will work with the OBAC in these capacities:

1. Engage OBAC members in aggregating comprehensive data and community engagement.
2. Consult the OBAC and the Oregon Business Development Department on proposed solutions
3. Lead fund raising efforts to ensure sustainability and growth of future commitments

The primary goal of the project is to facilitate the deployment of broadband services to all communities, rural and urban. The project will profile and aggregate user demands, engage providers, seek to reconcile/coordinate state, county and municipal policies and provide actionable information to entrepreneurs. The project will determine the size and location of unserved and underserved areas in Oregon and offer specific recommendations for further deployment of services.

The functional deliverables will include a Digital Inclusion / Adoption Blueprint, that serves as a comprehensive study of our findings on both the mapping data and adoption/demand factors, the environment of the State, the next steps to increasing higher adoption rates, and a plan to acquire further non-governmental funding to continue adoption efforts and implement customized programs that are seen as necessary to grow adoption.

The second deliverable is a comprehensive data set, composed of the efforts of the Digital Connectors conducting demand side surveys, data aggregated from town hall meetings and information gathered by our staff. This data set will be converted to a data format that can be placed as an additional data layer onto our state broadband map. This will allow the State and residents to see how demand side factors affect the acquisition and long-term use of Broadband for differing populations.

REPORTING

As the awardee and administrator, the Oregon PUC recognizes that pursuant to OMB Memorandum M-09-21, it is ultimately responsible for the reporting of all data required, though it may delegate certain reporting requirements to vendors. In turn, as the sub-awardees, the vendors acknowledge the guidelines and requirements set forth by the Federal Funding Accountability and Transparency Act of 2006 and OMB Requirements for Implementing Sections 1512, 1605 and 1606 of the Recovery Act, and provisions regarding "Buy American," wage rate, and separate identification of funds Oregon PUC will ensure compliance with all federal reporting requirements by all sub-awardees.

2. Please clearly list the BDIA related purposes of the planning project.

These are the BDIA related purposes of Oregon's Planning Project:

a) develop and provide a baseline assessment of broadband deployment in each state;

b) identify and track the areas with low levels of deployment, the rate at which residential and business users adopt broadband service and other related information technology services, and possible suppliers of such services;

c) identify barriers to the adoption of broadband service and information technology services; e) create and facilitate by county or designated region in a state, local technology planning teams;

f) collaborate with broadband service providers and information technology companies to encourage deployment and use;

g) establish computer ownership and Internet access programs in unserved and areas with lower than average penetration on a national basis;

h) collect and analyze detailed market data concerning use and demand for broadband service;

i) facilitate information exchange regarding use and demand for broadband services between public and private sector users.

3. Please provide substantially more detail about the proposed Digital Connectors program.
    a. How many youth will be trained?

Oregon will create a team of 200 Digital Connectors in this effort. The State feels that it is important that in this implementation, there are at least a few Connectors available in every county. Through this effort, there will be at least 2 connectors in each county (36 counties), and the remaining 128 connectors will be

deployed in the counties that, upon the initial map deliverable, are identified to be the most unserved and underserved communities. In addition, there will be a concentration of Connectors in the Tribal areas of Oregon to not only work on demand side data aggregation but also to provide a layer of technology support in their communities.

b. What is the training period and what is the content? For example, what is meant by "they will learn the process of data aggregation and be trained to aggregate demand data at the ground level."

The Connectors will train for a continuous week in the summer through a Digital Connectors camp.

The core elements of their program will involve the following:

Technology Base Training - Digital Connectors will learn how to best utilize hardware, utilize search engines, and other basics that enable them to be savvy consumers of the Internet.

Customer Service - Instructors will teach the Digital Connectors how to interact with people who they are serving. They will learn best practices of surveying, patience, and the language with which to survey the population.

Making presentations - The Digital Connectors will learn how to use Microsoft PowerPoint to make presentations that will help engage the local communities.

Leadership – As students, each will learn valuable leadership skills such as team-building and effective communication. In addition to this, helping communities will make them into young leaders.

Obstacles of Broadband Adoption - The Digital Connectors will be taught about the various obstacles to broadband adoption, how to identify them, and how to prescribe the best possible solutions.

Evaluation and Data Aggregation Standards and Processes - Each Digital Connector will learn best practice surveying methods. They will learn how to ask the questions, proper follow-up questions, and standardized aggregation methods to ensure the greatest accuracy and surveyor experience.

c. To what extent, if at all, will Digital Connectors be utilized in the broadband mapping activities? Is cost allocation presented in the budget?

In the standard mapping processes, the Digital Connectors will not be involved. Their scope of work includes aggregating and submitting data regarding barriers to adoption and related adoption activities. This structure was proposed in accordance with the NOFA stating that all adoption related activities must be within the limitations of Broadband Planning.

BroadMap, LLC: OREGON POINT ADDRESS DATA EVALUATION

Reviewer:	Dennis Ulatowski, GIS Support Tech
Date:	**3-Nov-09**
Objective:	Report on completeness and accuracy for data from NAVTEQ 2009Q3 & OREGON Geospatial Enterprise Office (OGEO)

OVERALL SCORE FOR OREGON		NAVTEQ	OREGON
Statewide (36 Total Counties)	Count[1]	1041945	1289894
	Number of Counties with Point Addresses	33	14
	Positional Accuracy Ranking[2] for available counties	3	4
	Attribution Ranking[3] for available counties	3	4

	Definitions
Count[1]	Total Number of Address Points.
Positional Accuracy Ranking[2]	General Accuracy compared to 2005 OSU orthophotos
Attribution Ranking[3]	General Completeness & Suitability for ingestion as source.
	Ranking Defined
0	Not Provided by OGEO and/or NAVTEQ
1	Unusable
2	Poor
3	Fair
4	Good
5	Excellent

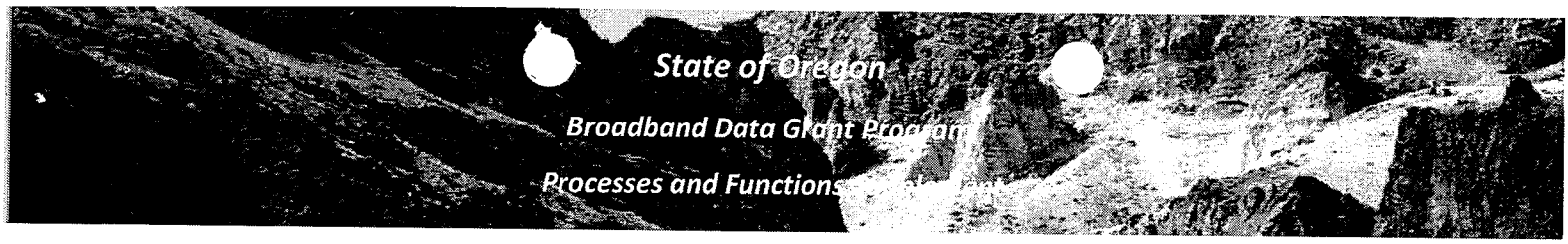
BroadMap, LLC: OREGON POINT ADDRESS DATA EVALUATION

Reviewer: Dennis Ulatowski, GIS Support Tech
Date: 3-Nov-09
Objective: Report on completeness and accuracy for data from NAVTEQ 2009Q3 & OREGON Geospatial Enterprise Office (OGEO)

	CO		NAVTEQ	OREGON
1	BAKER	Count[1]	4442	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
2	BENTON	Count[1]	23467	22625
		Positional Accuracy Ranking[2]	3	5
		Attribution Ranking[3]	3	5
3	CLACKAMAS	Count[1]	93535	150340
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4
4	CLATSOP	Count[1]	12862	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
5	COLUMBIA	Count[1]	11279	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
6	COOS	Count[1]	22170	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
7	CROOK	Count[1]	6368	10535
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4
8	CURRY	Count[1]	5644	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
9	DESCHUTES	Count[1]	72094	81797
		Positional Accuracy Ranking[2]	3	5
		Attribution Ranking[3]	3	5
10	DOUGLAS	Count[1]	39624	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
11	GILLIAM	Count[1]	480	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
12	GRANT	Count[1]	0	0
		Positional Accuracy Ranking[2]	0	0
		Attribution Ranking[3]	0	0
13	HARNEY	Count[1]	1487	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
14	HOOD RIVER	Count[1]	4880	9367
		Positional Accuracy Ranking[2]	3	5
		Attribution Ranking[3]	3	5
15	JACKSON	Count[1]	51089	93995
		Positional Accuracy Ranking[2]	3	5
		Attribution Ranking[3]	3	5
16	JEFFERSON	Count[1]	4855	0

		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
17	[illegible]	Count[1]	13688	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
18	[illegible]	Count[1]	18401	26766
		Positional Accuracy Ranking[2]	3	5
		Attribution Ranking[3]	3	5
19	[illegible]	Count[1]	0	0
		Positional Accuracy Ranking[2]	0	0
		Attribution Ranking[3]	0	0
20	[illegible]	Count[1]	95250	168685
		Positional Accuracy Ranking[2]	3	5
		Attribution Ranking[3]	3	5
21	[illegible]	Count[1]	15539	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
22	[illegible]	Count[1]	35086	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
23	[illegible]	Count[1]	0	0
		Positional Accuracy Ranking[2]	0	0
		Attribution Ranking[3]	0	0
24	[illegible]	Count[1]	79807	125516
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4
25	[illegible]	Count[1]	1572	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
26	[illegible]	Count[1]	217705	309470
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4
27	[illegible]	Count[1]	21550	45245
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4
28	[illegible]	Count[1]	309	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
29	[illegible]	Count[1]	10029	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
30	[illegible]	Count[1]	13334	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
31	[illegible]	Count[1]	6978	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
32	[illegible]	Count[1]	1977	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
33	[illegible]	Count[1]	6265	10164
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4

34	WASHINGTON	Count[1]	125053	197196
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4
35	WHEELER	Count[1]	165	0
		Positional Accuracy Ranking[2]	3	0
		Attribution Ranking[3]	3	0
36	YAMILL	Count[1]	24961	38193
		Positional Accuracy Ranking[2]	3	4
		Attribution Ranking[3]	3	4



Processes and Functions

1. Data Gathering, Verification, Processing, Access, and Security

The Oregon Team is committed to implementing systems, processes and applications which will efficiently and repeatedly produce the broadband service area data to meet NTIA and Oregon requirements. The following narrative documents our experienced-based approach to satisfy the requirements as outlined in the NOFA and other submission guidelines.

Data Gathering

The NTIA specified four major reporting areas in NOFA Technical Appendix A, as outlined here:

1. Broadband Service Availability in Provider's Service Area, for each Provider
    a. Service availability by address
    b. GIS-based (for wireless service)
2. Residential Broadband Service Pricing in Provider's Service Area, for each Provider
3. Broadband Service Infrastructure, for each Provider
    a. Last mile connection points
    b. Middle mile and backbone interconnection points
4. Community Anchor Institutions

We propose an interrelated series of data gathering steps, or ***tasks***, which collectively result in the preparation of the comprehensive and high-quality datasets required by NTIA. Each of the ***data gathering tasks***, detailed below, are organized to support both the expedient the initial data delivery and the facilitate the semi-annual updates that are required by NTIA, as well as to support efficient public access to Oregon broadband service area maps. Each task activity considers security and confidentiality for data access as described in the ***Accessibility*** and ***Security and Confidentiality*** sections, respectively. The ***data*** gathering tasks specifically include: establishing a working relationship with Oregon's Broadband Service Providers, establishing a robust data processing and management environment, collecting and automating service area data from the Service Providers, and collecting and preparing other GIS data, prior to ***verifying*** the data and then processing them into to a unified schema in order to support all reporting mandates for NTIA, the State of Oregon, and the public.

Establishing a Working Relationship with Oregon's Broadband Service Providers

In anticipation of a favorable grant application review by NTIA, Oregon's Team will begin dialogs with the key broadband providers in Oregon in an effort to help them understand

this program, our approach, our information needs, and the opportunities and benefits associated with a successful broadband data collection, mapping and planning program. Oregon's Team will continue our engagement with these organizations to expedite timely, accurate and comprehensive data collection from each of them, utilizing Non Disclosure Agreements (NDAs) as appropriate. In this way, we will accelerate and optimize the deployment of the data processing environment and the development of an appropriate data model.

Establishing the Data Processing and Management Environment

To support the eventual processing and management of all broadband data collected under this task, appropriate system hardware and software licenses will be acquired, installed, and configured. The hardware platform will be sized to assure sufficient storage and optimal performance given the volume of data and usage, as well as maximizing up-time. The software applications include a host of enterprise and scalable solutions, such as Oracle or other similar Relational Databases extendible for GIS, ESRI server products (e.g., ArcGIS, ArcIMS, ArcCatalog for metadata, etc.), and a variety of other (mostly open-source) Internet and Application Server (stock) products.

The system and the platform will initially be housed and hosted by the BroadMap, leveraging existing capabilities, for a defined period of performance (up to 5 years), and then will be transferred at the appropriate time to GEO (or designated Agency), as described in the sustainability section below.

Initially, a fully configured GIS system will be deployed, and associated data models will be implemented to provide the baseline inventory system for the collected broadband service areas and address point data. Incrementally, other services will be added to address:

- Automated broadband data and metadata automation processing which may require systems engineering and software development;
- Definition and implementation of GIS data services (and data standards), based on standard industry services that may be required for data exchange and information sharing and distribution (e.g. web feature service (WFS), web mapping services (WMS), keyhole markup language (KML), extensible markup language (XML), etc.);
- Automated broadband data update processes and ingest (as feasible).

Over time, and as standard services are defined and deployed, Oregon's Team will develop, deploy, and release the following services:

- Automated applications and/or processes to generate reports from the GIS inventory that are required by NTIA and according to the specifications provided in the Grant Solicitation Appendix A;

- Web-based standard OGC-compliant metadata search, discovery, and download processes (as applicable according to licensing agreements and confidentiality governing the data);
- Web-accessible standard data exchange services, such as WFS, WMS, KML, XML, etc. (constrained by the licensing agreements and confidentiality governing particular);
- Web-based accessible, password-protected (as well as appropriately open) access GIS viewer application(s) to allow public user access and mapping product generation. The application will include printing capabilities of generated products; place-name gazetteers and address lookup search, and of the ability to link directly to other baseline GIS data sets;

The system components necessary to accomplish these tasks and the associated data flow are described above. Many of the components and processes are already in place within BroadMap's data processing facility and can be used without any modification. These include significant hardware, GIS software, applications, and data as well as other network and internet servers and services. Other components – equipment and processes – will be acquired and developed under this grant to specifically receive, process, safeguard, and deliver required datasets to NTIA and to the public.

Quality Control (QC) processes will be employed to ensure maximum accuracy of processing and data ingest into the GIS inventory. All data records will be geo-coded, as necessary, at this stage.

Built into the processes above will be steps to verify the accuracy of the data provided by the Service Providers and/or computed by processing steps (above), especially as it relates to actual performance of their services vs. advertised capacities.

Following the processing and validation steps, data sets will be delivered to NTIA. Additionally, non-proprietary and non-confidential data will be transferred to a public access server and incorporated into web-based map viewers to create the "Oregon Broadband Portal" for public access and analysis.

Sustainability phase will commence after the first year of production and will continue beyond the Grant completion. During this phase, the Team will develop the necessary documents describing the processes, data processing, technical specifications of applications, system architecture, system maintenance, and the like. These documents will be used to provide training over the course of the project implementation to the GEO (or designated Agency).

Collaboration phase will require a group effort from all involved state agencies and private partnerships with participation from all stakeholders. The Program Management Team will

deploy a traditional approach to project planning and collaboration. We follow five components in our Broadband Mapping project planning: a) Project Initiation Stage; b) Project Planning Stage; c) Project Execution Stage; d) Project Monitoring and Controlling Systems; and e) Project Completion Stage.

Planning Phase requires well-designed and well-executed broadband adoption programs for Oregon to make significant progress in realizing the economic, educational, and personal benefits of universal broadband adoption by all segments of the population. The planning program will have an emphasis on the following goals; (a) developing a baseline assessment on Broadband deployment, (b) identifying and tracking areas of low Broadband penetration and implementing suppliers who could assist us in increasing adoption, (c) identifying barriers of adoption for Broadband, (d) creating regional and local Digital Connector programs to manage planning teams and efforts, (f) establishing internet and computer ownership programs, (g) collect Broadband market data for incorporation into the core Broadband mapping database, (h) facilitating exchange of information between private and public sector partners and (i) tool creation for automated input into the core Broadband Map. (See Narrative page 26 for Broadband Planning Proposal)

Collecting and Automating Data from Broadband Service Providers

Immediately upon award notification from NTIA, Oregon's Team will request subscriber, service area and infrastructure data from all broadband service providers. The Oregon Team's group of subject matter experts will utilize a representative sample of these data to develop a data model to efficiently store data from each provider and to create a template database schema.

Each Service Provider is expected to provide the requested information in different formats and schemas as there is no industry standard for broadband service area data storage. Oregon's Team will not attempt to harmonize all sources into a single unified data model/schema at this point, but will perform some pre-processing to standardize storage of common elements across all provider schemas (e.g., names, addresses, etc.). The resulting data tables will be considered a "staging area" designed to both effectively accommodate future inputs (i.e., updates) and outputs (further described below.)

To populate the Staging Area database processing scripts will be developed to Extract, Transform and Load (ETL) data from each provider into the template database tables. Depending upon available data transfer mechanisms and anticipated data update procedures; a unique script/process will likely be required for each data type (1 – 3 above) from each broadband service provider. These ETL processes will be automated using BroadMap's Dynamic Data Processing and Publication (D2P2) service. D2P2 extracts key parameters from the original source documents / data services, transforms them into geospatially-referenced data sets, and loads the resulting records into BroadMap's Enterprise Geospatial Database (EGDb).

Metadata (information that describes the underlying data) is also captured and/or updated at this point in the processing sequence. D2P2 is designed to process dynamic data from a wide range of data types from multiple sources using a diverse set of protocols and methods.

In addition to automated parsing using D2P2, Oregon's Team will aggressively work with every small to mid-tier provider to integrate our open Application Programming Interfaces (API) into their billing and/or serviceability engine. Specifically, BroadMap has extensive experience undertaking similar integration efforts using the selected messaging platform (depicted in Figure 1). There will be some cases where carriers do not have the core expertise or infrastructure to build these interfaces. In those cases, Oregon's Team will determine whether integration of open APIs is feasible, and if not, will provide additional options based upon their situation. These options include:

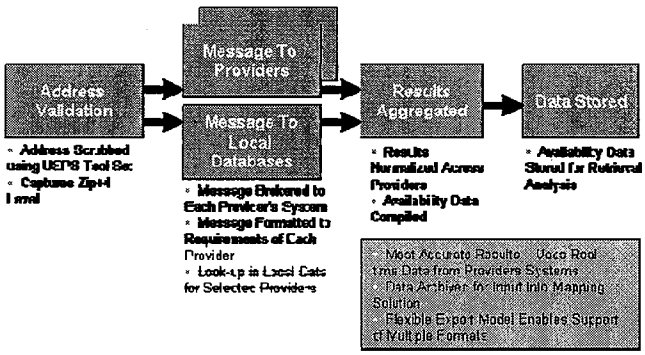


Figure 1 - Overview of the messaging platform

- Secured FTP site – Allows broadband service providers to send their data via a secure standardized protocol
- Email Interface – For broadband service providers that are less sophisticated, the Team has a conflation tool that converts various data file formats and integrates the data into the "staging area" described above;
- Fax Interface – To serve broadband service providers that still rely on manual data management techniques. These data will be transcribed into the system by Broadmap staff.

BroadMap and its partners have successfully implemented these techniques with major broadband service providers, and they have negotiated national agreements to provide serviceability data collected using these options to consumers through protective terminals and online. They have developed integrated tools to provide for the dynamic display of serviceability data including such attributes as speed (upload and download), price, plan detail, promotions and bundled offerings. Their efforts produced the first ever nationwide assemblage

of carrier serviceability. This experience will be used to gather serviceability information from those core providers.

Whether the ETL scripts or any combination of the above options are used, Oregon's Team will follow a formal testing process that includes establishment of test case scenarios and documentation of all required inputs and anticipated outputs. Test cases will include several "designed to fail" cases, which allow observation error handling capabilities and ensures data accuracy. This testing step will ensure that the broadband service area data contained within the Staging Area database are consistent with what was originally obtained from each Provider and that the ETL process did not introduce errors. Additionally, as the data are compiled from each service provider they will be verified for consistency and completeness (i.e., Oregon's Team will review the data to assure that they are correct representations of the service that is actually provided.) This second mode of verification/validation will include utilizing broadband technology-specific algorithms to uncover possible discrepancies, such as comparing aggregated data with the inter-connect network capacities for a given location or area. Spot-checks will be performed manually as well. At the conclusion of the Data Collection and Automation task, Oregon's Team will have:

- Established data sharing relationships with all Oregon Broadband Service Providers;
- Implemented mechanisms to automate receipt of necessary service area, service pricing and infrastructure data; and
- Populated a Staging Area database with an initial snapshot of data sufficient to address the NTIA requirements for items 1 - 3 as outlined in NOFA Technical Appendix A.

Preparing other GIS Data

Data Gathering also involves collection and processing of additional GIS "framework" and community anchor institution data to fulfill the NTIA requirements (i.e., item 4 in Appendix A). These data are also needed to effectively fulfill the public-accessibility / State Map requirement. Presently, BroadMap holds a significant number of these necessary datasets, many of which have been provided by strategic partners. In addition the Oregon Team is providing a broad set of Oregon public domain framework and other GIS datasets as part of the State's in-kind contribution to the project. The table below highlights key framework and anchor institution data, their source and main attributes:

GIS Framework Layers*		
Name	**Source(s)**	**Key Features / Characteristics**
Demography	US Census, Navteq, State GIS	Cities, Place Names, Populated Places, CensusSF1 and SF3, Population Density
Transportation	Oregon State & County GIS	Airports, Seaports, Heliports, Roads, Bridges

Hydrography	Oregon USGS NHD	Streams, Wetlands, Dams, Rivers, Reservoirs
Cadastral	Oregon County GIS	Land Parcels (aka TMK)
Business Loc	InfoUSA	Hotels, Financial Institutions, Ice Production Facilities, Fuel Supply
Boundaries	Navteq, State and County GIS	Coastlines, ZIP codes, Census Tracts and Blocks
Land Use	NOAA, USGS, State GIS	Landcover, Landuse, Fed Lands, Parks, Reserves, Zoning
Terrain	USGS, State GIS	Digital Elevation Model (DEM), contours, Radar-derived DEM (IfSAR), shaded relief, LIDAR, topographic maps (DRG's)
Imagery	USGS, Digital Globe, State GIS	Satellite (Landsat, SPOT, IKONS, QuickBird), airphotos
Community Anchor Institution Layers		
Emergency Services	Navteq	Police & Fire Stations, Fire Response Zones, Emergency Shelters, Emergency Operations Centers, Siren Locations
Health Care Svc	InfoUSA, Schools, Health and Libraries Coalition	Hospitals, Health Clinics, Assisted Living, Skilled Nursing Fac
Public Facilities	InfoUSA	Public schools, Government buildings
Other	InfoUSA	Cemeteries, Places of Worship

Table 1 – Sample of Existing Data Inventory

These datasets will be processed and quality controlled for high accuracy according to the One Economy's "Best Practices" procedures. Key components of this process include establishment of defined staff roles and responsibilities including: (i) Processing Manager, responsible for prioritizing, scheduling, resourcing and tracking data automation processing; (ii) Geospatial Data Manager, responsible for overall data content and quality for EGDb resources; (iii) Metadata Manager, responsible for ensuring quality and integrity of metadata describing the contents within the EGDb; and (iv) Analysts, who create (and utilize) data. Each is assigned specific database roles and permissions commensurate with their duties. Other components of the EGDb processes include acquisition planning, processing, validation, metadata authoring, data and metadata loading, and symbology file creation. A versioned geospatial database will be used to support multi-user editing and review of new/revised data prior to them being committed to a production service.

Data Processing and Analysis

The next step in the Data Gathering process involves additional processing of data within the Staging Area and the EGDb to populate the Broadband Production Database. In a sense, this

moves, transforms and conditions all necessary data from assorted data providers, including Broadband Service Providers, into a unified and controlled data environment.[1] It also captures data processing steps and other information required to update metadata. These steps will be automated to the extent possible, especially for re-occurring steps such "mapping" provider data to the data model developed by the team during the previous step. Other data loading, populating community anchor institution tables from One Economy's GDb, for example, may be done manually as updates are not expected to be frequent nor regular.

Initially, during this phase, the greatest emphasis will be placed on:

- Meeting the broadband mapping requirements for the "Substantially Complete" data set. All possible capacities at the disposal of the entire Team will be utilized here to ensure the most realistic delivery of the data sets for the Grant's deliverable timelines;
- Aggregation of the broadband data to determine the State's "unserved" and "underserved" areas. These data sets are not currently available with sufficient accuracy.

Priority will also be given to an initial analysis of the information above in correlation to the identification of possible unserved/underserved vulnerable/disadvantage population and emergency services. Among other benefits, this will help identify important "hot spots" for the broadband planning process.

Data Processing and Analysis tasks will include a combination of automated and manual (or manually assisted) steps to harmonize and insure quality and integrity of data required to address all items in Appendix A. These steps will include combinations of:

- **geo-coding** - providing address-based records with spatial coordinates;
- **reverse geo-coding** - assigning an address to data containing geospatial coordinates,
- **conflation** - combining and aggregating different sources of information for the same feature – e.g., two street maps – to provide a single representation of the feature by using the best available information from all sources – e.g. street geometry from one source and address ranges from another source;

Priority processing will be given to "*Substantially Complete*" data set.

Priority Analysis will be given to the State's "*unserved/"underserved*"

[1] As shown in Figure 2 above, the Staging Area Database is also physically stored on the Broadband Data Server for security and confidentiality purposes. Thus all provider data will be appropriately and securely controlled.

- **feature editing/clean-up** - manual editing to resolve errors or discrepancies associated with automated processing steps – e.g., polygon "sliver" and "dangling nodes" removal to construct valid topology;
- **spatial overlay** - mathematically compositing information from two or more feature categories to into a single data source – e.g., assigning available broadband service levels from one GIS layer to addresses in a parcel database layer or combing individual wireless service area maps into a composite map;
- **spatial analysis** - implementing spatial algorithms to derive new/additional information – e.g., validating or estimating service availability by modeling wireless propagation over terrain or estimating wireline service boundary from infrastructure data layers.

Specifically, under this task, data will be processed and transferred from the Staging Area Database and from GDb into the Broadband Production Database such that:

- all addressed-based provider data (1a) are geocoded and loaded into the same geodatabase schema;
- all shape-based provider data (1b) are composited into the same geodata schema;
- all broadband service infrastructure data (3a, b) are reverse geo-coded (if/as necessary) and loaded into the same schema; and
- all community anchor institution data are geocoded (as necessary) and loaded into the same geodatabase schema. (As noted above, many of the required community anchor data are already available and geocode.)

Quality Control (QC) and metadata preparation processes described above will be utilized in this phase as well to ensure consistently high-quality data standards. BroadMap and its Team members have significant experiences and resources to accomplish these tasks. Highlights include:

Geocoding/Reverse Geocoding

Oregon's Team has multiple means available for geocoding addresses within the State of Oregon. The ESRI StreetMap which is a national dataset with a 85 – 90 percent accuracy is often used as the starting point. Through the use of custom address locators, other datasets within our proposed EGDb which contain address range information can then be used to complete the geocoding process. These include national databases such as the National Transportation Atlas Database, NAVTEQ, and TIGER, as well as local data resources, such as county centerline datasets and parcel datasets. Oregon has also proposed the use of a broad set of Oregon public domain framework and other GIS datasets for this project.

Dasymetric Mapping

Oregon's vendor partners have refined and applied methods to disaggregate census data to estimate the distribution of population and socio-economic characteristics. In Oregon the Census geography, even at the most detailed Census block level, varies significantly in both area and population size. This discourse in the Census geography is especially important in rural areas where census units are large and population density is not homogeneous. Ancillary data sets, such as land use/land cover, can be used to more accurately distribute the population, and thus the demographic data associated with the population, to better identify segments of the population requiring specific services, be they emergency management services or broadband telecommunications services.

Spatial Modeling and Analysis

Spatial modeling and analysis techniques will be used to transform information provided by service providers into informative and easy-to-interpret coverage area maps. The underlying spatial data used to create this map will in turn be used to populate the publicly-access Oregon Broadband Map and associated map services as well as combined with parcel and master address files to produce address-based broadband availability data required by NTIA.

Address Point Data Acquisition

The state of Oregon proposed the development of a Master Address File/Repository to successfully complete this project. Across the nation, the geographic location of addresses is one of the most needed and sought after GIS datasets for the management of land resources at the state, regional or local level. Oregon is no exception. An address defines the physical location where services (in this case broadband services) are or are not currently delivered. In addition, physical addresses are used for other critical government functions, such as emergency 9-1-1 response. The master address file (MAF) is a fundamental dataset that is easily understood by GIS and non-GIS people in the public sector, the private sector, and within the public at large. As a key component of this grant application, Oregon proposes to augment its broadband service area mapping solution via the collection/acquisition of a complete set of address data points across Oregon.

Although the recent clarification to the NOFA states that address-level service mapping is no longer a mandatory requirement, Oregon proposes to pursue this level of mapping. The State can readily access approximately 50% of the address points throughout the state. By obtaining the balance of the address points, Oregon will be able to

- Report on disaggregated broadband service area data, if needed and allowed under NDA;
- Protect confidential information concerning broadband characteristics that are not protected if reported at Census block aggregations;

- Gain appropriate granularity on consumer access to broadband service (measurements beyond a 2+ square mile census block);
- Meaningfully identify underserved and unserved consumers that might otherwise be tied to served concentrations;
- Verify census-based population estimates, based on addresses rather than census survey statistics
- Develop a stewardship plan with a master address layer; and, thereby
- Reduce Oregon's dependence on proprietary/licensed data sets for the NTIA and for future GIS applications

The State of Oregon will assemble a master address repository for this project using statewide parcel data – address points will be at the centroid of the parcel and will be SITUS address not mailing address (i.e. the address for the physical location of the property). These addresses will be derived from the CAMA databases that are available from the assessor's office for each county or from the State of Oregon. If counties have completed their own addressing projects, we will use those rather than the parcel centroid. The State will supplement addresses for parcels with missing data from other sources of better address information such as e911 addresses, utility billing addresses, etc. either statewide or for each county to enable us to improve the addresses for the counties since assessment data often have no information on tax-exempt properties, not updated regularly, etc. If no local source of information exists, the State will supplement with USPS data to collect as many physical addresses as possible (no PO boxes will be collected).

Other local sources of data may be a list and not point data – these will be reconciled with parcel data and point locations created using geocoding. For large parcels, the parcel centroid may be far from the actual building. It is our assumption in such cases the building is closer to the road and a better location can be created by using a map overlay function (intersect) of the parcel with a specified road buffer and using the centroid of the common area. The cut-off for what constitutes a large parcel will be determined in discussion with the project staff. The State will resolve all discrepancies that arise from the multiple sources of data, and will standardize the addresses using the Draft FGDC Address Standard and use a suitable relational data model for matching points to address data and to multiple address points where there are multiple addresses in a parcel. The project will support outreach with locals regarding the Master Address Repository, set expectations, get buy in, outline local updates, etc. The Master Address Repository data will be hosted on a web mapping website where local GIS coordinators or their designees can provide feedback on addresses as counties get completed. Correction of address discrepancies that arise out of local review will be corrected up to an average of 240 hours per

county for the 36 counties in Oregon. Any remaining issues with addresses will be identified at this time. Clean up will prioritize addresses with the most significance.

Each point will be tagged with record-level metadata which will show the source of the address – i.e. parcel centroid, utility address geocoded, manually placed using imagery, GPS, etc.. The master address repository will be used to locate both the service of the current broadband users and where the unserved and underserved population lives.

Acquisition and Implementation

Sanborn's approach to creating a Master Address File for a state can best be described as a pragmatic approach that balances the need for good addresses (as a fundamental basis for understanding broadband availability and gaps) against the limitations posed by schedule and budget. We understand that having the most perfect address file is a long-term goal and a start is needed to achieve that goal. With that in mind, our approach is one that allows for the creation of a good initial statewide dataset with the aim that local efforts can build upon the initial investment and incrementally improve the data over time and maintain it over time.

The goal is a Master Address Dataset comprising of a point file with either addresses in a table and linked to the point in a one-to-many cardinality or every address point with it's related address (in the latter, in some cases, multiple points may be on the same location). Addresses will be standardized, cleaned and validated. The points for address placement will be the best available source depending upon source data available at the state and hence the location point will be a hybrid source and fields with domains will be used to track where a particular point has been placed and how. This will result in feature level metadata that will be updated over time and as the data locations are improved, this field will be updated to reflect new location point.

Keeping the above in mind, outlined below are some of the steps that can be taken for statewide master address dataset creation.

Speed Testing - The Commerce Department's NOFA requires not only the mapping of the "maximum advertised downstream (and upstream) speeds," but also the "typical downstream (and upstream) speeds" experienced in practice by consumers. While mapping all available carrier data and other serviceability data will be our initial and immediate priority, we propose to undertake a second phase of data collection can cost-effectively supplement and verify this data with survey data collected directly from consumers. Data on consumers' actual online user experience can serve a number of important policy objectives, including the verification of carrier-provided data (such as "advertised" speeds) and the identification of bottlenecks due to under-provisioning. Concerning the speeds (throughput) provisioned to the state's residences, businesses and community anchor institutions, the Commerce Department's NOFA requires not

only the mapping of the "maximum advertised downstream (and upstream) speeds," but also the "typical downstream (and upstream) speeds" experienced in practice by consumers. While the accurate collection of actual consumer experience data requires additional collection efforts, it provides an opportunity to simultaneously survey consumers concerning other aspects of the service they receive.

The collection and layering on of broadband service experience data can be done in two basic ways: First, and most cost-effectively, it can be done in volume online by "crowd-sourcing" data from automated 'speed tests' that individual users can run in a minute or two – and receive immediate feedback for their own use as an incentive. Viral outreach efforts can encourage tens of thousands of users to 'take the test,' receive a 'report card,' and as a byproduct add to the automated aggregation of consumer experience data. Second, resources permitting, surveys of small business, residential and community anchor tenant broadband users can collect richer profiles of actual user experience and preferences.

Crowd-sourcing - One Economy will be deploying tools online that consumers will use to measure and report actual measurements of the speeds (upstream and downstream), as well as (simultaneously) other diagnostic data on the quality of their broadband connections and actual user experience, including latency (packet delay), jitter (variability in latency), and routing or packet degradation discrepancies. As large numbers of broadband users access these tools for their own benefit, their data will be 'crowd sourced' (aggregated) into the state map, improving its overall quality at extremely low cost.

Through its MeasurementLab (M-Lab) platform, New America provides consumers and researchers with real-time feedback on the speed and quality of their Internet connections.[2] M-Lab was founded by New America's Open Technology Institute (OTI), Google Inc., the PlanetLab Consortium at Princeton University, and other academic researchers to enhance Internet transparency and to sustain a healthy, innovative Internet.

M-Lab provides the consumer with immediate feedback, provides Internet researchers with aggregate data to discern patterns and, in the context of broadband mapping, M-Lab can add geographically specific queries in order to generate views and reports that reveal the actual user experience in discrete local areas. The national scope of M-Lab's data on broadband connection speed and quality will promote the comparability of State of Oregon data with data

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[2] *See* http://measurementlab.net OTI, in collaboration with the Knight Center on Digital Excellence, conducts community needs assessments and advises on strategies to address the needs of unserved / under-served areas.

gathered from other states. Google and other companies contribute data hosting capacity. All data collected via M-Lab is openly available to the academic researchers.

2. Project Planning and Management

From the implementation perspective, here is an overview of the Team's Project Management Processes, utilizing best practices approach to project planning and collaboration. This process recognizes the following five major stages during the course of a project: a) Project Initiation Stage; b) Project Planning Stage; c) Project Execution Stage; d) Project Monitoring and Controlling Systems; e) Project Completion Stage. The relationships among the components are depicted here.

Project Initiation Stage

Project initiation involves finalizing contractual agreements, assembling of the Subject Matter
Experts (SME) for a detailed review, determining the scope and nature of Oregon's broadband mapping effort, and detailed tactical and strategic planning. Focus elements of this stage are:

- Study analyzing the business needs in measurable goals.
- Conceptual design of the operation of the final products.
- Equipment and contracting requirements including an assessment of 'long-lead' items.
- Financial analysis.
- Stakeholder analysis, including State Departments, Broadband Providers, and support personnel for the project.
- Project charter including costs, tasks, deliverables, and schedule.

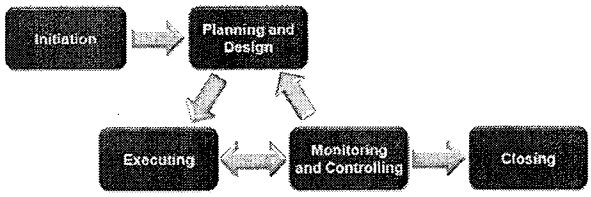


Figure 2 - Project Planning & Management Stages

Planning and Design Stage

During this stage, the system design is completed; prototype system is built and configured; the data model is established; and the initial database with licensed data and a control Broadband Provider dataset is tested. Controls are created to ensure that the final product will meet the specifications of the NTIA Technical Appendix. The results of the design stage should include a product design that:

- Satisfies the State of Oregon, NTIA, Broadband Providers and the end users

- Functions as it intended.

was
- Can be produced within quality standards.
- Can be produced within time and budget constraints

Project Execution Stage

This stage involves completing the work defined in the planning and design stage, in accordance with the project objectives. The Oregon Team will coordinate with service providers and data sharing partners, as well as integrating and performing the activities of the project in accordance with the project management plan. Deliverables (preliminary data reports, broadband service maps, etc.) are produced as outputs from the processes performed.

Project Monitoring and Controlling

Monitoring and Controlling consists of processes performed to observe project execution so that potential problems can be identified in a timely manner and corrective action can be taken, when necessary. The Broadband Mapping performance will be observed and measured regularly to identify variances from the project management plan:

- Measuring the ongoing project activities (where we are);
- Monitoring the project variables (cost, effort, etc.) against the project plan and the project performance baseline (where we should be);
- Identify corrective actions to properly address issues and risks (How can we get on track);
- Influencing the factors that could circumvent integrated change control so only approved changes are implemented

Project Completion Stage

The Oregon Team will perform closing after each stage of the project, by denoting the formal acceptance of the deliverables by the constituents. Administrative activities include the archiving of the files and documenting lessons learned. The Broadband Mapping closing phase consists of two parts:

- Close project: to finalize all activities across all of the process groups to formally close the project or a project phase
- Contract closure: necessary for completing and settling each contract, including the resolution of

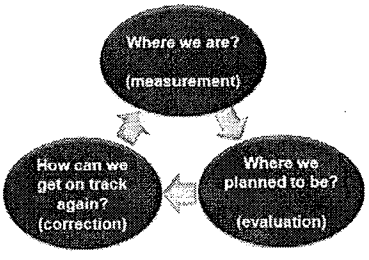


Figure 6 - Project Monitoring

any
and
and acceptance.

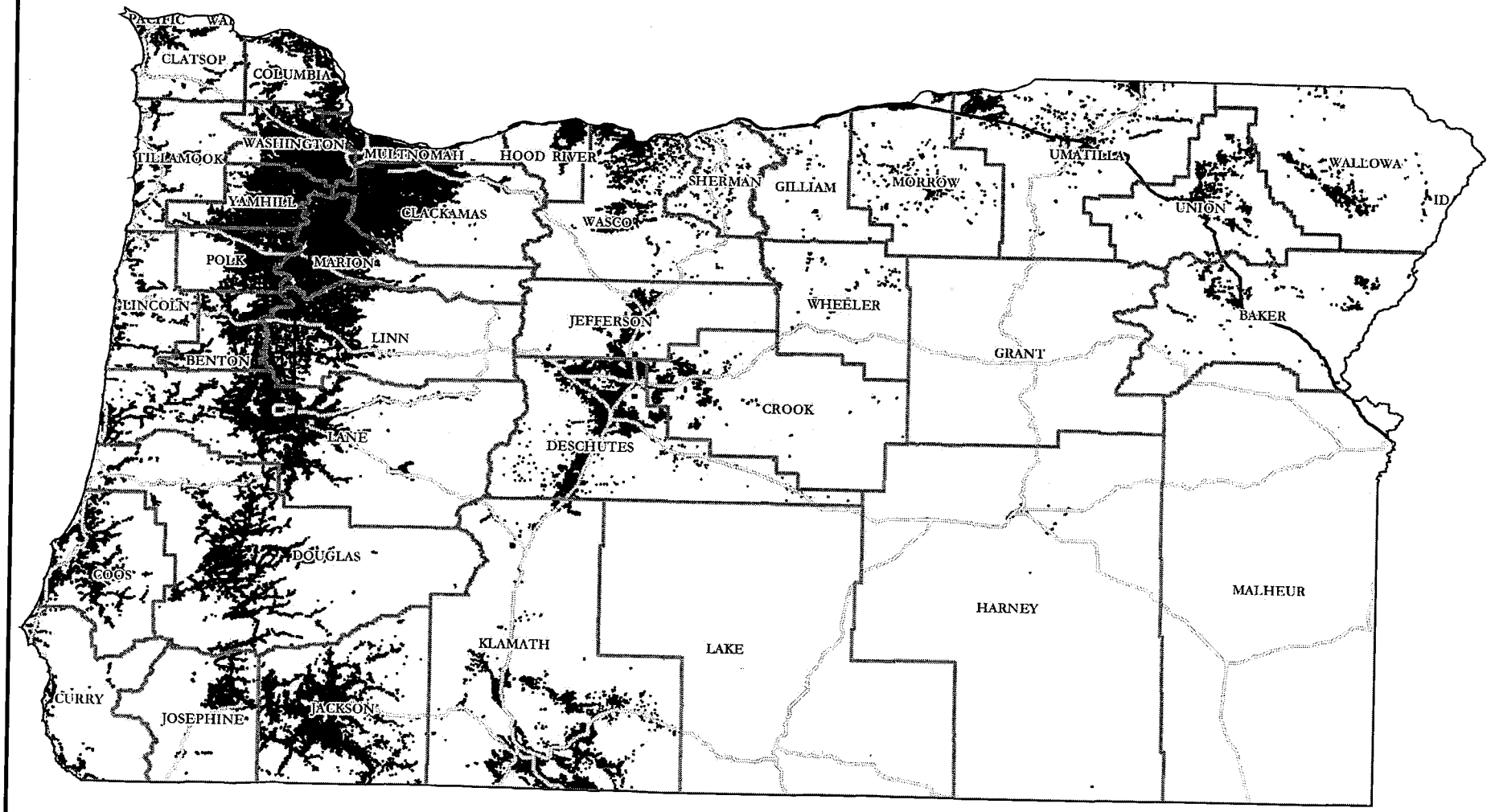
open items,
final reporting

Key Performance Indicators (KPIs)

Beyond the Project Plan, the Oregon Team will utilize Key Performance Indicators to assure that the Team's focus remains on the tangible and measurable results. The KPIs will be used to gauge the project's real world impact on policy making and the success of the broadband data collection and mapping initiative. These KPIs will ensure that we keep a focus on the key areas of performance. Here are some KPIs to be considered for this project.

Key Performance Indicator	Description & Notes
Government Relevance	To be defined within the policy context by real value and impact measured in fact or as perceived by various State of Oregon, Tribal, regional, and local government agencies, communities, and end users.
Business Relevance	To be defined within the business context primarily for telecommunication providers who participate in the program by real value and impact measured in fact or as perceived by end users
Stakeholder Engagement	Complementing the Government Relevance and Stakeholder Engagement KPIs, gauge the quality of interaction and level of engagement with all the various stakeholder groups and participants on an ongoing basis
Data Accuracy and Improvement Processes	The use of a blended approach will allow the cross check of various data elements and comparison of source data quality. However all anticipated data sources have limitations and shortcomings that a set of quality metrics and process improvement measurements can and should address.
Reportability	The measurement of whether the project, its standard deliverables, and ad hoc use deliver the right level of information to the end user as needed.
Governance and Compliance	Each of the varied array of varied data sources each with their own rights and obligations defined by agency policies, license terms and conditions, contributors' proprietary concerns, and privacy concerns which should be codified in project policy, tracked in real time, re-mediated when necessary, and reported on periodically.
Performance to Budget and Schedule	Though grant and commercialization opportunities will affect long term opportunities and direction, the initial budget and schedule will be defined and should be readily measured against by standard agency accounting and management practices

Table 2 - Key Performance Indicators



Point Address Data Distribution in the State of Oregon

Source: GIS data sets provided by NAVTEQQ3 & the Oregon Geospatial Enterprise Office (OGEO), 3-November 2009

Prepared by BroadMap, LLC

- Oregon Geospatial Enterprise Office provided data points
- NAVTEQ 2009Q3 Point Addresses

0 50 100 200 300 400 Miles

N W E S